(1) # EC-TYPE EXAMINATION CERTIFICATE

(2) **Equipment and protective systems intended for use in potentially explosive atmospheres - Directive 94/9/EC**

(3) EC-Type Examination Certificate Number: **KEMA 07ATEX0104 X** Issue Number: **1**

(4) Equipment: **Variable Area Flowmeter Model Series FAM54-.....**

(5) Manufacturer: **ABB Automation Products GmbH**

(6) Address: **Dransfelder Strasse 2, 37079 Göttingen, Germany**

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

(8) KEMA Quality B.V., notified body number 0344 in accordance with Article 9 of the Council 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 and protective systems intended for use in potentially explosive atmospheres given in Annex II to the directive.

The examination and test results are recorded in confidential test report number 2086867.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0 : 2006	**EN 60079-1 : 2004**	**EN 60079-11 : 2007**
EN 60079-15 : 2005	**EN 61241-0 : 2006**	**EN 61241-1 : 2004**
EN 13463-1 : 2001	**EN 13463-5 : 2003**	

(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 according to the Directive 94/9/EC. Further requirements of the directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

II 1/2 G	**Ex c ia IIC T6 ... T1** and/or **Ex c d IIC T6 ... T1** and/or **c T6 ... T1** and/or
II 1/3 G	**Ex c nA [nL] IIC T6 ... T1** or **Ex c nA II T6 ... T1** and
II 2 D	**c T85 °C ... Tmedium** or **Ex tD A21 IP6X T85 °C... Tmedium**

This certificate is issued on 14 August 2007 and, as far as applicable, shall be revised before the date of cessation of presumption of conformity of (one of) the standards mentioned above as communicated in the Official Journal of the European Union.

KEMA Quality B.V.

C.G. van Es
Certification Manager

PRODUCTS RvA C 001

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(13) # SCHEDULE

(14) **to EC-Type Examination Certificate KEMA 07ATEX0104 X** Issue No. **1**

(15) **Description**

The Variable Area Flowmeter Model Series FAM54-..... is designed for vertical installation and is suitable for the measurement of the flow of gases, liquids and steam. The Flowmeter is provided with a mechanical display and depending on the options with electrical output signals (analog and/or digital) and an electronic display.

