DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. P-12572
This Certificate consists of 5 pages

This is to certify that the

Ball Valve

with type designation(s)

NP, FB, FBL, FBM, FR, PQR-i

Manufactured by

BAC VALVES S.A.
FIGUERES GERONA, Spain

is found to comply with
Det Norske Veritas' Rules for Classification of Ships
Det Norske Veritas' Standards for Certification 2.9 No. 5-794.40

Application
The valves may be used in the following systems: Fresh and sea water, water ballast, bilge, sanitary, compressed air, steam, fuel oil, lubrication oil, cargo oil, N2 and chemicals (see certificate)

Temperature range:	-196 to 250°C (dep. on material and testing, see cert.)
Max. working press.:	40 bar
Sizes:	See certificate

Place and date
Høvik, 2007-09-26
for DET NORSKE VERITAS AS

Hanne Anita Hjerpetjønn
Head of Section

DET NORSKE VERITAS * 1864 *

Local Office
DNV Barcelona

This Certificate is valid until
2011-06-30

Per Jørgen Tviberg
Surveyor

Notice: 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

Split body, full bore free-floating or trunnion mounted ball. Flanged or threaded end connections.

Size ranges:

NP	DN250, 300, 350 and 400 (10", 12", 14" and 16")
FB	DN15, 20, 25, 40, 50, 80, 100, 150 and 200
FBL	DN15, 20, 25, 32, 40, 50, 65, 80, 100, 125, 150 and 200
FBM	DN15, 20, 25, 32, 40 and 50
FR	DN15, 20, 25, 32, 40 and 50
PQR-i	½", ¾", 1", 1½", 2", 3", 4", 6", 8", 10" and 12"

Flange rating: DIN 3357 PN 16, 25 40
ANSI Class 150 and 300

Material combinations:

Type	Body	Ball / Stem	Seals	Seat
NP (SS)	SS, ASTM A-351 CF8M		PTFE, Reinf. PTFE and Graphite	Mod. PTFE
FBM	SS, ASTM A-351 CF8M	SS, ASTM A-351 CF8M / 904L / UNS S31803 SS, DIN EN10213-4 WNo 1,4308 / AISI 304		
FB, FB-L (CS)	CS, DIN EN10213-2 WNo 1,0619 / ASTM A105 N			
FB, FB-L (SS)	SS, DIN EN10213-4 WNo 1,4408	SS WNo 1,4408 / AISI 316		
PQR-i	CS, ASTM A-216 WCC SS, ASTM A-351 CF8M	SS ASTM A-351 CF8M / AISI 316		

Application/Limitation

The valve types and sizes listed in the below table have been subjected for a cryogenic test at minimum design temperature and can be used in systems with design temperatures down to:

Type	Sizes	Minimum design temperature
FB	DN25, 50 and DN80	-110 °C
	DN100	-196 °C
PQR-i	½", ¾", 1", 1½", 2", 3", 4"	-196 °C

Valves not subjected to a cryogenic test can be used in systems with design temperatures down to -55 or -40 °C, depending on the body material

Maximum working temperatures for valves with the following body materials:

Part and material	Max temp. range
Carbon Steels *)	-40 to 250 °C
Stainless Steels	-196 to 250 °C

*) - Carbon steel used in body and bonnet shall be charpy tested when the thickness exceeds 6 mm, and the minimum working temperature is -10 °C or lower. Acceptance criteria according to DNV Cert. Notes 2.9 No. 5-794.40, 3.2.4.

In addition to the systems mentioned on the front-page, the valves may be used in the following chemicals:

- Ammonium Nitrate Solution, 93% or less [1)]
- Carbon disulphide
- Hydrogen peroxide Solutions of 60% but not over 70% [1)]
- Diethyl Ether [1)]
- Phosphorus, yellow or white [1)]
- Propylene oxide and mixtures of ethylene oxide/propylene oxide with ethylene content of not more than 30% by weight [1, 2)]
- Sulphuric acid [1)]
- Sulphur liquid

Notes:

[1)] - only valves of stainless steel may be used.
[2)] - FBM type valves may not be used in Propylene oxide.

Valve type FBL, FBM, FR and PQR-i 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, and as shut off or quick closing valve.

For pressure class I and II, only threaded end connections of conical or parallel with o-ring sealing may be used.

All valves larger than DN 50 for hydrocarbon service shall be fitted with an anti-static device that will ensure electrical conductivity between the ball and the valve body. For valves DN 50 and smaller, only electrical conductivity between ball and stem is required.

These valves can be used for bilge suction when fitted in connection with a non-return valve.

Valves used in the following systems shall be arranged for local manual operation even if these valves are remote controlled:

- Sea suction and discharge
- Bilge
- Fuel and lubrication oil tanks which are located above the double bottom tanks

For sea suction and discharge valves a portable hand pump is not accepted as equivalent to manual operation.

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

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",

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

Each valve is to be surveyed and certified by Det Norske Veritas when required by Det Norske Veritas Rules, or by the Purchaser. DNV product certificate is required for valves with DN> 100 mm and PN> 16 bar and for ship side/bottom valves regardless of pressure rating. For other valves manufacturer's certificate is accepted.

Each product/delivery is to be accompanied by the following documents:

- Work's Certificate for materials used in valve body indicating mechanical and chemical properties. Valve bodies with nominal diameter 100 mm or less will be accepted with test report.
- Instruction manual/specification sheet.

Cert. No.: P-12572
File No.: 794.50
Case No.: 262.1-003845-1

Type Approval documentation

Drawing nos.: 05-2889 Rev.A, FBC ANSI 150-300 dated 2005-01-18, FBC ANSI EB50 dated 2006-08-03, FBC ANSI EB110 dated 2006-08-03, FBC ANSI EB200 dated 2006-08-03, FBC DIN dated 2006-11-03, FBC DIN EB50 dated 2006-08-03, FBC DIN EB110 dated 2006-08-03, FBC DIN EB200 dated 2006-08-03, FBCT ANSI dated 2006-02-13, FBCT DIN dated 2006-02-13, FRC-EB110 dated 2007-06-15, PQR_i-EB50 dated 2007-06-12, 11-2011 dated 2003-01-16, 11-2013 dated 2004-03-10, 11-2014 dated 2005-03-15,

Leakage test nos.: 7.907, 7.908, 7.909 dated 25.06.98, 1 112742 dated 11.05.95, 7.910, 7.911, 7.912 dated 25.06.98, BCL 600705/1 dated 18.07.96, BRC/12/210/0074/96-A dated 13.07.96, 1-25593, 2-25593 and 3-25593 dated 05.03.05

Fire test nos.: BCL200663/1 dated 11.2.93, BCL400651/1 dated 20.06.94, BCL200339/1 dated 21.12.92, BCL1004227/9 dated 12.06.91, and BCL200390/1 dated 11.2.93

DNV's test report No.: 44001171 dated 2007-07-11
DNV's retention survey report dated 2007-08-10

Tests carried out

Fire test (for NP and FB), hydrostatic pressure test, seat leakage test and cryogenic testing (for FB and PQR-i)

Marking of product

For traceability to this type approval, each valve is at least to be marked with:

- Manufacturer's name or trade mark
- Type designation
- Size
- Pressure class

Certificate retention survey

For retention of the Type Approval, DNV 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.

END OF CERTIFICATE