1 EC-TYPE EXAMINATION CERTIFICATE

2 **Equipment or Protective systems intended for use in Potentially Explosive Atmospheres - Directive 94/9/EC**

3 **EC-Type Examination Certificate No:** **FM12ATEX0045X**

4 **Equipment or protective system: (Type Reference and Name)** **CoriolisMaster FCB3_ _, FCH3_ _ and FCT3_ _ Flowmeter**

5 **Name of Applicant:** **ABB Automation Products GmbH**

6 **Address of Applicant:** **Dransfelder Strasse 2**
D37079 Gottingen
Germany

7 This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and documents therein referred to.

8 FM Approvals Ltd, notified body number 1725 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report number:
3046185 dated 2nd August 2012

9 Compliance with the Essential Health and Safety Requirements, with the exception of those identified in item 15 of the schedule to this certificate, has been assessed by compliance with the following documents:
EN 60079-0:2009, EN 60079-1:2007, EN 60079-7:2007, EN 60079-11:2011, EN 60079-15: 2010, EN 60079-26:2007, EN 60079-31:2008 and EN 60529:1991 + A1:2000

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC-Type Examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

12 The marking of the equipment or protective system shall include:

FCa3cA1Y0fghijklm.n.o.p CoriolisMaster - Integral transmitter/sensor
II 1/2 G Ex d e ia IIC T6…T2 IP65, IP67
II 2 D Ex ia tb IIIC T85°C…Tmedium IP65, IP67
II 1/2 G Ex d e ia ib IIC T6…T2 IP65, IP67
II 2 D Ex ia ib tb IIIC T85°C…Tmedium IP65, IP67
II 2 (1) G Ex d e ia IIC T6 … T2 IP65, IP67
II 2 (1) D Ex ia tb IIIC T85°C... T medium IP65, IP67
II 2 D Ex tb IIIC T85°C…Tmedium Ta = -40°C to 60°C IP65, IP67

Mick Gower
Certification Manager, FM Approvals Ltd.

Issue date: 20th May 2013

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SCHEDULE

to EC-Type Examination Certificate No. FM12ATEX0045X

12 The marking of the equipment or protective system shall include (Continued):

FCT3cA1klm.n.o.p CoriolisMaster – Transmitter only
II 2 (1) G Ex d e ia IIC T6 – IP65, IP67
II 2 (1) G Ex d e ib [ia] IIC T6 – IP65, IP67
II 2 (1) G Ex d e [ia] IIC T6 – IP65, IP67
II 2 (1) D Ex ia tb IIIC T85°C – IP65, IP67
II 2 (1) D Ex ib tb [ia] IIIC T85°C – IP65, IP67
II 2 (1) D Ex tb [ia] IIIC T85°C – IP65, IP67

FCa3cA1efghijY0Y0Y.n.o.p CoriolisMaster – Sensor only
II 1 G Ex ia IIC T6…T2 IP65, IP67,
II 1 D Ex ia IIIC T85°C … Tmedium IP65, IP67
II 2 D Ex tb IIIC T85°C…Tmedium IP65, IP67

FCT3cY0klm.n.o.p CoriolisMaster – Transmitter only
II (1) G [Ex ia] IIC - IP65, IP67

FCT3cA2klm.n.o.p CoriolisMaster – Transmitter only
II 3 (2) G Ex nA nR [ia] IIC T6 – IP65, IP67

13 **Description of Equipment or Protective System:**

The CoriolisMaster Mass flowmeter system is comprised of a Flowmeter Primary and a Transmitter (converter/secondary). The flowmeter primary is installed in the pipeline while the Transmitter for evaluating the flow signals can be mounted locally at the meter location or in a centralized location. The CoriolisMaster is available as a Remote Design where the Transmitter and Sensor (flowmeter primary) are connected together with a signal cable or otherwise as a Integral Design where the transmitter is directly mounted on the primary.

Operation Temperature Ranges:
The ambient operating temperature range of the CoriolisMaster is -40°C to 60°C.
Process temperature range is -50°C to 200°C.