Electrical data

Table 1

Model	Equipment Marking	Terminal	Input Data	Tamb -20 °C or -50 °C to	Temp. Class	Max. Medium Temp.	Thermal Isolation	Steam Jacket
FAM54abc**A4**f.. and **FAM54**abc**A9**f.. with b = E or F	II 1/2G Ex c ia IIC T4 ... T1 II 2D Ex tD A21 IP6X T85°C to Tmedium	31/32 for connection to an intrinsically safe circuit	U_i = 30 V I_i = 110 mA P_i = 770 mW C_i = 5,3 nF L_i = 266 µH	+40 °C	T1	+440 °C	NO	NO
				+40 °C	T1	+375 °C	YES	NO
				+40 °C	T1	+260 °C	YES	YES
				+50 °C	T1	+300 °C	YES	NO
				+50 °C	T2	+290 °C	YES	NO
				+50 °C	T2	+220 °C	YES	YES
				+60 °C	T2	+320 °C	NO	NO
		41/42 for connection to an intrinsically safe circuit	U_i = 30 V I_i = 30 mA P_i = 115 mW C_i = 4,8 nF L_i = 133 µH	+60 °C	T2	+230 °C	YES	NO
				+60 °C	T3	+170 °C	YES	YES
				+70 °C	T3	+195 °C	NO	NO
				+70 °C	T3	+150 °C	YES	NO
				+70 °C	T4	+125 °C	YES	YES
FAM54abc**A9**f.. with b = E or F	II 1/2G Ex c d IIC T6 ... T1 II 2D Ex tD A21 IP6X T85°C to Tmedium	31/32 for connection to a non-intrinsically safe circuit (note 1)	U_{max} = 46 V	+40 °C	T1	+440 °C	NO	NO
				+40 °C	T1	+375 °C	YES	NO
				+40 °C	T1	+260 °C	YES	YES
				+50 °C	T1	+300 °C	YES	NO
				+50 °C	T2	+290 °C	YES	NO
				+50 °C	T2	+220 °C	YES	YES
		41/42 for connection to a non-intrinsically safe circuit (note 1)	U_{max} = 30 V I_{max} = 30 mA P_{max} = 115 mW	+60 °C	T2	+320 °C	NO	NO
				+60 °C	T2	+230 °C	YES	NO
				+60 °C	T3	+170 °C	YES	YES
				+60 °C	T4	+130 °C	YES	YES
				+60 °C	T5	+95 °C	YES	YES
				+60 °C	T6	+80 °C	YES	YES
FAM54abc**B1**f.. and **FAM54**abc**A4**f.. and **FAM54**abc**A9**f.. with b = E or F	II 1/3G Ex c nA [nL] IIC T6 ... T1 II 2D Ex tD A21 IP6X T85°C to Tmedium	31/32 for connection to a non-intrinsically safe circuit (note 1)	U_{max} = 46 V	+40 °C	T1	+440 °C	NO	NO
				+40 °C	T1	+375 °C	YES	NO
				+40 °C	T1	+260 °C	YES	YES
				+50 °C	T1	+300 °C	YES	NO
				+50 °C	T2	+290 °C	YES	NO
				+50 °C	T2	+220 °C	YES	YES
				+60 °C	T2	+320 °C	NO	NO
		41/42 for connection to a non-intrinsically safe circuit (note 1)	U_{max} = 30 V I_{max} = 30 mA P_{max} = 115 mW	+60 °C	T2	+230 °C	YES	NO
				+60 °C	T3	+170 °C	YES	YES
				+70 °C	T3	+195 °C	NO	NO
				+70 °C	T3	+150 °C	YES	NO
				+70 °C	T4	+130 °C	YES	YES
				+70 °C	T5	+95 °C	YES	YES
				+30 °C	T6	+25 °C	YES	YES

Table 1: Special condition if used with dust for Models **FAM54**abc**A4**f.. and **FAM54**abc**B1**f..:
Tmedium ≤ 250°C for Tamb = -50°C to +60°C
Tmedium ≤ 340°C for Tamb = -50°C to +40°C
Tmedium ≤ 430°C for Tamb = -50°C to +20°C

Note 1: If the possibility is kept open, that the apparatus in a next instance may be used as an intrinsically safe device, Um = 60 V is applicable to the input circuits.

