



CERTIFICATE NUMBER
EFFECTIVE DATE
EXPIRY DATE
ABS TECHNICAL OFFICE

20-2030935-1-PDA
28-Mar-2022
27-Sep-2025
Houston ESD - Piping

CERTIFICATE OF Product Design Assessment

This is to certify that a representative of this Bureau did, at the request of

FLOW SAFE, INC.

located at

S-3865 TAYLOR ROAD, ORCHARD PARK, NY, United States, 14127

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the pages attached to this certificate.

Product: Valve, In-Line Pressure Relief Valve

Model: F84/F85/F88/F84L

Endorsements:

Tier: 2 - PDA Issued

This Product Design Assessment (PDA) Certificate remains valid until 27/Sep/2025 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

American Bureau Of Shipping

Yongjin Lee

Yongjin Lee, Engineer/Consultant

NOTE: This certificate evidences compliance with one or more of the Rules, Guides, standards or other criteria of ABS or a statutory, industrial or manufacturer's standards. It is issued solely for the use of ABS, its committees, its clients or other authorized entities. Any significant changes to the aforementioned product without approval from ABS will result in this certificate becoming null and void. This certificate is governed by ABS Rules 1-1-A3/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2010)

FLOW SAFE

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Product: Valve, In-Line Pressure Relief Valve

Model: F84/F85/F88/F84L

Endorsements:

Intended Service:

Marine and Offshore Applications - Pressure Safety Relief valve for gas and liquid service, including CNG and LNG applications.

Description:

These are spring operated pressure relief valves designed with combination of disc and seat used for relieving pressure service on piping systems.

F84/F85/F88 models are certified for Gas service.

F84L/F88 models are certified for Liquid service.

Rating:

F84/F85/F88 – Gas/Vapor service

F84L/F88 - Liquid service

F84L and F88 sizes DN 13 to 50 mm (½" to 2")

F84/F85 sizes DN 6 to 50 mm (¼" to 2")

Valve Body- SA351 Grade CF8M (F85//F84L) and SA-479 Grade 316/316L (only for few F84L, and F85 models)

Service temperatures -29°C to 274°C (-84°F to 525°F)

The F84 and F88 plastic-seated valves are rated to -278°F (-172°C) for PTFE, PCTFE, and PI / PAI materials. See Comment Note 16)

Service Restriction:

1) Unit Certification is not required for this product. If the manufacturer or purchaser request an ABS Certificate for compliance with a specification or standard, the specification or standard, including inspection standards & tolerances, must be clearly defined.

2) If used on LNG vessel, then (i) As per MVR 5C-8-5/3.2.1 (b), Unit certification is required and the valves are to be tested at the plant of manufacturer in the presence of the ABS surveyor. (ii) As per MVR 5C-8-6/1.3 and 1.4.1, Charpy V-Notch toughness test data is to be submitted by the manufacturer to the ABS surveyor.

3) Use of the valves in marine applications is subjected to the limitations on threaded connections as indicated in MVR 4-6-2/5.5.

4) Threaded connections may be used for normal fluid service in process piping systems designed per ASME B31.3 code provided they comply with the provisions in Para 314 of the B 31.3 code, in particular, (i) Threaded joints should be avoided in any service where crevice corrosion, severe erosion, or cyclic loading may occur. (ii) When threaded joints are intended to be seal welded, thread sealing compound shall not be used.

5) As per the Parker Material Report, Aflas VP101-80 elastomer valve seat recommended temperature range is from 25°F to 450°F and for Aflas VP 102-80 elastomer valve seat is 15°F to 450°F. The Aflas valve seat is not recommended for aromatic fuels, ketones, carbon tetrachloride, ethers, non-polar solvents, acetic acid and organic acetates per the material report.

6) As per API 520, Part 1, Annex D, Inlet flange rating and facing should be chosen to meet the requirements of the upstream protected equipment specification. The outlet flange rating and facing should be chosen to meet the requirements of the downstream discharge system.

7) As per API 520, Part 1, Annex D, Resilient, soft seated designs provide tighter sealing and can reduce the amount of leakage through the pressure relief valve. Operating temperature, pressure, & fluid corrosivity may limit the applicability of soft goods. Resilient seat materials are to be suitable for the application.

8) Where added corrosion resistance is needed to meet the severity of the process fluid, applicability of the valves in corrosive systems is to be verified with the manufacturer.

9) As per API 520, Part 1, Annex D and 2020 ABS Rules for Facilities on Offshore installations Chapter 3/Section 3/3.3, for processes containing Hydrogen Sulphide, special attention is to be given to spring materials since they are

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subject to stress corrosion cracking.

10) Flanged connections to be per ASME B16.5, with associated temperature/pressure ratings.

11) The safety relief valve is to be set, sealed and installed in accordance with the manufacturer's instructions.

Comments:

1) The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.

2) If used on CNG vessel, then as per ABS CNG Guide Chapter 6/Section 2/6 and MVR 2-3-13/3 and 23, Charpy impact tests are not required for Grade 6L (A351).

3) Depending on the valve seat material used, suitability of the valve in a particular system is to be verified on case-by-case basis.