Temperature Class and Process Temperature

Model FCa330-A1, FCa350-A1			
Ambient temperature	≤40 °C	≤50 °C	≤60 °C
Temperature class	Maximum Process Temperature		
T2	200 °C	200 °C	200 °C
T3	185 °C	180 °C	180 °C
T4	125 °C	120 °C	120 °C
T5	5 °C	85 °C	75 °C
T6	65 °C	65 °C	60 °C

SCHEDULE

to EC-Type Examination Certificate No. FM12ATEX0045X

Electrical Input Parameters:
U = 110 V…230Vac or 24 Vac/dc

Output/Signal Parameters:

FCa3cA1A_… Size DN15-150 Remote Sensor		Size	Operating Value		Ex i					
			U_N [V]	I_N [mA]	$U_I = U_O$ [V]	$I_I = I_O$ [mA]	$P_I = P_O$ [mW]	$C_I = C_O$ [nF]	$C_{IPA} = C_{OPA}$ [nF]	$L_I = L_O$ [mH]
Driver	Terminal 91/92	DN15	12	37	13.2	74	245	4.8	0	3.0
		DN25		37		74	245			3.0
		DN50		27		66	220			17.6
		DN80		37		75	250			6.4
		DN100		37		61	205			8.8
		DN150		37		54	180			8.8
Sensor Flowsignal	Terminal 85…90	DN15	6	6	6.6	9.0	14.9	0	0	1.1
		DN25								3.0
		DN50								3.0
		DN80								1.5
		DN100								1.5
		DN150								1.5
PT1000	Terminal 93…96	DN15 to DN150	12	2	13.2	2.3	8.0	11	0	0

Current active. HART FCT3cA1kA2.. FCa3cA1Y0fghijk_2..		Ex e		Operating Value		Ex ib					
		U_M [V]	I_M [A]	U_N [V]	I_N [mA]	U_O [V]	I_O [mA]	P_O [mW]	C_O [nF]	C_{OPA} [nF]	L_O [mH]
Current 1 Active	Terminal 31/32 Terminal 32=PA	60	35	30	30	20	100	500	217	0	3.8
						U_I [V]	I_I [mA]	P_I [mW]	C_I [nF]	C_{IPA} [nF]	L_I [mH]
						60	100	500	2.4	2.4	0.17
Current 2 Passive	Terminal 33/34 Terminal 34=PA	60	35	30	30	U_I [V]	I_I [mA]	P_I [mW]	C_I [nF]	C_{IPA} [nF]	L_I [mH]
						30	100	760	2.4	2.4	0.17
Contact Output	Terminal 41/42	60	35	30	65	15	30	115	2.4	2.4	0.17
Contact Input	Terminal 81/82	60	35	30	10	30	60	500	2.4	2.4	0.17
Pulse Output	Terminal 51/52	60	35	30	65	15	30	115	2.4	2.4	0.17

SCHEDULE

to EC-Type Examination Certificate No. FM12ATEX0045X

Current passive. HART FCT3cA1kA3 FCa3cA1Y0fghijk_3..		Ex e		Operating Value		Ex ia					
		U_M [V]	I_M [A]	U_N [V]	I_N [mA]	U_I [V]	I_I [mA]	P_I [mW]	C_I [nF]	C_{IPA} [nF]	L_I [mH]
Current 1 Passive	Terminal 31/32	60	35	30	30	60	300	2000	0.47	0.47	0.17
Current 2 Passive	Terminal 33/34	60	35	30	30	60	300	2000	0.47	0.47	0.17
Contact Output	Terminal 41/42	60	35	30	65	60	300	2000	0.47	0.47	0.17
Contact Input	Terminal 81/82	60	35	30	10	60	300	2000	0.47	0.47	0.17
Pulse Output	Terminal 51/52	60	35	30	65	60	300	2000	0.47	0.47	0.17

FCa3cA1Y0fghijklm.n.o.p CoriolisMaster - Integral transmitter/sensor

a = Product Family; B or H
c = Tiers: 30 or 50
f = Meter Size: 015E1, 015R0, 015R1, 025E1, 025R0, 025R2, 050E1, 050R0, 050R1 080E1, 080R0, 080R1, 100E1, 100R0, 100R1, 150E1, 150R0 or 150R1.
g = Process Connection Type: D2, D4, D5, D6, D7, E1, A1, A3, A6, A7, A8, A9, J1, J2, J3, M1, F1, T1, T2, T3, N3, or P1.
h = Material wetted parts; A1, A2, H1, H2, C1, C2, T1 or L1.
i = Flow calibration: Any single letter
j = Density calibration: Any single letter
k = Connection Design/Transmitter Housing type/Transmitter housing material/Cable glands: D1, or D2
l = Outputs: A1, A2, A3, H1, H2, H3 or Y0.
m = Power Supply: A, B or Y
n = Ambient temperature range: Blank, TA1, or TA4
o = Fluid temperature range : Blank or TF1
p = Extended Tower length: Blank or TE1