KEMA

(13) **SCHEDULE**

(14) **to EC-Type Examination Certificate KEMA 07ATEX0104 X** Issue No. **1**

Table 2

Model	Equipment Marking	Terminal	Input Data	Tamb -20 °C or -50 °C to	Temp. Class	Max. medium Temp.	Thermal Isolation	Steam Jacket
FAM54abc**A4**f.. and **FAM54**abc**A9**f.. with b = B, C or D	II 1/2G Ex c ia IIC T6 ... T1 II 2D Ex tD A21 IP6X T85°C to Tmedium	41/42 and 51/52 for connection to an intrinsically safe circuit	For each circuit U_i = 16 V I_i = 25 mA P_i = 64 mW C_i = 50 nF L_i = 250 µH	+40 °C	T1	+440 °C	NO	NO
				+40 °C	T1	+375 °C	YES	NO
				+40 °C	T1	+260 °C	YES	YES
				+50 °C	T1	+300 °C	YES	NO
				+50 °C	T2	+290 °C	YES	NO
				+50 °C	T2	+220 °C	YES	YES
				+60 °C	T2	+320 °C	NO	NO
				+60 °C	T2	+230 °C	YES	NO
				+60 °C	T3	+170°C	YES	YES
				+70 °C	T3	+195 °C	NO	NO
				+70 °C	T3	+150 °C	YES	NO
				+70 °C	T4	+130 °C	YES	YES
				+70 °C	T5	+95 °C	YES	YES
				+60 °C	T6	+80 °C	YES	YES
		41/42 and 51/52 for connection to an intrinsically safe circuit	For each circuit U_i = 16 V I_i = 52 mA P_i = 169 mW C_i = 50 nF L_i = 250 µH	+40 °C	T1	+440 °C	NO	NO
				+40 °C	T1	+375 °C	YES	NO
				+40 °C	T1	+260 °C	YES	YES
				+50 °C	T1	+300 °C	YES	NO
				+50 °C	T2	+290 °C	YES	NO
				+50 °C	T2	+220 °C	YES	YES
				+60 °C	T2	+320 °C	NO	NO
				+60 °C	T2	+230 °C	YES	NO
				+60 °C	T3	+170 °C	YES	YES
				+70 °C	T3	+195 °C	NO	NO
				+70 °C	T3	+150 °C	YES	NO
				+70 °C	T4	+130 °C	YES	YES
				+60 °C	T5	+60 °C	YES	YES
				+50 °C	T5	+90 °C	NO	YES
				+40 °C	T6	+60 °C	YES	YES
		41/42 and 51/52 for connection to an intrinsically safe circuit	For each circuit U_i = 16 V I_i = 76 mA P_i = 242 mW C_i = 50 nF L_i = 250 µH	+40 °C	T1	+440 °C	NO	NO
				+40 °C	T1	+310 °C	YES	NO
				+40 °C	T2	+190 °C	YES	YES
				+50 °C	T2	+340 °C	NO	NO
				+50 °C	T2	+230 °C	YES	YES
				+60 °C	T2	+230 °C	NO	NO
				+60 °C	T3	+160 °C	YES	YES
				+70 °C	T4	+120 °C	NO	NO
				+70 °C	T4	+100 °C	YES	YES
				+40 °C	T5	+60 °C	YES	YES
				+30 °C	T6	+30 °C	YES	YES

Table 2: Special condition if used with dust for Models **FAM54**abc**A4**f.. and **FAM54**abc**A9**f..:
Tmedium ≤ 250°C with Tamb = -50°C to +60°C
Tmedium ≤ 340°C with Tamb = -50°C to +40°C
Tmedium ≤ 430°C with Tamb = -50°C to +20°C

(13) **SCHEDULE**

(14) **to EC-Type Examination Certificate KEMA 07ATEX0104 X** Issue No. **1**

Table 3

Model	Equipment Marking	Terminal	Input Data	Tamb -20 °C or -50 °C to	Temp. Class	Max. medium Temp.	Thermal Isolation	Steam Jacket
FAM54abc**A9**f.. with b = B, C or D	II 1/2G Ex c d IIC T6 ... T1 II 2D Ex tD A21 IP6X T85°C to Tmedium	41/42 and 51/52 for connection to a non-intrinsically safe circuit	For each circuit U_{max} = 16 V I_{max} = 25 mA P_{max} = 64 mW	+40 °C	T1	+440 °C	NO	NO
				+40 °C	T1	+375 °C	YES	NO
				+40 °C	T1	+260 °C	YES	YES
				+50 °C	T1	+300 °C	YES	NO
				+50 °C	T2	+290 °C	YES	NO
				+50 °C	T2	+220 °C	YES	YES
				+60 °C	T2	+320 °C	NO	NO
				+60 °C	T2	+230 °C	YES	NO
				+60 °C	T3	+170 °C	YES	YES
				+70 °C	T3	+195 °C	NO	NO
				+70 °C	T3	+150 °C	YES	NO
				+70 °C	T4	+130 °C	YES	YES
				+70 °C	T5	+95 °C	YES	YES
				+60 °C	T6	+80 °C	YES	YES
		41/42 and 51/52 for connection to a non-intrinsically safe circuit	For each circuit U_{max} = 16 V I_{max} = 52 mA P_{max} = 169 mW	+40 °C	T1	+440 °C	NO	NO
				+40 °C	T1	+375 °C	YES	NO
				+40 °C	T1	+260 °C	YES	YES
				+50 °C	T1	+300 °C	YES	NO
				+50 °C	T2	+290 °C	YES	NO
				+50 °C	T2	+220 °C	YES	YES
				+60 °C	T2	+320 °C	NO	NO
				+60 °C	T2	+230 °C	YES	NO
				+60 °C	T3	+170 °C	YES	YES
				+70 °C	T3	+195 °C	NO	NO
				+70 °C	T3	+150 °C	YES	NO
				+70 °C	T4	+130 °C	YES	YES
				+60 °C	T5	+60 °C	YES	YES
				+50 °C	T5	+90 °C	NO	YES
				+40 °C	T6	+60 °C	YES	YES
		41/42 and 51/52 for connection to a non-intrinsically safe circuit	For each circuit U_{max} = 16 V I_{max} = 76 mA P_{max} = 242 mW	+40 °C	T1	+440 °C	NO	NO
				+40 °C	T1	+310 °C	YES	NO
				+40 °C	T2	+190 °C	YES	YES
				+50 °C	T2	+340 °C	NO	NO
				+50 °C	T2	+230 °C	YES	YES
				+60 °C	T2	+230 °C	NO	NO
				+60 °C	T3	+160 °C	YES	YES
				+70 °C	T4	+120 °C	NO	NO
				+70 °C	T4	+100 °C	YES	YES
				+40 °C	T5	+60 °C	YES	YES
				+30 °C	T6	+30 °C	YES	YES