4) Seat leakage per API 527 (soft seated valves)

5) Verification of set pressure at room temperature via functional test

6) Capacity certification per National Board cert no.'s 28044, 28055, 28066, 28077, 28088, 28101, 28112, 28123, 28134, 28145 & 28167

7) Quality Management System in accordance with ISO 9001:2015

8) Valves materials, design, and testing in accordance with ASME B&PV Code, Section VIII, Div. 1, "Rules for Construction of Pressure Vessels"

9) NPT threads in accordance with ASME B1.20.1

10) Female MS threads per MS33649/AS5202 "Bosses, Fluid Connection, Internal Straight Thread"

11) SAE threads per SAE J1926, "Ports and Stud Ends with ISO725 Threads and O-Ring Sealing"

12) If used on a LNG vessel, then requirements of MVR 5C-8-5/2.1.7 are applicable

13) Use of the valves in marine applications is subjected to the requirements of MVR 5C-1-7/3.3.1 (f), MVR 5C-8-5/2.1.6 & 2.1.7, MVR 5C-8-8/2 and should be suitable for the prescribed service.

14) Use of the valves in Offshore applications is subjected to the requirements of MOU 4-2-2/11; MOU 4-2-6/5.5.2; ABS Guide for CNG in bulk Chapter 6/Section 1/3; Chapter 9/Section 2 and Chapter 6/Section 2/4.4 & 4.5 and 2020 Rules for Building & Classing Facilities on Offshore Installations Chapter 3/ Section 2/ 7.17, Chapter 3/Section 3/ 15.

15) The application of the valves in various systems should be suitable for the prescribed service.

16) Testing performed on both plastic-seated and elastomer-seated F84 or F88 valves at temperatures less than -278°F demonstrated that these valves will function reliably in cryogenic conditions.

Notes/Drawing/Documentation:

Drawing No. BV Mode I Certificate, Certificate number SMS.WI_74228_C.0, Revision: -, Pages: -

Drawing No. Drawing No F80 Series_Safety Valves, Design Analysis of F80_F84 & F85, Revision: 3, Pages: -

Drawing No. Drawing No NBCC, National Board Capacity Certifications 28044, 28055, 28066, 28077, 28101, 28112, 28123, 28134, 28145, 28167 Revision: -, Pages: -

Drawing No. Drawing No PED Module B Certificate, EU Type Examination Certificate-Module B-Cert-F84-F85 exp. 08.02.2027, Revision: -, Pages: -

Drawing No. Drawing No PED Module B-Certificate, EU Type Examination Certificate HPiVS-P1012-035-I-02, Revision: -, Pages: 1

Drawing No. Drawing No PED Module D Certificate, Type Examination Certificate expires 11.01.2020, Revision: -, Pages: -

Drawing No. Drawing No. F84L & F88 Series, Design Analysis F84L & F88 Series_Liquid Relief Valves, Revision: 3, Pages: -

Drawing No. BV Cert exp 04, BV Certificate, Revision: -, Pages: 1

Drawing No. Cert-ISO9001, ISO9001 Certificate, Revision: -, Pages: 1

Drawing No. DesignAnalysis-F80-Rev2, Design Analysis-F80, Revision: 2, Pages: 1

Drawing No. DesignAnalysis-F84L+F88-Rev2, Design Analysis-F84L+F88, Revision: 2, Pages: 1

Drawing No. Drawings-F84L, Drawings-F84L, Revision: C, Pages: 1

Drawing No. Drawings-F85-F84, Drawings-F85-F84, Revision: D, Pages: 1

Drawing No. Drawings-F88, Drawings-F88, Revision: -, Pages: 1

Drawing No. PED-ModB-cert-F84-F85, PED-ModB-cert-F84-F85, Revision: -, Pages: 1

Drawing No. PED-ModB-cert-F84L-F88, PED-ModB-cert-F84L-F88, Revision: -, Pages: 1

Drawing No. PED-ModD-cert, PED-ModD-cert, Revision: -, Pages: 1

Drawing No. National Board capacity certifications (28044, 28055, 28066, 28077, 28088, 28101, 28112, 28123,

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28134, 28145, 28167)

Drawing No. Flow Safe NB-18 Cert Numbers

Drawing No. Flow Safe Soft Good ASTM specifications

Drawing No. Sample MTR with Charpy

Drawing No. Aflas Compound Data Sheets Material Reports (VP101 and VP102)

Drawing No. Flow safe letter conforming to ASME and API standards

Drawing No. FSI Job No. 050134-7-1, F88-4 Cryogenic Nitrogen Test, 15 December 2021

Terms of Validity:

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STANDARDS

ABS Rules:

Rules for Conditions of Classification, Part 1 - 2020 Rules for Building and Classing Marine Vessels 1-1-4/7.7, 1-1-A3, 1-1-A4, which covers the following:

2022 Marine Vessel Rules: 4-6-2/9.9; 4-6-2/5.11 and 5.13; 5C-8-5/3.1

Rules for Conditions of Classification, Part 1 - 2020 Rules for Building and Classing Mobile Offshore Units 1-1-4/9.7, 1-1-A2, 1-1-A3, which covers the following:

2022 Mobile Offshore Unit Rules: 4-2-2/9

2022 ABS Rules for Facilities on Offshore Installations 1-1-4/9.7, 1-1-A2, 1-1-A3, Chapter 3/Section 3/ 3.3; Chapter 3/ Section 2/ 7.17

2021 Guide for Classification of Drilling System Section 2/1.5;

2020 ABS Guide for vessels intended to carry compressed natural gases in bulk: Chapter 6 /Section 1 /3; Chapter 6 /Section 2 /1.6 & 1.7; Chapter 9 /Section 2/ 3

National:

ASME Boiler and Pressure Vessel Code, Section VIII, Div. 1 2021 Edition

Directive 2014/68/EU – 15 May 2014

API 527 – Fifth Edition, July 2020

API 520 Part 1 – 10th Edition October 2020

ASME B31.3 - Process Piping - 2020

ASME B16.5 - 2017

International:

NA

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Government:

NA

EUMED:

NA

OTHERS:

NA