CERTIFICATE OF CONFORMITY

1. **HAZARDOUS LOCATION ELECTRICAL EQUIPMENT PER CANADIAN REQUIREMENTS**
2. **Certificate No:** **FM19CA0100X**
3. **Equipment:** **MicroFlow, MicroFlow-i Measuring Sensors**
   (Type Reference and Name)
4. **Name of Listing Company:** **Pulsar Process Measurement Ltd.**
5. **Address of Listing Company:** **Cardinal Building, Enigma Commercial Centre**
   Sandy's Road
   Malvern, Worcestershire
   WR14 1JJ
   United Kingdom
6. The examination and test results are recorded in confidential report number:

   PR452863 dated 12th December 2019
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. 60079-0:2011, CAN/CSA-C22.2 No. 60079-11:2014,
   CAN/CSA-C22.2 No. 60079-18:2016, CAN/CSA-C22.2 No. 61010-1:2012,
   CAN/CSA-C22.2 No. 25:1966(R2014), CAN/CSA-C22.2 No. 94.1:2015, CAN/CSA-C22.2 No. 94.2:2015,
   CSA-C22.2 No. 60529:R2010,
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:

    Intrinsically safe model (k = 1)
    Intrinsically safe for Class I, II, III, Division 1, Groups A, B, C, D, E, F, G; Ex ia for Class I, Zone 0, Group IIC;

Certificate issued by:

J.E. Marquedant
VP, Manager - Electrical Systems

12 December 2019
Date

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

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
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T4; -20°C ≤ Ta ≤ +60°C; Ex ia for Class 1, Zone 20, Group IIIC; T135°C; -20°C ≤ Ta ≤ +60°C;
IP68.

Special Protection Model (k = 0)
IPA for Class I, II, III, Division 1, Groups A, B, C, D, E, F, G; Ex mb for Zone 1, Group IIC; T4; -20°C ≤ Ta ≤ +60°C; Ex mb for Zone 21, Group IIIC; T135°C; -20°C ≤ Ta ≤ +60°C;
IP68.

11. The marking of the equipment shall include:

Intrinsically safe model (k = 1)
Intrinsically safe for:
Class I, Div 1, Group A, B, C & D
Class II, Div 1, Group E, F & G
Class III
T4; Ta = 20°C ≤ Ta ≤ +60°C

Zone 0, Ex ia IIC T4 Ga
Zone 20, Ex ia IIIC T135°C Da
Ta = 20°C ≤ Ta ≤ +60°C
Drawing D-804-1329-A
IP68.

Special Protection Model (k = 0)
Suitable for:
Class I, Div 1, Group A, B, C & D
Class II, Div 1, Group E, F & G
Class III
T4; Ta = 20°C ≤ Ta ≤ +60°C

Zone 1, Ex mb IIC T4 Gb
Zone 21, Ex mb IIIC T135°C Db
Ta = 20°C ≤ Ta ≤ +60°C
Drawing D-804-1329-A
IP68.

12. **Description of Equipment:**

The MicroFlow (k = 0) is a non-invasive flow-measuring device utilizing radar technology. The sensor is housed in a non-metallic enclosure with an integral cable which connects to control equipment. The equipment is powered from a 24 VDC supply. The output of the sensor is sent via an RS485 data link to external control equipment. The enclosure incorporates a threaded cap which allows the equipment to be mounted on a suitable bracket.
The equipment comprises a non-metallic enclosure, in which are located three PCBs and the radar module. It uses a RS485 digital signaling to communicate with control equipment . The interior of the enclosure is encapsulated.

The MicroFlow (k = 1) is a DC-powered process flow measurement sensor utilizing radar technology.
The equipment comprises a non-metallic enclosure, in which are located three PCBs and the radar module. It

has an integral cable which connects to the power source and control equipment. It uses a 4-20mA loop and HART digital signaling to communicate with the control equipment. The interior of the enclosure is encapsulated.

Ratings:
MicroFlow-i: Ui = 28V, Ii = 162 mA, Pi = 1.03W, Ci = 0, Li = 0.
MicroFlow: Voltage = 28V maximum, current = 170 mA maximum.

MicroFLOW DRF-abcdefghijklmn. Measuring Sensor.

a = F = MicroFLOW.
b = Type;
I = Intelligent (2-wire);
S = Standard (3-wire);
T = Technolog Variant.
cde = Cable length;
010 = 10m;
020 = 20m;
030 = 30m;
C10 = 10m c/w Point Connector;
Other lengths can be entered in the range of 010 to 999 meters.
f = Options;
0 = standard.
g = Reserved for future use;
0 = standard.
h = Reserved for future use;
0 = standard.
i = Reserved for future use;
0 = standard.
j = Frequency band (Regulations);
0 = standard;
J = JAP - Japan;
k = Approval classification;
X = No hazardous approvals;
0 = Ex mb;
1 = Ex ia;
l = Output communications;
H = HART (2-wire);
S = Standard (3-wire RS485 – Modbus);
P = Profibus V1;
T = Technolog Protocol.
m = Thread type;
B = BSP (ATEX/IECEx);
N = NPT FM (FM).
n = Customer ID (Overlay/Labelling);
P = Default;
H = IMHI V_{rad};
T = Technolog.

13. **Specific Conditions of Use:**

SCHEDULE

Canadian Certificate Of Conformity No: FM19CA0100X

Intrinsically Safe model (k = 1)

1. The enclosure of the transducer is considered to constitute an electrostatic discharge hazard. Clean only with a damp cloth.
2. When installed in Zone 20, Zone 21, or Zone 22 locations, the transducer shall be routinely inspected to avoid the buildup of a dust layer.

Special Protection model (k = 0)

1. The enclosure of the transducer is considered to constitute an electrostatic discharge hazard. Clean only with a damp cloth.
2. The transducer shall be connected to a source incorporating a 100 mA fuse which provides a minimum interrupt capacity of at least 1500A.
3. When installed in Zone 21 or Zone 22 locations, the transducer shall be routinely inspected to avoid the buildup of a dust layer.
4. The transducer is not suitable for use in the presence of Ketones, Aliphatic Hydrocarbons, Alcohols, Esters and Acids.

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
12th December 2019	Original Issue.