Table 3: Special condition if used with dust for Model **FAM54**abc**A9**f..:
Tmedium ≤ 250°C with Tamb = -50°C to +60°C
Tmedium ≤ 340°C with Tamb = -50°C to +40°C
Tmedium ≤ 430°C with Tamb = -50°C to +20°C

(13) **SCHEDULE**

(14) **to EC-Type Examination Certificate KEMA 07ATEX0104 X** Issue No. **1**

Table 4

Model	Equipment Marking	Terminal	Input Data	Tamb -20 °C or -50 °C to	Temp. Class	Max. medium Temp.	Thermal Isolation	Steam Jacket
FAM54abc**B1**f.. and **FAM54**abc**A4**f.. and **FAM54**abc**A9**f.. with b = B, C or D	II 1/3G Ex c nA II T6 ... T1 II 2D Ex tD A21 IP6X T85°C to Tmedium	41/42 and 51/52 for connection to a non-intrinsically safe circuit (note 1)	For each circuit U_{max} = 16 V I_{max} = 25 mA P_{max} = 64 mW	+40 °C	T1	+440 °C	NO	NO
				+40 °C	T1	+375 °C	YES	NO
				+40 °C	T1	+260 °C	YES	YES
				+50 °C	T1	+300 °C	YES	NO
				+50 °C	T2	+290 °C	YES	NO
				+50 °C	T2	+220 °C	YES	YES
				+60 °C	T2	+320 °C	NO	NO
				+60 °C	T2	+230 °C	YES	NO
				+60 °C	T3	+170 °C	YES	YES
				+70 °C	T3	+195 °C	NO	NO
				+70 °C	T3	+150 °C	YES	NO
				+70 °C	T4	+130 °C	YES	YES
				+70 °C	T5	+95 °C	YES	YES
				+60 °C	T6	+80 °C	YES	YES
		41/42 and 51/52 for connection to a non-intrinsically safe circuit (note 1)	For each circuit U_{max} = 16 V I_{max} = 52 mA P_{max} = 169 mW	+40°C	T1	+440 °C	NO	NO
				+40°C	T1	+375 °C	YES	NO
				+40°C	T1	+260 °C	YES	YES
				+50°C	T1	+300 °C	YES	NO
				+50°C	T2	+290 °C	YES	NO
				+50°C	T2	+220 °C	YES	YES
				+60°C	T2	+320 °C	NO	NO
				+60°C	T2	+230 °C	YES	NO
				+60°C	T3	+170 °C	YES	YES
				+70°C	T3	+195 °C	NO	NO
				+70°C	T3	+150 °C	YES	NO
				+70°C	T4	+130 °C	YES	YES
				+60°C	T5	+60 °C	YES	YES
				+50°C	T5	+90 °C	NO	YES
				+40°C	T6	+60 °C	YES	YES
		41/42 and 51/52 for connection to a non-intrinsically safe circuit (note 1)	For each circuit U_{max}= 16 V I_{max} = 76 mA P_{max} = 242 mW	+40 °C	T1	+440 °C	NO	NO
				+40 °C	T1	+310 °C	YES	NO
				+40 °C	T2	+190 °C	YES	YES
				+50 °C	T2	+340 °C	NO	NO
				+50 °C	T2	+230 °C	YES	YES
				+60 °C	T2	+230 °C	NO	NO
				+60 °C	T3	+160 °C	YES	YES
				+70 °C	T4	+120 °C	NO	NO
				+70 °C	T4	+100 °C	YES	YES
				+40 °C	T5	+60 °C	YES	YES
				+30 °C	T6	+30 °C	YES	YES
FAM54abcdef with b = A de = A4, A9 or B1	II 1/2 G c II T6...T1 II 2D c T85 °C to Tmedium II 2D Ex tD A21 IP6X T85°C to Tmedium	n.a.	n.a	+70 °C	T1	+440 °C	YES	YES
					T2	+290 °C	YES	YES
					T3	+190 °C	YES	YES
					T4	+130 °C	YES	YES
					T5	+95 °C	YES	YES
					T6	+80 °C	YES	YES

