



CERTIFICATE NUMBER
18-HS1777005-PDA

DATE
08 Oct 2018

ABS TECHNICAL OFFICE
Houston ESD - Offshore
Equipment

CERTIFICATE OF Design Assessment

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

FLOW MANAGEMENT DEVICES LLC

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: **Meter, Flowmeter**

Model: **FMD-001, -003, -007, -015, -025, -035, -045, -060, -090, -130, -200, & -245**

This Product Design Assessment (PDA) Certificate 18-HS1777005-PDA, dated 08/Oct/2018 remains valid until 07/Oct/2023 or until the Rules or specifications used in the assessment are revised (whichever occurs first).

This PDA is intended for a product to be installed on an ABS classed vessel, MODU or facility which is in existence or under contract for construction on the date of the ABS Rules or specifications used to evaluate the Product.

Use of the Product on an ABS classed vessel, MODU or facility which is contracted after the validity date of the ABS Rules and specifications used to evaluate the Product, will require re-evaluation of the PDA.

Use of the Product for non ABS classed vessels, MODUs or facilities is to be to an agreement between the manufacturer and intended client.

AMERICAN BUREAU OF SHIPPING

Tim Kimble
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 the terms and conditions as contained in ABS Rules 1-1-A/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2016).

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Tier: 2 - PDA Issued

Product: Meter, Flowmeter**Model: FMD-001, -003, -007, -015, -025, -035, -045, -060, -090, -130, -200, & -245****Intended Service:**

Marine and Offshore Application: A flow rate measuring instrument for proving liquid flow meters in process piping systems on Offshore Oil Platforms and Floating Production Storage and Offloading Vessels.

Description:

The FMD-XXX Prover (small volume Unidirectional Captive Displacement Prover) is a flow rate measuring instrument for proving liquid flow meters in piping systems. The flow rate is calculated based on measured fluid traveling distance in a controlled volume device over a period of time.

The prover consists of a cylindrical flow tube (with a known verified diameter), control system PIM (Prover interface Module housed in explosion-proof enclosure) with software, drive train including electric motor for moving the piston and shuttle assembly in the tube.

The system consists of an electrical panel which houses up to two I.S. barriers and power supply. The PIM is powered by the end user in the field.

Rating:

Media to be measured: liquid fluids

Measurement Range: 23 m³/hr to 5,565 m²/hr (100 GPM to 24,500 GPM)

Pressure Rating Range: 19.6 bar to 255.3 bar (285 psi to 3705 psi)

Power: Prover Interface Module (PIM): 11 to 26 VDC

Motor: 24 VDC, 110-120 VAC 1 phase, 220/230/240 VAC 1 phase, 190/208-230/240 VAC 3 phase,

380/400/415 VAC 3phase, 440/460/480 VAC 3 phase

Hydraulic motor drive train option is available

Ambient Temperature: -20°C to 54°C (-4°F to +129°F)

Hazardous Areas: USA/Canada (CSA): Class I, Div.1, Group D; Class I, Div. 2 Group D;

IECEX (Intertek): Ex d mb [ia] IIB T3 Gb

* See attached "pdf" for Technical Specification Details.

** Note: 190 VAC and 380VAC are 50 Hz, all others are 60 Hz.

Service Restriction:

- 1) Unit Certification is required for this product if it is installed in process piping systems on offshore installations Classed with notation FPS or FPSO or Hydrocarbon Processing/production.
- 2) Unit Certification is not required for this product if it is installed on offshore installations without the relevant class notation. If the manufacturer or purchaser request an ABS Certificate for compliance with a specification or standard, the specification or standard, including inspection standards and tolerances, must be clearly defined.
- 3) Where a host flow computer is used in association with the Prover, it must be either certified for the intended hazardous area classification or used in non-classified location.

Comments:

- 1) Materials used for load bearing and/or pressure containing components are to be traceable and the certified material test reports showing that they meet or exceed the required specifications are to be made available upon request.
- 2) The Prover Installation and calibration are to be in accordance with the manufacturer's procedures specified in the manuals.
- 3) The internal software is outside the scope of this PDA certification.
- 4) Hydraulic motor is outside the scope of this PDA certification.
- 5) The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.

