



(1) **EC-TYPE EXAMINATION CERTIFICATE**

(2) Equipment or protective system intended for use in potentially explosive atmospheres – Directive 94/9/EC

(3) EC-Type Examination Certificate Number: **KEMA 01ATEX1078 X**

(4) Equipment or protective system: **Reflex Radar Level Transmitter Model BM 100**

(5) Manufacturer: **Krohne S.A.**

(6) Address: **Usine des Ors, 26103 Romans Cedex, France**

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

(8) KEMA, notified body number 0344 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment or protective system 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 report no. 2010685.


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

**EN 50014 : 1997    EN 50018 : 2000    EN 50019 : 2000    EN 50020 : 1994**  
**EN 50284 : 1999    EN 50281-1-1 : 1998**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system 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 the following:

 **II 1/2 GD    T 75 °C ... 150 °C**

**EEx d [ia] IIC T6 ... T3 or EEx de [ia] IIC T6 ... T3 or**  
**EEx d [ia] IIB T6 ... T3 or EEx de [ia] IIB T6 ... T3**

Arnhem, 1 August 2001  
by order of the Board of Directors of N.V. KEMA

T. Pijpker  
Certification Manager

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## SCHEDULE

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(15) **Description**

Reflex Radar Level Transmitter Model BM 100 Type VF044 ... and Type SF049 ..., consisting of an aluminium enclosure, containing the electronics circuits, and a passive probe, is used to measure the level or the volume of a fluid or solid process medium inside a vessel or tank. The distance to the surface of the process medium is determined by the reflexion time of an electro-magnetic pulse, transmitted in the probe system. The measured pulse delay is converted into an electrical output signal.

There are variations in the probe type, material and length, in the process connection, in the mounting of the transmitter and in the nature of the electrical output signal.

For the application of the apparatus in a potentially explosive atmosphere caused by the presence of air/gas mixtures, the enclosure is in type of explosion protection flameproof enclosure "d". The terminal compartment is either in type of explosion protection flameproof enclosure "d" or in type of explosion protection increased safety "e".

For the application of the apparatus in a potentially explosive atmosphere caused by the presence of air/dust mixtures, the ingress protection of the enclosure is at least IP 65 in accordance with EN 60529.

Ambient temperature range at the transmitter enclosure -20 °C ... +50 °C.

Following tables show the relation between ambient temperature, temperature of the mounting flange respectively process temperature and temperature class:

Temperature class	Ambient temperature	Process temperature or temperature of mounting flange
T6	≤ 50 °C	≤ 85 °C
T5	≤ 50 °C	≤ 100 °C
T4	≤ 50 °C	≤ 135 °C
T3	≤ 50 °C	≤ 150 °C

In temperature class T6, the temperature of the process medium may be higher than 85 °C, if the surface temperature at the mounting flange does not exceed 85 °C.

For use in a potentially explosive atmosphere caused by combustible dust, at a maximum ambient temperature of 50 °C, up to the maximum process temperature of 150 °C and with a dust layer of maximum 5 mm, the maximum surface temperature at any place of the apparatus is equal to the process temperature, but at least 75 °C.

**Electrical data**

Supply .....  $U_N = 90 \dots 240 \text{ Vac } (\pm 10 \%)$  or  
 (terminals 11 and 12)  $24 \text{ Vdc or ac } (\pm 10 \%),$   
 $P_N = \text{max. } 8 \text{ W resp } 10 \text{ VA}$   
 $U_m = 250 \text{ Vac}$

Output circuits ..... depending on the signal modules used, the following  
 (terminals 4.1, 4 and 6, 5 data apply to the intrinsically safe respectively the  
 for all type of circuits) non-intrinsically safe signal output circuits:

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**Electrical data (continued)**

Intrinsically safe signal output circuits:

Active signal circuit ..... in type of explosion protection intrinsic safety  
 EEx ia IIC, with following maximum values:

$$\begin{aligned} U_o &= 23,5 \text{ V} \\ I_o &= 98 \text{ mA} \quad (\text{linear characteristic}) \\ P_o &= 0,6 \text{ W} \end{aligned}$$

Maximum allowed external inductance  $L_o = 3,98 \text{ mH}$ ,  
 maximum allowed external capacitance  $C_o = 110 \text{ nF}$ .

