MARINE DIVISION

17 bis Place des Reflets - La Défense 2
92400 Courbevoie - France

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Certificate number: 11543/B0 BV

File number : ACM 145/0207/018

Product code : 7333I

This certificate is not valid when presented without the full attached schedule composed of 7 sections

TYPE APPROVAL CERTIFICATE

as per Bureau Veritas Classification Rules

This certificate is issued to

BAC VALVES, S.A.

FIGUERES (Girona) - SPAIN

for the type of product

BALL VALVES FOR LIQUEFIED GASES

Type PQR-i

Regulations and standards :
- BUREAU VERITAS Rules for the Classification of Steel Ships
- NR 216 Materials Rules
- IGC Code

This certificate is issued to attest that BUREAU VERITAS did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements of the Regulations and standards mentioned above.

This certificate is valid until : 07 Nov 2012

At Paris la Défense, on : 07 Nov 2007

For BUREAU VERITAS,
By order of the Secretary

L.COURREGELONGUE

Approval office

Local office : BV MADRID
Surveyor : A. Banta Villamil

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION

Ball valves Type PQR-i Class 150-300
- Body design: one piece body end-entry reduced bore, free floating ball, double stuffing box self adjustable, anti-static device, flanged end connections
- Operator type: wrench/manual type
- Seat: soft seated (Fire-safe seat type tested)

1.1 Rating
- Size: 1/2" to 12"
- Class range: Class 150-300
- Max. pressure rating (bar):

Class 150	Class 300
20	50

- Service temperature (°C):

Stainless Steel version (SS version)	-50 / 200
Carbon Steel (CS version)	-30 / 200

1.2 Material specification

Parts	SS (Stainless Steel) version	CS (Carbon Steel) version
Body	ASTM A351 CF8M or ASTM A-182 F316	ASTM A216 WCC / ASTM 105 N
Ball	ASTM A351 CF8M / SS 316	ASTM A351 CF8M / SS 316
Stem	SS 316(1.4401)	SS 316(1.4401)
Seat	PTFE Mod.	PTFE Mod.
Fire safe seals	Graphite	Graphite
O-ring	Viton PTFE-coating	Viton PTFE-coating

When other choices of materials are used per manufacturer's instructions, the BV agreement will be obtained.

2. DOCUMENTS AND DRAWINGS

- Manufacturer's drawings N° 11-2803 Rev. A dated 06/06/2000 and N° 11-2804 dated 09/02/2000
- Installation and maintenance instructions N° I-19-701-F

3. TEST REPORTS

3.1 Fire tests according to BS 6755 Part 2 (1987) and API Spec. 6FA (1985) and API Std. 607 (1985) carried out and witnessed by a Classification Society's Surveyor:
- Fire-safe test report N° F-04-003/49 dated 28/03/2000. Test specimen PQR-i 1/2" Class 150
- Fire-safe test report N° F-04-003/50 dated 28/03/2000. Test specimen PQR-i 1" Class 150
- Fire-safe test report N° F-04-003/43 dated 14/03/2000. Test specimen PQR-i 2" Class 150
- Fire-safe test report N° F-04-003/45 dated 16/03/2000. Test specimen PQR-i 6" Class 150

3.2 Pressure tests ans seat lekage tests carried out and witnessed by Bureau Veritas:
- Hydraulic test in accordance with DIN 3230 Part 3, Test reports N° 8.185 to 8.194. Test specimen PQR-i valves 1/2" to 6" Class 150-300.

4. APPLICATION / LIMITATION

4.1 May be used in cargo handling systems of liquefied gas carrier (not below minus 55 °C). May be also used for conventional piping systems on board ships.
4.2 The valves of a fire safe design may be used for handling of Propylene Oxide or Ethylene Oxide/ Propylene Oxide mixtures.
4.3 The valves belong to class I according to the relevant requirements stated in Part D, Ch 9, Sec 5 of the Bureau Veritas Rules applicable to liquefied gas carriers.
4.4 When required in Part D, Ch 9, Sec 6 of the Bureau Veritas Rules applicable to liquefied gas tankers, Charpy V-notch impact test shall be carried out for castings. Castings in steel grades 316 and 316L at any temperature will be impact tested at -196 °C. A reduction may be granted for design temperature above -60 °C after examination by the Society.
4.5 The valves body, disc and sealing should be of a suitable type for use with cargoes intended to be carried.
4.6 The approval does not include any operating gear for remote control of the valves.
4.7 The valve is to be installed according to manufacturer's instructions and Society's rule requirements.

