CERTIFICATE OF CONFORMITY

1. **HAZARDOUS LOCATION ELECTRICAL EQUIPMENT PER CANADIAN REQUIREMENTS**

2. **Certificate No:** **FM17CA0173X**

3. **Equipment:**
   (Type Reference and Name) **IN-FLOW Series, Mass Flow Meter/Controller**

4. **Name of Listing Company:** **Bronkhorst High-Tech B.V.**

5. **Address of Listing Company:** **Nijverheidsstraat 1A**
   NL-7261 AK Ruurlo, Gelderland
   the Netherlands

6. The examination and test results are recorded in confidential report number:

   3064018 dated 13th December 2018

7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:

   CAN/CSA-C22.2 No. 213-17:2017, CAN/CSA-C22.2 No. 60529:2016, CAN/CSA-C22.2 No. 61010-1-12:2012

8. If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.

9. This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.

10. **Equipment Ratings:**

    In type of protection suitable equipment, the mass flow meter/controller (IN-FLOW Series) equipment is certified to the following classification(s).

    Suitable equipment for use in Class I, Division 2, Groups A, B, C and D, hazardous locations; and ordinary locations with an ambient temperature rating of 0 ºC to +50 ºC, indoor and outdoor (IP65) environments.

Certificate issued by:

J. E. Marquedant
VP, Manager, Electrical Systems

13 December 2018
Date

To verify the availability of the Approved product, please refer to www.approvalguide.com

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11. The marking of the equipment shall include:

In type of protection suitable equipment, the mass flow meter/controller (IN-FLOW Series) equipment is labelled with the following marking(s).

Cl I, Div 2, Gp A, B, C, D T4
Ta = 0 ºC to +50 ºC
IP65
WARNING – DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAY BE PRESENT
AVERTISSEMENT – NE PAS OUVRIR SI UNE ATMOSPHÈRE EXPLOSIVE PEUT ÊTRE PRÉSENTE

12. **Description of Equipment:**

General – The IN-FLOW Series mass flow meter/controller (MFM) is designed for industrial and hazardous (classified) location applications. The mass flow meters and controllers of the IN-FLOW series convert a gas flow into an electrical signal using a thermal mass flow sensor. In addition, the instruments are equipped with an electromechanical valve that allows them to control the flow. The valve can be either be integrally or separately mounted, as an option.

In-line mass flow meter/controller for gases is intended for permanent installation. The unit is supplied by a 15-24 (±10 %) VDC low power energy source and has a data output connector with several data output formats to read out and/or control the flow rate. It has a proportional electromagnetic control valve to block and/or control the fluid stream, this is operated via an internal PID controller. Mechanical dimensions can vary, depending on the flow range and pipe diameter of the applicable circuit. However, the electrical part is the same for all models. Optionally a number of additional fieldbus communication protocols are available.

Construction – All industrial valves listed can be used in combination with a mass flow meter/controller within the scope of the IN-FLOW series. Valves can be offered separately only in combination with a mass flow meter/controller and if the customer requires, the valve can be electrically connected to the ordered mass flow meter/controller. The ingress protection classification for all IN-FLOW series instruments is IP65. The sealing positions of the instrument are representative for the whole IN-FLOW series.

For more specifics concerning construction and description details of the mass flow meter/controller, reference the manufacturer's sales literature and specification sheets.

Ratings – The equipment is certified to the following ratings.

The ambient operating temperature range is 0 ºC to +50 ºC (IN-FLOW Series) in type of protection suitable equipment, when properly mounted and installed.

The equipment is designated for installation transient overvoltages up to levels of overvoltage category I and environmentally classified as pollution degree 2 inside the enclosure.

In type of protection suitable equipment, the mass flow meter/controller (IN-FLOW Series) equipment is connected to limited output Class 2 circuits and power source, or similar supply regarded as limited energy circuit, with the following nominal external supply values.

Supply Terminals, IN-FLOW are:
*V*max = 13.5-26.4 VDC, *I*max (*I*i) = 350 mA, *P*i = 8.4 W maximum
*V*nom = 24 VDC

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Model Codes – The equipment is identified with the following model code structure.

In type of protection suitable equipment, the mass flow meter/controller (IN-FLOW Series) equipment is designated with the following model code(s).

IN-FLOW F-abc-d-efg-hi-j, Mass Flow Meter/Controller.

a = Base: 0, 1 or 2
b = Pressure Rating: 0, 1, 2, 3 or 4
c = Ranges: 0CI, 1AI, 1BI/1CI, 2AI, 3AI, 6AI/7AI, 6BI/7BI, 6CI/7CI, 6EI, 6FI or 6GI (for PN64/PN100 Flow Meters/Controllers; 0MI, 1MI, 2MI or 3MI (for PN200/PN400 Flow Meters); or 0MI, 1MI or 2MI (for PN400 flow Controllers)
d = Nominal Range: Any 3 digit alphanumeric code referring to factory selected range indication
e = Communication (I/O): A, B, D, E, M, N, P, Q, R or S
f = Analog Output: A, B, F or G
g = Supply Voltage: D
h = Connections (In/Out): 1, 2, 3, 4, 5, 6, 8 or 9
i = Mounting Between Flanges: 01, 02, 03, 06, 07, 13, 15, 26, 27, 28 or 99
j = Internal Seals: E, K or V

13. **Specific Conditions of Use:**

In type of protection suitable equipment, the mass flow meter/controller (IN-FLOW Series) equipment is designated with the following specific conditions of use.

1. For Division 2 Approvals, the mass flow meter/controller is suitable for non-flammable process connections to Class I, Division 2, Groups A, B, C and D, hazardous (classified) locations.
2. Maximum permissible working pressure is 700 bar (10,150 psi).
3. The installer shall provide transient over-voltage protection external to the equipment such that the voltage at the supply terminal of the equipment does not exceed 140 % of the voltage rating of the equipment.

14. **Test and Assessment Procedure and Conditions:**

This Certificate has been issued in accordance with FM Approvals Canadian Certification Scheme.

15. **Schedule Drawings:**

A copy of the technical documentation has been kept by FM Approvals.

16. **Certificate History:**

Details of the supplements to this certificate are described below:

Date	Description
13th December 2018	Original Issue.