Notes/Drawing/Documentation:

Drawing No. 000-113786-DOC, Outline GEN 4, Revision: A, Date: 1 June 2018

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Drawing No. 000-113846-DOC, Overview FMD 015-200, Revision A, date 11 July 2018 Pages: 2
Document No.: 000-112680-DOC, Compact Prover G4 - Operating and Maintenance Manual, Rev. C, date: 5 September 2018, Pages: 36
Document No. 000-112821-DOC, 4th Generation Prover Configuration, Revision: C, Pages: 1
Document No. 000-101491-DOC, Flow Prover Pressure Vessel Design Calculations, Revision: D, Date 29 March 2017, Pages: 51
Drawing No. 000-111416-DOC, PROVER POWER 2 PH 220V, Revision: B, Pages: 1
Drawing No. 000-111417-DOC, PROVER POWER 3 PH 380 460V, Revision: D, Pages: 1
Drawing No. 000-111414-DOC, PROVER POWER DC, Revision: C, Pages: 1
Drawing No. 000-111415-DOC, PROVER SYSTEM WIRING POWER 1PH 115V, Revision: B, Pages: 1
Drawing No. 000-111418-DOC, SYSTEM WIRING SENSORS STD, Revision: C Pages: 1
Drawing No. 000-111413-DOC, SYSTEM WIRING CUSTOMER CONNECTIONS, Revision: D, Pages: 1
Drawing No. 000-111432-DOC, SYSTEM WIRING POWER DC-HYDRAULIC, Revision: A, Pages: 1
Drawing No. 000-113944-DOC, PROVER POWER 3 PH 380 460V, Revision: A
Document No: CSA certificate: 2137671, Small Volume Prover for Hazardous Area Locations, Revision: -, Issued Date 11 June 2018, Pages: 5
Document No. IECEx ETL 14.0037X, Unidirectional Captive Displacement Prover-Series, Issued by Intertek, 15 February 2016, Pages: 5
Document: EC Declaration for Unidirectional Captive Displacement Prover-Series, Issued by Flow Management Devices, LLC, date: 6 June 2013, Pages: 3

Terms of Validity:

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STANDARDS**ABS Rules:**

The Rules for Conditions of Classification, Part 1 2018 Steel Vessels Rules 1-1-4/7.7, 1-1-A3, 1-1-A4, which covers the following:

2018 Steel Vessel Rules: 4-8-3/1.7, 4-8-3/1.11, 4-8-4/27.5.1

2018 Offshore Support Vessels: 4-8-3/1.7, 4-8-3/1.11, 4-8-4/29.5.1

2018 Marine Vessel Rules: 4-8-3/1.7, 4-8-3/1.11, 4-8-4/27.5.1

The Rules for Conditions of Classification, 2018 - Offshore Units and Structures 1-1-4/9.7, 1-1-A2, 1-1-A3, which covers the following:

2018 Mobile Offshore Drilling Unit Rules: 4-3-3/1.5, 4-3-3/9.3

2018 Mobile Offshore Units Rules: 4-3-3/1.5, 4-3-3/9.3

2018 Facilities on Offshore Installations: 3-3/9.1, 3-3/11.1, 3-6/15.3, 4-3/1

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National:

ASME B31.3, ASME SECTION VIII DIV. 1

International:

IEC 60079-25: Edition: 2.0 : 2010-02 Explosive atmospheres – Part 25: Intrinsically safe electrical systems

Government:

CAN/CSA-C22.2 No. 0-10 (R2015) - General Requirements - Canadian Electrical Code, Part II

CAN/CSA-C22.2 No. 94-M91 (R2011) - Special Purpose Enclosures

CAN/CSA-C22.2 No. 213-M1987 (R2013) - Non-incendive electrical equipment for use in class I, division 2 hazardous locations - First Edition

EUMED:

NA

OTHERS:

NA