



Marine & Offshore  
Division

Certificate number: 23751/B1 BV

File number: ACM 145/2552/01

Product code: 7352I

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

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## TYPE APPROVAL CERTIFICATE

*This certificate is issued to*

**Flow Safe, Inc.**

Orchard Park - UNITED STATES OF AMERICA

*for the type of product*

### PRESSURE RELIEF VALVES FOR LIQUEFIED GAS TANKS

Pilot Operated Safety Relief Valve Series F7000/F8000

Including F7040, F7050, F7140, F7150, F7240, F7250, F7340, F7350, F7540, F7550, F8040, F8050, F8140, F8150, F8240, F8250, F8340, F8350, F8540, F8550

#### Requirements:

- BUREAU VERITAS Rules for the Classification of Steel Ships
- IGC Code as amended by IMO Resolution MSC.370(93)

*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 mentioned above.*

**This certificate will expire on: 29 Apr 2021**

For BUREAU VERITAS,

At BV PORT EVERGLADES CENTRE, on 01 May 2017,

Flavio Rosas



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with BUREAU VERITAS. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of BUREAU VERITAS Marine & Offshore Division available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against BUREAU VERITAS for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

The electronic version is available at: <http://www.veristarnb.com/veristarnb/jsp/viewPublicPdfTypepec.jsp?id=q39xlyuimv>

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This certificate consists of 3 page(s)

## THE SCHEDULE OF APPROVAL

### 1. PRODUCT DESCRIPTION

**Pilot Operated Safety Relief Valve Series F7000/F8000**

**Including F7040, F7050, F7140, F7150, F7240, F7250, F7340, F7350, F7540, F7550, F8040, F8050, F8140, F8150, F8240, F8250, F8340, F8350, F8540, F8550**

#### 1.1 Valve type

- F7000 series: Full Bore
- F8000 series: Reduced Bore

#### 1.2 Pilot Valve Type

- F100: Modulating Flowing - Gas or Vapor / Liquid service
- F200: Modulating Flowing - Gas or Vapor
- F300: Modulating Flowing - Gas or Vapor / Liquid service
- F500: Modulating Flowing - Gas or Vapor / Liquid service

#### 1.3 Ratings

Materials	Continous Process Temp, °C		Min Pressure psig (barg)	Max Pressure psig (barg)
	Min	Max		
Buna-N	-163	135	15 (1)	6000 (413)
Viton®	-34	204	15 (1)	6000 (413)
Ethylene Propylene	-53	162	15 (1)	6000 (413)
Polyurethane	-51	107	15 (1)	6000 (413)
PTFE / Teflon®	-252	204	15 (1)	1000 (69)
PCTFE / Kel-F	-252	204	1000 (69)	4000 (275)
Vespel®	-252	260	4000 (275)	6000 (413)
PEEK	-17	273	4000 (275)	6000 (413)
Chemraz® 504	-163	230	15 (1)	500 (34.5)

Connections: 1" up to 12" inlet

Discharge Coefficients (K)	(K)	
	F7000	F8000
Gas / Vapor	0.824	0.878
Liquid*	0.634	0.830/0.730

\*F300-F500 modulating pilots only

#### 1.4 Materials

Parts	Main valve	Pilot valve
Body	SA-352 LCC / SA-351 CF8M	SA-479 316
Cap / Bonnet	SA-516-GR. 70 / SA-240 / SA-479 316	A479 316 / A351 CF8M
Retainer / Lower piston	316 SS	A564 630 / A479 316
Seat / Seals	Elastomer or Plastic (see above)	Elastomer (see above)

*When other choices of materials are used per manufacturer's recommendations, the BV agreement is to be obtained.*

### 2. DOCUMENTS AND DRAWINGS

- Manufacturer's product catalogue F7000/8000 series Pilot-operated safety relief valves N° F78K0914 dated June 2015
- Assembly and test procedures N° ATP-G-010 rev 4 dated 13/07/2015
- Inspection and test plan Flow Safe for F7350 specimen
- Inspection and test plan Flow Safe for F835R specimen dated 02/02/2011

