CERTIFICATE OF CONFORMITY

1. **HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS**
2. **Certificate No:** **FM17US0372X**
3. **Equipment:** **Gammapilot M Type FMG60 Level Detector**
   (Type Reference and Name) **Level Transmitter**
4. **Name of Listing Company:** **Endress+Hauser SE+Co. KG**
5. **Address of Listing Company:** **Hauptstrasse 1**
   Postfach 1261
   Maulburg
   D79689
   Germany
6. The examination and test results are recorded in confidential report number:

   3022785 dated 6th June 2005
7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:

   FM Class 3600:2018, FM Class 3610:2018, FM Class 3615:2018, FM Class 3616:2011, FM Class 3810:2018, ANSI/ISA 61010-1:2012, ANSI/ISA 60079-0:2013, ANSI/UL 60079-1:2015, ANSI/ISA 60079-11:2014, ANSI/NEMA 250:1991, ANSI/IEC 60529:2004
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.

Certificate issued by:

J.E. Marquedant

J.E. Marquedant
VP, Manager, Electrical Systems

2 July 2018
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

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10. Equipment Ratings:

Explosionproof with Intrinsically Safe Connections for Class I, Division 1, Groups A, B, C, and D hazardous (classified) locations; Dust-Ignitionproof with Intrinsically Safe Connections for Class II, III, Division 1, Group E, F, and G hazardous (classified) locations; as Flameproof with Intrinsically Safe Connections for Class I, Zone 0, AEx db [ia Ga] IIC Gb hazardous locations. Ingress protection rating of Type 4X, 6, IP65, and IP67.

11. The marking of the equipment shall include:

LISTING 1 ***Gammapilot M Type FMG60-SbE1efD1i***
CL I, II, III, DIV 1, Groups A, B, C, D, E, Fand G with Intrinsically Safe Connections for CL I, II, II, DIV 1 Groups A, B, C, D, E, F and G, T6 T*, 960007128, Entity;
CL I, Zone 1, AEx db [ia Ga] / IIC / T6 Gb T* - 960007128, Entity;
Type 4X, Type 6, IP65, IP67

LISTING 2 ***Gammapilot M Type FMG60-SbD1efD1i***
CL I, II, III, DIV 1, Groups A, B, C, D, E, Fand G with Intrinsically Safe Connections for CL I, II, II, DIV 1 Groups A, B, C, D, E, F and G, T6 T*, 960007340, Entity;
CL I, Zone 1, AEx db [ia Ga] IIC T6 Gb T* - 960007340, Entity; Type 4X, Type 6, IP65, IP67

LISTING 3 ***Gammapilot M Type FMG60-SbE2efD1i and Type FMG60-SbE3efD1i***
CL I, II, III, DIV 1, Groups A, B, C, D, E, Fand G with Intrinsically Safe Connections for CL I, II, II, DIV 1 Groups A, B, C, D, E, F and G, T6 T*, 960007338, Entity;
CL 1, Zone 1, AEx db [ia Ga] IIC T6 Gb T* - 960007338, Entity; Type 4X, Type 6, IP65, IP67

LISTING 4 ***Gammapilot M Type FMG60-SbD2efD1i and Type FMG60-SbD3efD1i***
CL I, II, III, DIV 1, Groups A, B, C, D, E, Fand G with Intrinsically Safe Connections for CL I, II, II, DIV 1 Groups A, B, C, D, E, F and G, T6 T*, 960007339, Entity;
CL I, Zone 1, AEx db [ia Ga] IIC T6 Gb T* - 960007339, Entity; Type 4X, Type 6, IP65, IP67

*See control drawing for specific information.

12. **Description of Equipment:**

General - The Gammapilot M Type FMG60 Level Detector is used for measurement of level, level limit, density, and concentration of liquids or solid material. The transmitter measures the radiation from an independent gamma source and generates light pulses in the sensor tube which converts the pulses into electrical signals. All signal outputs are available in 4 to 20 mA, PA/FF and HART communications.

Construction - The Gammapilot M Type FMG60 Level Detector enclosure consists of a stainless steel pipe housing which contains all active parts (PCBs, scintillator) and a coated aluminum with a conductivity of less than 1 G ohm or AISI 316 L stainless steel compartment housing containing the power supply terminals and Intrinsically Safe connections. To prevent the detector from reaching surface temperature above 60°C at an ambient of 80°C a water cooling assembly is available.

