



Member of the FM Global Group

FM Approvals  
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# CERTIFICATE OF COMPLIANCE

## HAZARDOUS LOCATION ELECTRICAL EQUIPMENT

This certificate is issued for the following equipment:

**OPTIMASS a000 bc VEd4efghijklmnop Mass Flow Sensor.**

IS / I, II, III / 1 / ABCDEFG / T4 Ta = 60°C — 8.85517.21 or 8.85517.20, Type 4X;

I / 0 / AEx ia IIC / T4 Ta = 60°C — 8.85517.21 or 8.85517.20, Type 4X;

NI / I / 2 / ABCD / T4 Ta = 60°C — 8.85517.21 or 8.85517.20, Type 4X;

a = Sensor Series: 1, 3, 7, 8 or 9

b = Measuring tube material: T, S, H or A.

c = Sensor size/ Flow area: 01, 03, 04, 06, 10, 15, 25, 40, 50, 80  
or 100

d = Sensor base model: 01, 03, 04, 11, 12, 13, 14, 15, 16, 17,  
21, 22, 23, 24, 25, 26, 27, 32, 33, 34, 35, 36, 37, 43, 44,  
45, 46, 47, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 83, 84,  
85 or 86

e = Measuring tube material: T, S, H or A.

f = Tube surface finish: — not safety relevant

g = Process connection size: — not safety relevant

h = Sealing face: — not safety relevant

i = Secondary containment material: — not safety relevant

j = Heating jacket options: 0, 1, 2, 3 or 4

k = Hazardous area approvals: 3.

l = Hygienic / sanitary approvals: — not safety relevant

m = Configuration: 0, 1 or 2

n = Calibration: — not safety relevant

o = Cleaning / degreasing: — not safety relevant

p = Extended options: — not safety relevant

*Special conditions of use:*

- 1) OPTIMASS a000 series sensor shall be used with the MFC 300 F mass flow converter.

**OPTIMASS a000 bc VEd4efghijklmnop0q. Mass Flow Sensor.**

IS / I, II, III / 1 / ABCDEFG / T4 Ta = 60°C — 8.85517.21 or 8.85517.20, Type 4X;

I / 0 / AEx ia IIC / T4 Ta = 60°C — 8.85517.21 or 8.85517.20, Type 4X;

NI / I / 2 / ABCD / T4 Ta = 60°C — 8.85517.21 or 8.85517.20, Type 4X;

- a = Sensor Series: 2.
- b = Measuring tube material: S.
- c = Sensor size/ Flow area: 100, 150 or 250.
- d = Sensor base model: 87, 88, or 89.
- e = Measuring tube material: S.
- f = Tube surface finish: – not safety relevant.
- g = Process connection size: – not safety relevant.
- h = Sealing face: – not safety relevant.
- i = Secondary containment material: – not safety relevant
- j = Heating jacket options: 0, 1, 2, 3 or 4
- k = Hazardous area approvals: 3.
- l = Hygienic / sanitary approvals: – not safety relevant
- m = Configuration: 0, 1 or 2
- n = Calibration: – not safety relevant
- o = Cleaning / degreasing: – not safety relevant
- p = Custody Transfer approval: – not verified by FM
- q = Converter Type: C or D.

*Special conditions of use:*

- 1) OPTIMASS 2000 series sensor shall be used with the MFC 300 F mass flow converter

**MFC 300a VE524bcdefghi0jklmn Mass Flow Converter.**

XP-AIS / I / 1 / ABCD / T4 Ta = 60°C — 8.85517.21 or 8.85517.20, Entity/NIFW/FISCO\*, Type 4X;

DIP-AIS / II, III / 1 / EFG / T4 Ta = 60°C — 8.85517.21 or 8.85517.20, Entity/NIFW/FISCO\*, Type 4X;

AIS / I, II, III / 1 / ABCDEFG — 8.85517.21 or 8.85517.20, Entity/FISCO\*, Type 4X;

ANI / I, II, III / 2 / ABCDEFG / T4 Ta = 60°C — 8.85517.21 or 8.85517.20, NIFW\*, Type 4X

\*For Entity Parameters and Nonincendive Field Wiring Parameters reference control drawings.

The Mass Flow Converter is configured with Entity Parameters and Non-incendive Field Wiring Parameters only when option j = 2, 3, D or E and / or option k = 1 or 2 is selected / configured.

- a = Converter configuration: F.
- b = Converter type: 4, H or S.
- c = Power supply: 1, 4 or A.
- d = Hazardous area approvals: 4
- e = Cable connections: 4, 5, or 6.
- f = Instruction manual / operating language: not safety relevant
- g = Custody transfer: not safety relevant.
- h = Process diagnostics: not safety relevant.
- i = Converter housing: 1, 2 or 3.
- j = Outputs (Base Module): 1, 2, 3, 4, 6, 7, 8, B, C, D, E, F, G or H.
- k = Outputs (1st I/O Module): 0, 1, 2, 8, A, B, C, E, F, G, H or K.
- l = Outputs (2nd I/O Module): 0, 8, A, B, C, E, F, G, H or K.
- m = Measuring functions: not safety relevant.
- n = Manuals: not safety relevant.
- o = Remote option signal cable: 0, 1, 2 or 3.

*Special conditions of use:*

- 1) Non-intrinsically safe IO options are restricted from being used in the MFC300 Mass Flow Converter when intrinsically safe IO options are installed.

**OPTIMASS a300 bc Compact Mass Flowmeter.**

XP-AIS / I / 1 / ABCD / T4 Ta = 60°C — 8.85517.21 or 8.85517.20, Entity/NIFW/FISCO\*, Type 4X;  
 DIP-AIS / II, III / 1 / EFG / T4 Ta = 60°C — 8.85517.21 or 8.85517.20, Entity/NIFW/FISCO\*, Type 4X

\*For Entity Parameters and Nonincendive Field Wiring Parameters reference control drawings.