*No departure from the above documents shall be made without the prior consent of the Society. The manufacturer must inform the Society of any modification or changes to these documents and drawings.*

### 3. TEST REPORTS

- National Board Capacity test N° 28000 03/2011 series F7100, F7200, F7300, F7400, F7500
- National Board Capacity test N° 28022 03/2011 series F8100, F8200, F8300, F8400, F8500
- National Board Capacity test N° 28156 10/2015 series F8100, F8300, F8500
- Air test report N° 4410A, 4411A, 4412A, 4413A, 4414A, 4415A, 4416A, 4417A, 4418A, 4419A, 5496A and 5497A dated 13/01/97
- Air test report N° 4730A, 5690A, 5491A, 5693A, 5694A dated 13/01/97
- Charpy test report by accu test labs N° 479885.1 rev A dated 19/11/2010
- Charpy test report by accu test labs N° 479884.1 rev A dated 19/11/2010
- Charpy test report by accu test labs N° 479883.1 rev A dated 19/11/2010

- Charpy test report by accu test labs N° 480523.1 rev A dated 19/11/2010
- Report of inspection BV Charpy test N° 20101332/6 dated 12/11/2010 and 19/11/2010
- Report of inspection BV Pressure test N° 20101332/IR1 dated 18/10/2010
- Cryogenic test at -163°C, low temp Buna-N 50 Durometer dated 26/10/2010
- Cryogenic test at -163°C, low temp Buna-N 70 Durometer dated 27/10/2010
- Cryogenic test at -163°C, low temp Chemraz® 504 dated 27/10/2010

#### **4. APPLICATION / LIMITATION**

- 4.1 The pressure relief valves may be used as cargo tank vent systems on board liquefied gas carriers classed with the Society.
- 4.2 The pressure relief valves belong to class I according to the relevant requirements stated in Part D, Ch 9, Sec 5 of BUREAU VERITAS Rules.
- 4.3 When required in Part D, Ch 9, Sec 6 of the BUREAU VERITAS Rules applicable to liquefied gas carriers, 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.
- 4.4 Prior to the use on cargo tanks of liquefied gas carriers, and depending on the nature of the cargoes, the pressure relief valves shall be required by the Society to be additionally tested for their capacity in accordance with BUREAU VERITAS Rules and IGC Code.
- 4.5 The materials for valve housing, internal and sealing are to be of a suitable type at the temperature and pressure for use with cargoes intended to be carried.
- 4.6 The pressure relief valve is to be set, sealed and installed according to manufacturer's instructions and BUREAU VERITAS Rules requirements.

#### **5. PRODUCTION SURVEY REQUIREMENTS**

- 5.1 The products are to be supplied by **Flow Safe, Inc.** in compliance with the type and the requirements described in this certificate.
- 5.2 This type of product is within the category IBV of BUREAU VERITAS Rule Note NR320.
- 5.3 BV product certificate is required.
- 5.4 The valve material is to be subjected to Charpy impact test in accordance with BUREAU VERITAS Rules and IGC Code.
- 5.5 BUREAU VERITAS Certificates are required for materials of valve housings of Class I (DN≥50). Materials of valve housings of Class I (DN<50) and for other parts of Class I are to be with Work's certificates.
- 5.6 Each valve housing for class I is to be hydraulically pressure tested to 1.5 times the design pressure and the set pressure of relief valves is to be tested at ambient temperature.

For information, **Flow Safe, Inc.** has declared to Bureau Veritas the following production site:  
**Flow Safe, Inc.:3865 Taylor Road, 14127 Orchard Park, USA**

#### **6. MARKING OF PRODUCT**

The product shall be marked with at least:

- Manufacturer's name or logo
- Type designation
- Setting pressure
- Society's brand as relevant

#### **7. OTHERS**

It is **Flow Safe, Inc.**'s responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

*This certificate supersedes the Type Approval Certificate No. 23751/B0 BV issued by the Society.*

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