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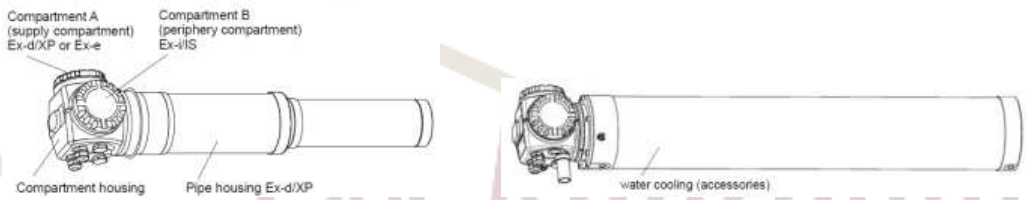

Ratings:

Operation temperature Ranges:

The ambient operating temperature range of the FMG60 is:
-40°C to +60°C (Detector without water cooling)
-40°C to +75°C (Detector with water cooling in operation)

Electrical data:

Intrinsically Safe Output Parameters:
Voc = 8.4V, Isc = 8.3mA, Po = 17.5mW Ca = 5.2uF (A,B) Ca = 43uF (C,D), La = 400mH [PT100]
Voc = 8.4V, Isc = 19.2mA, Po = 40.3mW Ca = 5.1uF (A,B) Ca = 42uF (C,D), La = 69mH(A,B) La = 199mH (C,D) [Cascade out]
Voc = 4.7V, Isc = 37.7mA, Po = 44.3 mW [FHX40]
Voc = 21.2V, Isc = 92mA, Po = 479mW, Ca = 169nF (A,B) Ca = 1.2uF (C,D), La = 4mH (A,B) La = 15mH (C,D) [4 -20mA / HART]

Intrinsically Safe Input Parameters:
Vmax = 24V, Imax = 250mA, Pi = 1.2W, Ci = 5nF, Li = 10uH [PA, FF]
Vmax = 30V, Imax = 13mA, Pi = 390mW [4 – 20mA / HART]
Vmax = 8.4V, Imax, 19.2mA, Pi = 40.3mW, Ci = 0, Li = 67uH [Cascade in]

FISCO Input Parameters:
Vmax = 17.5V, Imax = 500mA, Pi = 5.5W, Ci = 5nF, Li = 10uH

Input Supply Voltage to FMG60 is:
90…253VAC, 50/60Hz, 18…35Vdc

LISTING 1 ***Gammapilot M Type FMG60-SbE1efD1i***
a = Approval: S.
b = Power Supply: 1 or 2.
c = Connection: E.
d = Communication Output: 1, 2, or 3.
e = Scintillator measuring range: A, B, C, D, G, H, J, K, L, M, N, P, Q, R, S, or T.
f = Housing operation: 1, 2, 3 or 4.
g = Cable Entry Power Supply: D.
h = Cable entry communication output: 1.
i = Additional options: A or B.

LISTING 2 ***Gammapilot M Type FMG60-SbD1efD1i***
a = Approval: S.
b = Power Supply: 1 or 2.
c = Connection: D.

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d = Communication Output: 1, 2, or 3.
e = Scintillator measuring range: A, B, C, D, G, H, J, K, L, M, N, P, Q, R, S, or T.
f = Housing operation: 1, 2, 3 or 4.
g = Cable Entry Power Supply: D.
h = Cable entry communication output: 1.
i = Additional options: A or B.

LISTING 3 ***Gammapilot M Type FMG60-SbE2efD1i and Type FMG60-SbE3efD1i***
a = Approval: S.
b = Power Supply: 1 or 2.
c = Connection: E.
d = Communication Output: 1, 2, or 3.
e = Scintillator measuring range: A, B, C, D, G, H, J, K, L, M, N, P, Q, R, S, or T.
f = Housing operation: 1, 2, 3 or 4.
g = Cable Entry Power Supply: D.
h = Cable entry communication output: 1.
i = Additional options: A or B.

LISTING 4 ***Gammapilot M Type FMG60-SbD2efD1i and Type FMG60-SbD3efD1i***
a = Approval: S.
b = Power Supply: 1 or 2.
c = Connection: D.
d = Communication Output: 1, 2, or 3.
e = Scintillator measuring range: A, B, C, D, G, H, J, K, L, M, N, P, Q, R, S, or T.
f = Housing operation: 1, 2, 3 or 4.
g = Cable Entry Power Supply: D.
h = Cable entry communication output: 1.
i = Additional options: A or B.

13. **Specific Conditions of Use:**

1. The flamepaths of the equipment are not intended to be repaired. Consult the manufacturer if repair of the flamepath joints is necessary.
2. The non-metallic labels, surface and coatings may store an electrostatic charge and become a source of ignition in gas and dust environments. Clean with a damp cloth to prevent the buildup of electrostatic charge.

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

This Certificate has been issued in accordance with FM Approvals US Certification Requirements.

15. **Schedule Drawings**

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

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16. **Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
6th June 2005	Original Issue.
2nd July 2018	Supplement 5: Report Reference: – 3064096 dated 2nd July 2018 Description of the Change: Internal electronics were updated keeping the same Input / Output parameters. Approval was brought up to the latest standards.

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