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 11.0014X issue No.:0	Certificate history:
Status:	Current	
Date of Issue:	2011-02-25 Page 1 of 4	
Applicant:	**KROHNE Limited** Rutherford Drive, Park Farm South Industrial Estate Wellingborough, Northants NN8 6AE **United Kingdom**	
Electrical Apparatus: *Optional accessory:*	**Measuring transducer, type MFC300F**	
Type of Protection:	**Intrinsic Safety**	
Marking:	**Ex d [ib] IIC T6 Gb** **Ex d [ib] IIC T4...T1 Gb** **Ex d [ia/ib] IIC T6 Gb** **Ex d [ia/ib] IIC T4...T1 Gb** **Ex de [ib] IIC T6 Gb** **Ex de [ib] IIC T4...T1 Gb** **Ex de [ia/ib] IIC T6 Gb** **Ex de [ia/ib] IIC T4...T1 Gb** **Ex t [ib] IIIC T** °C Db** **Ex t [iaDa/ibDb] 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:	2011-03-02	

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:

Physikalisch-Technische Bundesanstalt (PTB)
Bundesallee 100
38116 Braunschweig
Germany

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

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 60079-7 : 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 pressence 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/ExTR11.0024/00

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 measuring transducer, type MFC300F is used for the determination and display of the mass flow rate of flammable and non-flammable liquids and gases. It consists of the separately certified electronic assembly which is mounted into an enclosure certified for type of protection Flameproof Enclosure "d". The measuring transducer is designed as associated apparatus and may be installed in the hazardous area. All connections to the sensor unit comply with type of protection Intrinsic Safety.

CONDITIONS OF CERTIFICATION: YES as shown below:

Special conditions for safe use

1. The measuring transducer, type MFC300F / MFC300F T6 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.

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Additional information:

For further information reference is made to the annex.

Annexe: Annex to IECEx PTB 11.0014X.pdf

Applicant: KROHNE Limited

Electrical Apparatus: Measuring transducer, type MFC300F and MFC300F T6

The measuring transducer, type MFC300F is used for the determination and display of the mass flow rate of flammable and non-flammable liquids and gases. It consists of the separately certified electronic assembly which is mounted into an enclosure certified for type of protection Flameproof Enclosure "d". The measuring transducer is designed as associated apparatus and may be installed in the hazardous area. All connections to the sensor unit comply with type of protection Intrinsic Safety.

The permissible range of the ambient temperature depends on the material of the enclosure as follows.

Aluminium enclosure: — 40 °C ... +65 °C for all variants listed in the table given in the operating instructions
— 40 °C ... +60 °C for non-listed variants

Stainless steel enclosure: — 40 °C ... +55 °C

The range of the permissible ambient temperature for the variant with optionally lacquered enclosure (aluminium or stainless steel) reads:

T_{amb}: — 40 °C ... + 40 °C

Electrical data

Auxiliary power (non-intrinsically safe)

depending on variant
(terminals L (L+), N (L-))

U_N = 12...24 V DC, +30 % / -10 % (short-time -25 %),
approx. 12 W
internal fusing $I_N \leq 2$ 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/12 W
24 V DC, +30 % / -25 %
internal fusing $I_N \leq 2$ 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 fusing $I_N \leq 1{,}6$ A

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In/Output circuits (non-intrinsically safe)

	Nominal voltage:	U_N ≤ 32 V DC U_m = 253 V

Printed circuit board:

Basic IO		
(terminals C, C-	status output, passive	I_{max} = 100 mA
B, B-	status output, passive or control input	I_{max} = 100 mA U_{max} = 32 V
D, D-	pulse output, passive	I_{max} = 100 mA
A, A-, A+)	current output, active/passive	HART
Modular IO		
(terminals C, C-	current output, active/passive	HART
D, D-)	status/pulse output, active	I_{max} = 20 mA
	status/pulse output, passive	I_{max} = 100 mA
Modular Carrier + IO Module	(depending on module)	
(terminals B, B-, A, A-)	current output, active/passive	0(4) – 20 mA
	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 D, D-, C, C-)	depending on function Profibus-PA, passive Foundation Fieldbus, passive	
Profibus DP IO		
(terminals D, D-, C, C-, B, B-)	depending on function Profibus RS 485, active, up to 12 Mbit/s	
Modbus IO		
(terminals D, D-, C, C-)	RS 485 Modbus, active	

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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 C, C-)

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
HART communication
(terminals C, C-)

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 D, D-)

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

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Exi-Option
Exi-Option 2

Current output, passive
(terminals A, A-)

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
(terminals A, A-)

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

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

or

Current output, active
(terminals A, A-)

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 B, B-)

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

Fieldbus IO

Profibus-PA Foundation Fieldbus passive (terminals D, D-, C, C-)	type of protection Intrinsic Safety or only for connection to a certified intrinsically safe circuit Maximum values: 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	Ex ia IIC Ex ib IIC/IIB
Data circuit (terminals A, B)	type of protection Intrinsic Safety Maximum values: U_o = 6 V I_o = 33 mA P_o = 120 mW trapezoidal characteristic C_o = 1.9 µF L_o = 2 mH	Ex ib IIC

Mesuring transducer, type MFC300 F

Supply circuit (terminals +, -)	type of protection Intrinsic Safety Maximum values: U_o = 16.5 V I_o = 305 mA P_o = 1.25 W linear characteristic C_o = 230 nF L_o = 320 µH	Ex ib IIC

Mesuring transducer, type MFC300 F T6

Supply circuit (terminals +, -)	type of protection Intrinsic Safety Maximum values: U_o = 16.5 V I_o = 262 mA P_o = 1.07 W linear characteristic C_o = 240 nF L_o = 450 µH	Ex ib IIC

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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

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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.
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