Table 4: Special condition if used with dust for Models **FAM54**abc**A4**f.., **FAM54**abc**A9**f.. and **FAM54**abc**B1**f..:
Tmedium ≤ 250°C with Tamb = -50°C to +60°C
Tmedium ≤ 340°C with Tamb = -50°C to +40°C
Tmedium ≤ 430°C with Tamb = -50°C to +20°C

Note 1: If the possibility is kept open, that the apparatus in a next instance may be used as an intrinsically safe device, Um = 60 V is applicable to the input circuits.

(13) # SCHEDULE

(14) **to EC-Type Examination Certificate KEMA 07ATEX0104 X** Issue No. **1**

Installation instructions

The cable entry devices and blanking elements must be suitable for the conditions of use and correctly installed.

Cables and cable glands with a temperature rating of at least 80 °C shall be used. For cable which are limited to 70 °C the maximum medium temperatures can be determined from the temperature class tables.

After connection of an intrinsically safe Flowmeter Type FAM54-.... to a non-intrinsically safe circuit of which it is guaranteed that the voltage has not exceeded 60 V (e.g. because it is an SELV or a PELV circuit), and after execution of the test and the inspection as described in the safety instructions, the flowmeter may be used as an intrinsically safe apparatus.

The installation instructions as provided by the manufacturer shall be followed in detail in order to assure safe functioning of the equipment, taking into account the local installation rules.

Routine tests

Each of the models FAM54abcA9f.. and FAM54abcF3f.. specified for use at an ambient temperature below -40 °C shall be subjected to an overpressure test according to EN 60079-1, clause 16, using a test pressure of 16 bar during at least 10 seconds. The enclosure shall withstand the pressure without suffering damage or permanent deformation of the joints.

A voltage test, in accordance with EN 60079-11: 2007, Clause 6.3.12, shall be conducted on each unit in type of protection intrinsic safety, between the signal/supply circuits and the base of the unit using a test voltage of 500 Vac during one minute, or 600 Vac during one second.

(16) **Test Report**

KEMA No. 2086867.

(17) **Special conditions for safe use**

For the different models of the Variable Area Flowmeter Series FAM54-....., the relation between the model code, the equipment marking, the electrical data, the ambient temperature range, the temperature class, and the medium temperature range, taking into account the presence of optional thermal isulation and/or a steam jacket, shall be taken from the tables under (15) above.

Service of the internal cylindrical flameproof joints (magnetic system) should be avoided. Contact the manufacturer if necessary.

(18) **Essential Health and Safety Requirements**

Covered by the standards listed at (9).

(19) **Test documentation**

As listed in Test Report No. 2086867.