FCa3cA1efghijY0Y0Y.n.o.p CoriolisMaster – Sensor only

a = Product Family; B or H
c = Tiers: 30 or 50
e = Connection Design: A1 or A2.
f = Meter Size: 015E1, 015R0, 015R1, 025E1, 025R0, 025R2, 050E1, 050R0, 050R1 080E1, 080R0, 080R1, 100E1, 100R0, 100R1, 150E1, 150R0 or 150R1.
g = Process Connection Type: D2, D4, D5, D6, D7, E1, A1, A3, A6, A7, A8, A9, J1, J2, J3, M1, F1, T1, T2, T3, N3, or P1.
h = Material wetted parts; A1, A2, H1, H2, C1, C2, T1 or L1.
i = Flow calibration: Any single letter
j = Density calibration: Any single letter
n = Ambient temperature range: Blank, TA1, or TA4
o = Fluid temperature range : Blank or TF1
p = Extended Tower length: Blank or TE1

SCHEDULE

to EC-Type Examination Certificate No. FM12ATEX0045X

FCT3cA1klm.n CoriolisMaster – Transmitter only

c = Tiers: 30 or 50
k = Connection Design/Transmitter Housing type/Transmitter housing material/Cable glands: F1, F2, R1, or R2
l = Outputs: A2, A3, H2, or H3.
m = Power Supply: A, or B
n = Ambient temperature range: Blank, TA1, or TA4

FCT3cY0klm.n CoriolisMaster – Transmitter only

c = Tiers: 30 or 50
k = Connection Design/Transmitter Housing type/Transmitter housing material/Cable glands: F1, F2, R1, or R2
l = Outputs: A1, A2, H1, or H2.
m = Power Supply: A, or B
n = Ambient temperature range: Blank, TA1, or TA4

FCT3cA2klm.n.o.p CoriolisMaster – Transmitter only

c = Tiers: 30 or 50
k = Connection Design/Transmitter Housing type/Transmitter housing material/Cable glands: F1, F2, R1, or R2
l = Outputs: A1, A2, H1, or H2.
m = Power Supply: A, or B
n = Ambient temperature range: Blank, TA1, or TA4

14 **Special Conditions for Safe Use:**

1. When installed using the protection concept Restricted Breathing (nR) routine testing is required. The CoriolisMaster Transmitter is not fitted with a dedicated test port; see the Manufacturer's Instructions for details of the routine tests.

15 **Essential Health and Safety Requirements:**

The relevant EHSRs that have not been addressed by the standards listed in this certificate have been identified and assessed in the confidential report identified in item 8.

16 **Test and Assessment Procedure and Conditions:**

This EC-Type Examination Certificate is the result of testing of a sample of the product submitted, in accordance with the provisions of the relevant specific standard(s), and assessment of supporting documentation. It does not imply an assessment of the whole production.

Whilst this certificate may be used in support of a manufacturer's claim for CE Marking, FM Approvals Ltd accepts no responsibility for the compliance of the equipment against all applicable Directives in all applications.

This Certificate has been issued in accordance with FM Approvals Ltd's ATEX Certification Scheme.

17 **Schedule Drawings**

A list of the significant parts of the technical documentation is annexed to this certificate and a copy has been kept by the Notified Body.

SCHEDULE

to EC-Type Examination Certificate No. FM12ATEX0045X

18 **Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
9th August 2012	Original Issue.
31st August 2012	Supplement 1 Description of the Change: Correction to include CDL report
18th December 2012	Supplement 2 Report Reference: 3047118 dated 14th December 2012 Description of the Change: 1. Addition of nR [ia] transmitter option 2. Addition of special condition 3. Meter sizes DN80, DN100 and DN150 added. 4. Correction of ambient temperature range.
20th May 2013	Supplement 3 Report Reference: 3047118 dated 7th May, 2013 Description of the Change: Correction to description and clarification of special condition