5. PRODUCTION SURVEY REQUIREMENTS

5.1 The products are to be manufactured, examined and tested by the manufacturer in accordance with the approved type described in this certificate and Bureau Veritas Rules and Regulations stated on the front page of this certificate. Arrangements shall be made for a Society's Surveyor to attend the tests and examinations at manufacturer's works or to perform the relevant audits when an alternative survey scheme, BV Mode I, has been arranged, in order to issue the Bureau Veritas certificate for the approved type to be fitted on board ships classed with Bureau Veritas.

5.2 The manufacturer has declared to Bureau Veritas that the products detailed in this certificate are manufactured at the production site stated on the front page of this certificate.

5.3 Bureau Veritas Certificates are required for materials of valve housings of class I ($DN \geq 50$). Materials of valve housings of class I ($DN < 50$) and other pressure boundary parts of class I are to be with work's certificates.

5.4 Each valve housing for class I is to be hydraulically pressure tested to 1.5 times the design pressure.

5.5 For a given batch, endurance tests may required to be repeated on one valve specimen.

6. MARKING OF PRODUCT

The valve is at least to be marked with:

- Manufacturer's name or logo
- Type designation
- Size
- Pressure class
- Society's brand as relevant

7. OTHERS

7.1 This approval is given on the understanding that the Society reserves the right to require check tests to be carried out on the units at any time and that the manufacturer will accept full responsibility for informing shipbuilders, shipowners or their sub-contractors of the proper methods of use and general maintenance of the approved products and of the conditions of this approval.

7.2 This certificate supersedes the Type Approval Certificate N° 11543/A0 BV issued on 26/06/2002 by the Society.

***** END OF CERTIFICATE *****

MARINE DIVISION

17 bis Place des Reflets - La Défense 2
92400 Courbevoie - France

Tel. 33 1 42 91 52 91
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Certificate number: 07548/C0 BV

File number : ACM 145/0207/016

Product code : 7333I

This certificate is not valid when presented without the full attached schedule composed of 7 sections

TYPE APPROVAL CERTIFICATE

as per Bureau Veritas Classification Rules

This certificate is issued to

BAC VALVES, S.A.

FIGUERES (Girona) - SPAIN

for the type of product

BALL VALVES FOR LIQUEFIED GASES

Type FB

Regulations and standards :
- BUREAU VERITAS Rules for the Classification of Steel Ships
- NR 216 Materials Rules
- IGC Code

This certificate is issued to attest that BUREAU VERITAS did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements of the Regulations and standards mentioned above.

This certificate is valid until : 26 Jun 2012

At Paris la Défense, on : 07 Nov 2007

For BUREAU VERITAS,
By order of the Secretary

L.COURREGELONGUE

Approval office

Local office : BV MADRID
Surveyor : A. Banta Villamil

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION

Ball valves Type FB Class 150-300 / FB PN10-16-25-40
- Body design: split body, flanged connections
- Operator type: wrench type and manual gear type
- Seat: soft seated (Fire safe seat type tested)

1.1 Rating
- Size: DN 15 to DN 200
- Class range: ANSI Class 150, ANSI Class 300, PN 10, PN 16, PN 25, PN 40
- Design pressure (bar): 10 to 50

Schedule range with maximum working pressures:

Class 150	Class 300	PN 10	PN 16	PN 25	PN 40
20	50	10	16	25	40

- Service temperature (°C):

Stainless Steel version (SS version)	-55 / 200
Carbon Steel version (CS version)	-30 / 200

1.2 Material specification

Parts	SS (Stainless Steel) version	CS (Carbon Steel) version
Body	SS ASTM A-351 CF8M	CS A-216 WCC
Ball	SS 316 - 1.4401 (DN 15 to DN 40) SS ASTM A-351 CF8M (DN 50 to DN 200)	SS 316 - 1.4401 (DN 15 to DN 40) SS ASTM A-351 CF8M (DN 50 to DN 200)
Seat	PTFE Mod.	PTFE Mod.
Fire safe top seal	Graphite	Graphite
O-ring	Viton + PTFE	Viton + PTFE

When other choices of materials are used per manufacturer's instructions, the BV agreement will be obtained.

