IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx PTB 11.0013X	Issue No: 1	Certificate history:
			Issue No. 1 (2011-11-30)
Status:	**Current**	Page 1 of 4	Issue No. 0 (2011-02-25)
Date of Issue:	**2011-11-30**		

Applicant: **KROHNE Limited**
Rutherford Drive, Park Farm South Industrial Estate
Wellingborough, Northants NN8 6AE
United Kingdom

Electrical Apparatus: **Mass Flow Meter, type OPTIMASS x300xC and OPTIGAS 5300C**

Optional accessory:

Type of Protection: **Intrinsic Safety, Flameproof Enclosure, Increased Safety**

Marking:
Ex d [ib] IIC T6/T4...T1 Gb
Ex d [ib] IIC T6/T4...T1 Ga/Gb
Ex d [ia/ib] IIC T6/T4...T1 Ga/Gb
Ex de [ib] IIC T6/T4...T1 Gb
Ex de [ib] IIC T6/T4...T1 Ga/Gb
Ex de [ia/ib] IIC T6/T4...T1 Ga/Gb
Ex t IIIC T*** °C Db
Ex t [ia Da] IIIC T*** °C Db

Approved for issue on behalf of the IECEx Certification Body: Dr.- Ing. U. Johannsmeyer

Position: Head of Department "Intrinsic Safety and Safety of Systems"

Signature:
(for printed version)

Date:

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

IECEx Certificate of Conformity

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Date of Issue:	**2011-11-30**	Page 2 of 4
Manufacturer:	**KROHNE Limited** Rutherford Drive, Park Farm South Industrial Estate Wellingborough, Northants NN8 6AE **United Kingdom**	
Additional Manufacturing location(s):		

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:

The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2007-10 Edition:5	Explosive atmospheres - Part 0:Equipment - General requirements
IEC 60079-1 : 2007-04 Edition:6	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
IEC 60079-11 : 2006 Edition:5	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
IEC 60079-26 : 2006 Edition:2	Explosive atmospheres - Part 26: Equipment with equipment protection level (EPL) Ga
IEC 60079-7 : 2006-07 Edition:4	Explosive atmospheres - Part 7: Equipment protection by increased safety "e"
IEC 61241-1 : 2004 Edition:1	Electrical apparatus for use in the presence of combustible dust - Part 1: Protection by enclosures "tD"
IEC 61241-11 : 2005 Edition:1	Electrical apparatus for use in the presence of combustible dusts - Part 11: Protection by intrinsic safety 'iD'

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:

DE/PTB/ExTR11.0105/00

Quality Assessment Report:

DE/TUN/QAR10.0003/00

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Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

The flow meters of new type series OPTIMASS 1300AC, 2300AC, 3300AC, 7300AC and 8300AkC are used for the direct determination and display of the flow rate of liquids and gases. They consist of the separately certified components, sensor unit and measuring transducer, which are mounted to each other to form a compact device. All connections between the sensor unit and the measuring transducer are internal connections and comply with type of protection Intrinsic Safety. The enclosure for the measuring transducer complies with type of protection Flameproof Enclosure.

CONDITIONS OF CERTIFICATION: YES as shown below:

Special conditions for safe use

1. The flow meters of type series OPTIMASS 1300C, 2300C, 3300C, 7300C, 8300C and OPTIGAS 5300C as well as OPTIMASS 1300AC, 2300AC, 3300AC, 7300AC and 8300AkC shall be included in the equipotential bonding system of the hazardous area.
2. Opening the enclosure inside the hazardous area is only permissible in a de-energized state and with keeping a subsequent waiting time (warning label !)

   This waiting time is:

   35 minutes for temperature class T6 and

   10 minutes for temperature class T5

   The waiting time may be omitted for temperature classes T4 ... T1.

3. Only certified cable glands may be applied as cable entries. Non-used openings shall be sealed by means of certified blind plugs.

4. The connecting cables shall be installed as fixed wiring and in such a way that they are sufficiently protected against damage.

5. For relationship between maximum permissible ambient temperature, maximum medium temperature, maximum surface temperature and temperature class for the individual type series and enclosure materials, reference is made to the tables given in the operating instruction manual or the annex respectively.