- a = Sensor Series: 1, 3, 7, 8 or 9.
- b = Measuring tube material: T, S, H or A.
- c = Sensor size/ Flow area: 01, 03, 04, 06, 10, 15, 25, 40, 50, 80 or 100.

*Special conditions of use:*

- 1) The OPTIMASS a300 series Flowmeter is the integration of the OPTIMASS 1000, 3000, 7000, 8000 or 9000 Mass Flow Sensor with the MFC300 Mass Flow Converter.

**OPTIMASS a300 bc Compact Mass Flowmeter.**

XP-AIS / I / 1 / ABCD / T4 Ta = 60°C — 8.85517.21 or 8.85517.20, Entity/NIFW/FISCO\*, Type 4X;  
 DIP-AIS / II, III / 1 / EFG / T4 Ta = 60°C — 8.85517.21 or 8.85517.20, Entity/NIFW/FISCO\*, Type 4X

\*For Entity Parameters and Nonincendive Field Wiring Parameters reference control drawings.

- a = Sensor Series: 2.
- b = Measuring tube material: S.
- c = Sensor size/ Flow area: 100, 150, or 250.

*Special conditions of use:*

- 1) The OPTIMASS 2300 series Flowmeter is the integration of the OPTIMASS 2000 Mass Flow Sensor with the MFC300 Mass Flow Converter.

**OPTIGAS 5000 bc VEd4efghijklmnop Mass Flow Sensor.**

IS / I, II, III / 1 / ABCDEFG / T4 Ta = 60°C — 8.85517.21 or 8.85517.20, Type 4X;  
 I / 0 / AEx ia IIC / T4 Ta = 60°C — 8.85517.21 or 8.85517.20, Type 4X;  
 NI / I / 2 / ABCD / T4 Ta = 60°C — 8.85517.21 or 8.85517.20, Type 4X

- b = Measuring tube material: S.
- c = Sensor size/ Flow area: 15 or 25.
- d = Sensor base model: 05 or 06.
- e = Measuring tube material: S.
- f = Tube surface finish: – not safety relevant
- g = Process connection size: – not safety relevant
- h = Sealing face: – not safety relevant
- i = Secondary containment material: – not safety relevant
- j = Heating jacket options: 0.
- k = Hazardous area approvals: 3.
- l = Hygienic / sanitary approvals: – not safety relevant
- m = Configuration: 0 or 1
- n = Calibration: – not safety relevant
- o = Cleaning / degreasing: – not safety relevant
- p = Extended options: – not safety relevant

*Special conditions of use:*

- 1) OPTIGAS 5000 series sensor shall be used with the MFC 300 F mass flow converter.

**OPTIGAS 5300 bc Compact Mass Flowmeter.**

XP-AIS / I / 1 / ABCD / T4 Ta = 60°C — 8.85517.21 or 8.85517.20, Entity/NIFW/FISCO\*, Type 4X;  
 DIP-AIS / II, III / 1 / EFG / T4 Ta = 60°C — 8.85517.21 or 8.85517.20, Entity/NIFW/FISCO\*, Type 4X

\*For Entity Parameters and Nonincendive Field Wiring Parameters reference control drawings.

- b = Measuring tube material: S.
- c = Sensor size/ Flow area: 15 or 25.

*Special conditions of use:*



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- 1) The OPTIGAS 5300 series Flowmeter is the integration of the OPTIGAS 5000 series Mass Flow Sensor with the MFC300 Mass Flow Converter.

### Equipment Ratings:

OPTIMASS series and OPTIGAS series Mass Flowmeters as Explosionproof for use in Class I, Division 1, Group A, B, C and D; Dust-Ignitionproof for use in Class II, III, Division 1, Group E, F and G indoor/ outdoor hazardous (classified) locations, utilizing Type 4X enclosure with Intrinsically Safe connection to Class I, II, III, Division 1, Groups A, B, C, D, E, F, & G indoor/outdoor hazardous (classified) locations. Temperature class of T4 Ta = 60°C. The installation of the products should be in accordance with control drawing 8.85517.21 or 8.85517.20.

OPTIMASS series and OPTIGAS series Mass Flowmeters as Explosionproof for use in Class I, II, III, Division 2, Group A, B, C and D; Dust-Ignitionproof for use in Class II, III, Division 2, Group E, F and G indoor/ outdoor hazardous (classified) locations, utilizing Type 4X enclosure with Nonincendive Field Wiring connections to Class I, II, III, Division 2, Groups A, B, C, D, E, F, & G indoor/outdoor hazardous (classified) locations. Temperature class of T4 Ta = 60°C. The installation of the products should be in accordance with control drawing 8.85517.21 or 8.85517.20.

### FM Approved for:

KROHNE Ltd.  
Rutherford Drive  
Park Farm Industrial Estate  
Wellingborough Northants NN8 6AE  
United Kingdom



This certifies that the equipment described has been found to comply with the following Approval Standards and other documents:

Class 3600	1998
Class 3810	1989
Class 3610	1999
Class 3615	1989
Class 3611	2004
NEMA 250	2003

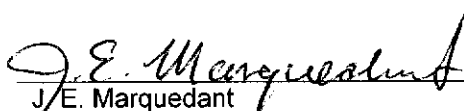
Original Project ID: 3028356

Approval Granted: February 5, 2007

Subsequent Revision Reports / Date Approval Amended

Report Number	Date	Report Number	Date
071003	October 15, 2007		
071203	January 18, 2008		
3031722	March 20, 2008		

FM Approvals LLC

  
 J.E. Marquedant  
 Group Manager, Electrical

20 March 2008  
 Date