2. DOCUMENTS AND DRAWINGS

Manufacturer's drawings	Ref. N°	Date
Ball Valve Type FB ANSI 150-300 (DN 15 to DN 40)	05-2022	12/02/1996
Ball Valve Type FB ANSI 150-300 (DN 50 to DN 200)	05-2023	12/02/1996
Ball Valve Type FB ANSI 150 (DN 15 to DN 40)	G38H001- A	16/11/1993
Ball Valve Type FB ANSI 150 (DN 50 to DN 200)	G38H002- A	11/03/1994
Ball Valve Type FB-FBL DIN PN 16/40 (DN 50 to DN 200)	G39H001- B	03/06/1994
Ball Valve Type FB-FBL DIN PN 40 (DN 50 to DN 200)	G39H002- C	03/06/1994

3. TEST REPORTS

3.1 Fire tests according to BS 6755 Part 2 (1987) and API Spec. 6FA (1985) and API Std. 607 (1985) carried out and witnessed by a Classification Society's Surveyor and found in order.
- Fire-safe test report N° F-04-003/13 dated 30/06/1992. Test specimen FB valve DN 50 Class 150
- Fire-safe test report N° F-04-003/19 dated 12/05/1994. Test specimen FB valve DN 15 Class 150
- Fire-safe test report N° F-04-003/20 dated 12/05/1994. Test specimen FB valve DN 25 Class 150
- Fire-safe test report N° F-04-003/21 dated 12/05/1994. Test specimen FB valve DN 100 Class 150

3.2 Pressure tests and cryogenic tests carried out and witnessed by a Classification Society's Surveyor:
- Hydraulic test in accordance with BS 6755. Part 1, Test reports N° 21.999; 22.000; 22.002; 23.271; 23.350; 23.938
- Hydraulic test in accordance with DIN 3230 Part 3, Test reports N° 7.858; 7.859; 23.270
- Cryogenic test at -110 °C, Test reports N° 25593 -1 (DN 25/PN 40); 2 (DN 50/PN 40); 3 (DN 80/PN 40)

4. APPLICATION / LIMITATION

4.1 May be used in cargo handling systems of liquefied gas carrier (not below minus 55 °C). May be also used for conventional piping systems on board ships.

4.2 The valves intended to be used for handling of Propylene Oxide or Ethylene Oxide/ Propylene Oxide mixtures shall be of a fire safe design.

4.3 The valves belong to class I according to the relevant requirements stated in Part D, Ch 9, Sec 5 of the Bureau Veritas Rules applicable to liquefied gas carriers.

4.4 When required in Part D, Ch 9, Sec 6 of the Bureau Veritas Rules applicable to liquefied gas tankers, Charpy V-notch impact test shall be carried out for castings. Castings in steel grades 316 and 316L at any temperature will be impact tested at -196 °C. A reduction may be granted for design temperature above -60 °C after examination by the Society.

4.5 The valves body, disc and sealing should be of a suitable type for use with cargoes intended to be carried.
4.6 The approval does not include any operating gear for remote control of the valves.
4.7 The valve is to be installed according to manufacturer's instructions and Society's rule requirements.

5. PRODUCTION SURVEY REQUIREMENTS

5.1 The products are to be manufactured, examined and tested by the manufacturer in accordance with the approved type described in this certificate and Bureau Veritas Rules and Regulations stated on the front page of this certificate. Arrangements shall be made for a Society's Surveyor to attend the tests and examinations at manufacturer's works or to perform the relevant audits when an alternative survey scheme, BV Mode I, has been arranged, in order to issue the Bureau Veritas certificate for the approved type to be fitted on board ships classed with Bureau Veritas.
5.2 The manufacturer has declared to Bureau Veritas that the products detailed in this certificate are manufactured at the production site stated on the front page of this certificate.
5.3 Bureau Veritas Certificates are required for materials of valve housings of class I ($DN \geq 50$). Materials of valve housings of class I ($DN < 50$) and other pressure boundary parts of class I are to be with Work's certificates.
5.4 Each valve housing for class I is to be hydraulically pressure tested to 1.5 times the design pressure.
5.5 For a given batch, endurance tests may required to be repeated on one valve specimen.

6. MARKING OF PRODUCT

The valve is at least to be marked with:
- Manufacturer's name or logo
- Type designation
- Size
- Pressure class
- Society's brand as relevant

7. OTHERS

7.1 This approval is given on the understanding that the Society reserves the right to require check tests to be carried out on the units at any time and that the manufacturer will accept full responsibility for informing shipbuilders, shipowners or their sub-contractors of the proper methods of use and general maintenance of the products and of the conditions of this approval.
7.2 This certificate supersedes the Type Approval Certificate N° 07548/B1 BV issued on 22/11/2006 by the Society.

***** END OF CERTIFICATE *****