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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

Introduction of the new type series OPTIMASS 1300AC, 2300AC, 3300AC, 7300AC and 8300AkC, with modified internal wiring between sensor and MFC300A-converter (FE/PB-FE/Plus-component as well as internal supply circuit and data circuit are no longer required)

Alteration of temperature specifications

Alteration of electrical data

Extension of Special Condition No.1 to the new type series

Annex:

Annex to IECEx PTB 11.0013X_issue 01.pdf

Applicant: KROHNE Limited

Electrical Apparatus: Coriolis Mass Flow Meter
OPTIMASS x300xC and OPTIGAS 5300C

The flow meters of the new type series OPTIMASS 1300AC, 2300AC, 3300AC, 7300AC and 8300AkC are intended for the measurement and display of the flow rate of liquids. They consist of the separately certified components, sensor unit and measuring transducer, which are mounted to each other to form a compact device. All connections between the sensor unit and the measuring transducer are internal connections and comply with type of protection Intrinsic Safety. The enclosure for the measuring transducer complies with type of protection Flameproof Enclosure.

For relationship between maximum permissible ambient temperature, maximum medium temperature, maximum surface temperature and temperature class for type series OPTIMASS 1300AC, 2300AC, 3300AC, 7300AC and 8300AkC, reference is made to the following tables.

OPTIMASS 1300AC and OPTIMASS 2300AC with transducer enclosure made of Aluminium with or without heating jacket / insulation			
permissible range of the ambient temperature T_{amb}	temperature class	maximum permissible medium temperature T_M	maximum surface temperature
-40 °C ... +40 °C	T6	50 °C	T80 °C
	T5	65 °C	T95 °C
	T4	100 °C	T130 °C
	T3 – T1	130 °C	T160 °C
-40 °C ... +50 °C	T5	65 °C	T95 °C
	T4 – T1	100 °C	T130 °C
-40 °C ... +60 °C	T5 – T1	60 °C	T90 °C
-40 °C ... +65 °C	T5 – T1	65 °C	T95 °C

OPTIMASS 1300AC and OPTIMASS 2300AC with transducer enclosure made of stainless steel with or without heating jacket / insulation			
permissible range of the ambient temperature T_{amb}	temperature class	maximum permissible medium temperature T_M	maximum surface temperature
-40 °C ... +40 °C	T6	50 °C	T80 °C
	T5	65 °C	T95 °C
	T4	100 °C	T130 °C
	T3 – T1	130 °C	T160 °C
-40 °C ... +50 °C	T5	65 °C	T95 °C
	T4 – T1	100 °C	T130 °C
-40 °C ... +60 °C	T6	50 °C	T80 °C
	T5 – T1	60 °C	T90 °C

Physikalisch-Technische Bundesanstalt (PTB)
Bundesallee 100, 38116 Braunschweig, Germany
Postfach 33 45, 38023 Braunschweig, Germany
Telephone +49 531 592-0, Telefax +49 531 592-3605

OPTIMASS 3300AC and OPTIMASS 7300AC with transducer enclosure made of aluminium with or without heating jacket / insulation			
permissible range of the ambient temperature T_{amb}	temperature class	maximum permissible medium temperature T_M	maximum surface temperature
-40 °C ... +40 °C	T6	65 °C	T80 °C
	T5	80 °C	T95 °C
	T4	100 °C	T115 °C
	T3 – T1	150 °C	T165 °C
-40 °C ... +50 °C	T5	80 °C	T95 °C
	T4 – T1	105 °C	T120 °C
-40 °C ... +60 °C	T6	60 °C	T75 °C
-40 °C ... +65 °C	T6	65 °C	T80 °C

OPTIMASS 3300AC and OPTIMASS 7300AC with transducer enclosure made of stainless steel without heating jacket / insulation			
permissible range of the ambient temperature T_{amb}	temperature class	maximum permissible medium temperature T_M	maximum surface temperature
-40 °C ... +40 °C	T6	65 °C	T80 °C
	T5	80 °C	T95 °C
	T4	100 °C	T115 °C
	T3 – T1	150 °C	T165 °C
-40 °C ... +50 °C	T6	65 °C	T80 °C
	T5 – T1	75 °C	T90 °C
-40 °C ... +60 °C	T6	60 °C	T75 °C

OPTIMASS 3300AC and OPTIMASS 7300AC with transducer enclosure made of stainless steel with heating jacket / insulation			
permissible range of the ambient temperature T_{amb}	temperature class	maximum permissible medium temperature T_M	maximum surface temperature
-40 °C ... +40 °C	T6	65 °C	T80 °C
	T5	80 °C	T95 °C
	T4	100 °C	T115 °C
	T3 – T1	145 °C	T160 °C
-40 °C ... +50 °C	T6	65 °C	T80 °C
	T5 – T1	75 °C	T90 °C
-40 °C ... +60 °C	T6	60 °C	T75 °C

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OPTIMASS 8300AkC with transducer enclosure made of aluminium with or without heating jacket / insulation			
permissible range of the ambient temperature T_{amb}	temperature class	maximum permissible medium temperature T_M	maximum surface temperature
-40 °C ... +40 °C	T4	65 °C	T125 °C
	T3	130 °C	T190 °C
	T2 – T1	190 °C	T250 °C
-40 °C ... +50 °C	T3	130 °C	T190 °C
	T2 – T1	190 °C	T250 °C
-40 °C ... +60 °C	T4	65 °C	T125 °C
	T3 – T1	130 °C	T190 °C
-40 °C ... +65 °C	T4 – T1	70 °C	T130 °C

OPTIMASS 8300AkC with transducer enclosure made of stainless steel with or without heating jacket / insulation			
permissible range of the ambient temperature T_{amb}	temperature class	maximum permissible medium temperature T_M	maximum surface temperature
-40 °C ... +40 °C	T4	65 °C	T125 °C
	T3	130 °C	T190 °C
	T2 – T1	190 °C	T250 °C
-40 °C ... +50 °C	T3	130 °C	T190 °C
	T2 – T1	190 °C	T250 °C
-40 °C ... +55 °C	T4	55 °C	T115 °C
	T3 – T1	130 °C	T190 °C
-40 °C ... +60 °C	T4 – T1	65 °C	T125 °C

OPTIMASS 8300AkC with transducer enclosure made of aluminium or stainless steel with or without heating jacket / insulation Cyrogenic applications			
permissible range of the ambient temperature T_{amb}	temperature class	permissible range of the medium temperature T_M	maximum surface temperature
-25 °C ... +40 °C	T4 – T1	-195 °C ... +70 °C	T130 °C

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Electrical data

OPTIMASS 1300AC, 2300AC, 3300AC, 7300AC and 8300AkC

Auxiliary power (non-intrinsically safe)

depending on variant periods), (terminals L (L+), N (L-))	U_N = 12…24 V DC, +30 % / -10 % (-25 % for short approx. 12 W internal fuse protection $I_N \leq 2$ A U_m = 253 V for connection to protective extra low voltage with safe isolation (PELV) or U_N = 24 V AC/DC, +10 % / -15 %, 50/60 Hz,
approx. 22 VA	24 V DC, +30 % / -25 %, approx. 12 W internal fuse protection $I_N \leq 2$ A U_m = 253 V for connection to protective extra low voltage with safe isolation (PELV) or U_N = 100…230 V AC, +10 % / -15 %, 50/60 Hz, approx. 22 VA internal fuse protection $I_N \leq 0.8$ A

In/Output circuits (non-intrinsically safe)

Nominal voltage: $U_N \leq 32$ V DC, $U_m = 253$ V

Printed circuit board:

Basic IO			
terminals	IO1-A2, B2	status output, passive	I_{max} = 100 mA
	IO1-A6, B6	status output, passive	I_{max} = 100 mA
		or control input	U_{max} = 32 V
	IO1-A11, B11	pulse output, passive	I_{max} = 100 mA
	IO1-A15, B15, A16	current output, active/passive	HART
Modular IO			
terminals	IO1-A2, B2	current output, active/passive	HART
	IO1-A11, B11	status/pulse output, active	I_{max} = 20 mA
		status/pulse output, passive	I_{max} = 100 mA

Modular Carrier + IO Module		depending on module	
terminals	Mod. A: IO2-A11, B11	current output, active/passive	HART
	Mod. B: IO2-A2, B2	status/puls output, active	I_{max} = 20 mA
		status/puls output, passive	I_{max} = 100 mA
		control input, active/passive	U_{max} = 32 V
		current input, active/passive	0(4) – 20 mA, U_{max} = 32 V
Fieldbus IO			
terminals	IO1-A2/A11, B2/B11	depending on function	
		Profibus-PA, passive	
		Foundation Fieldbus, passive	
Profibus DP IO			
terminals	IO1-A6/B2, A11/B6	Profibus-DP, active, 12 Mbit/s	
	IO1-A2, B11	Termination	
Modbus IO			
terminals	IO1-B2, A11, B11	RS 485 Modbus, active	

In/Output circuits (intrinsically safe)
(depending on p.c.b. and I/O-function)

Printed circuit board:

Exi-IO

Current output, passive HART communication terminals IO1-A2, B2 circuit	type of protection Intrinsic Safety	Ex ia IIC or Ex ib IIC
	only for connection to a certified intrinsically safe	
	Maximum values:	
	U_i = 30 V	
	I_i = 100 mA	
	P_i = 1.0 W	
	C_i = 10 nF	
	L_i negligibly low	

or

Current output, active
HART communication
terminals IO1-A2, B2

type of protection Intrinsic Safety Ex ia IIC
or Ex ib IIC

Maximum values:

U_o = 21 V
I_o = 90 mA
P_o = 0.5 W
linear characteristic

C_o	90 nF	110 nF
L_o	2.0 mH	0.5 mH

and

Puls/Status output, passive
terminals IO1-A11, B11

type of protection Intrinsic Safety Ex ia IIC
or Ex ib IIC
only for connection to a certified intrinsically safe circuit

Maximum values:

U_i = 30 V
I_i = 100 mA
P_i = 1.0 W
C_i = 10 nF
L_i negligibly low

Exi-Option

Current output, passive
terminals IO2-A2, B2

type of protection Intrinsic Safety Ex ia IIC
or Ex ib IIC
only for connection to a certified intrinsically safe circuit

Maximum values:

U_i = 30 V
I_i = 100 mA
P_i = 1.0 W
C_i = 10 nF
L_i negligibly low

or

Current output, active
terminals IO2-A2, B2

type of protection Intrinsic Safety Ex ia IIC
or Ex ib IIC

Maximum values:

U_o = 21 V
I_o = 90 mA
P_o = 0.5 W
linear characteristic

C_o	90 nF	110 nF
L_o	2.0 mH	0.5 mH

and

Puls/Status output
Control input, passive
terminals IO2-A11, B11
circuit

type of protection Intrinsic Safety Ex ia IIC
or Ex ib IIC
only for connection to a certified intrinsically safe

Maximum values:

U_i = 30 V
I_i = 100 mA
P_i = 1.0 W
C_i = 10 nF
L_i negligibly low

Exi-Option 2

Current output, passive
terminals IO2-A2, B2

type of protection Intrinsic Safety Ex ia IIC
or Ex ib IIC
only for connection to a certified intrinsically safe

circuit

Maximum values:

U_i = 30 V
I_i = 100 mA
P_i = 1.0 W
C_i = 10 nF
L_i negligibly low

or

Current input, active

type of protection Intrinsic Safety Ex ia IIC
or Ex ib IIC

terminals IO2-A2, B2

Maximum values:

U_o = 24.1 V
I_o = 99 mA
P_o = 0.6 W
linear characteristic
C_o = 75 nF
L_o = 0.5 mH

and

Puls/Status output, passive		type of protection Intrinsic Safety Ex ia IIC or Ex ib IIC
terminals	IO2-A11, B11	only for connection to a certified intrinsically safe circuit
		Maximum values: U_i = 30 V I_i = 100 mA P_i = 1.0 W C_i = 10 nF L_i negligibly low

Fieldbus IO

Profibus-PA Foundation Fieldbus passive circuit		type of protection Intrinsic Safety Ex ia IIC or Ex ib IIC/IIB only for connection to a certified intrinsically safe
terminals	IO2-A2, B2	Maximum values:
	IO2-A11, B11	U_i = 24 V I_i = 380 mA P_i = 5.32 W C_i = 5 nF L_i = 10 µH
		suitable for connection to an intrinsically safe fieldbus in accordance with the FISCO-model

Internal circuits of type of protection Intrinsic Safety:

Driver circuit

Sensor circuit

RTD / DMS circuit

The intrinsically safe circuits are safely electrically isolated from all non-intrinsically safe circuits up to a peak value of the nominal voltage of 375 V.

Special conditions for safe use

1. The flow meters of type series OPTIMASS 1300C, 2300C, 3300C, 7300C, 8300C and OPTIGAS 5300C as well as OPTIMASS 1300AC, 2300AC, 3300AC, 7300AC and 8300AkC shall be included in the equipotential bonding system of the hazardous area.
2. Opening the enclosure inside the hazardous area is only permissible in a de-energized state and with keeping a subsequent waiting time (warning label !)

   This waiting time is:
   35 minutes for temperature class T6 and
   10 minutes for temperature class T5
   The waiting time may be omitted for temperature classes T4 ... T1.
3. Only certified cable glands may be applied as cable entries. Non-used openings shall be sealed by means of certified blind plugs.
4. The connecting cables shall be installed as fixed wiring and in such a way that they are sufficiently protected against damage.
5. For relationship between maximum permissible ambient temperature, maximum medium temperature, maximum surface temperature and temperature class for the individual type series and enclosure materials, reference is made to the tables given in the operating instruction manual or the tables given above respectively.

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