and/or

Passive signal circuit(s) ..... in type of explosion protection intrinsic safety  
 HART protocol optional EEx ia IIC, only for connection to a certified  
 intrinsically safe circuit, with following maximum  
 values:

$$\begin{aligned} U_i &= 30 \text{ V} \\ I_i &= 250 \text{ mA} \\ P_i &= 1 \text{ W} \end{aligned}$$

and/or

Fieldbus (PA or FF) ..... in type of explosion protection intrinsic safety  
 EEx ia IIC, only for connection to a certified  
 intrinsically safe circuit, with following maximum  
 values:

$$\begin{aligned} U_i &= 30 \text{ V} \\ I_i &= 300 \text{ mA} \\ P_i &= 4,2 \text{ W} \end{aligned}$$

Of any intrinsically safe signal circuit, the effective internal capacitance  $C_i = 5 \text{ nF}$  and  
 the effective internal inductance  $L_i = 10 \text{ }\mu\text{H}$ .

The intrinsically safe circuits are infallibly galvanically isolated from the non-intrinsically  
 safe circuits up to a peak value of the rated voltage of 375 V.

Non-intrinsically safe signal output circuits:

Active or passive circuits  
 (HART, Fieldbus (PA or FF) ..... 
$$\begin{aligned} U_N &\leq 35 \text{ V} \\ I_N &\leq 50 \text{ mA} \\ U_m &= 250 \text{ Vac} \end{aligned}$$

**Installation instructions**

For the connection of the supply and signal cables, certified cable entries must be  
 used, suitable for the application and properly installed.

In applications with a process temperature  $\geq 100 \text{ }^\circ\text{C}$ , the connected cables must be  
 suitable for an operation temperature of at least  $75 \text{ }^\circ\text{C}$ .

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(16) **Report**

KEMA No. 2010685.

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

1. When the probe of a Level Transmitter is coated with a non-conductive layer, this probe may only be installed in a hazardous area where equipment category 1 G is required, under restriction of the apparatus group to IIB.
2. The use of a Level Transmitter with a sensor with a non-conductive layer is not allowed in a potentially explosive atmosphere caused by combustible dust, unless precautions are taken to prevent electrostatic discharges. This must be pointed out to the user by means of a warning.
3. The intrinsically safe Fieldbus (PA or FF) circuit is intended to be used in accordance with the FISCO model.
4. The probe may only be installed in an area where an explosive mixture is present continuously or for long periods, if the explosive atmosphere is under atmospheric conditions (-20 °C ... + 60 °C and 80 ... 100 kPa).

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

Essential Health and Safety Requirements not covered by the standards listed at (9)	
Clause	Subject
1.0.5	Marking
1.0.6 b)	Instructions
2.1.2	Explosive atmospheres caused by air/dust mixtures

These Essential Health and Safety Requirements are examined and positively judged. The results are laid down in the report listed at (16)

(19) **Test documentation**

1. EC-Type Examination Certificate PTB 01 ATEX 1047 U  
 EC-Type Examination Certificate PTB 97 ATEX 2265 U

signed

2. Description (45 pages) )
  3. Drawing No. F08207512 05 )
  - F08207512 06 )
  - F08207512 07 )
  - F08207512 09 )
  - F08207512 10 )
  - F08207512 11 )
  - F08207512 12 )
  - F08207512 14 )
  - F08207512 16 )
- 19.01.2001

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**Test documentation (continued)**

signed

Drawing No.	F08207512 17	)	
	F08207512 18	)	
	F08207512 19	)	
	F08207512 22	)	
	F08207512 23	)	
	F08207512 24	)	
	F08207512 28	)	
	F08207512 31	)	
	F08207512 32	)	
	F08207512 34	)	
	F08207512 35	)	19.01.2001
	F08207512 36	)	
	F08207512 37	)	
	F08207512 38	)	
	F08207512 39	)	
	F08207512 40	)	
	F08207512 41	)	
	F08207512 42	)	
	F08207512 43	)	
	F08207512 44	)	
	F08207512 70	)	
	F08207512 72	)	24.07.2001
	F08207512 77	)	
	F08207512 74	)	
	F08207860 01	)	
	F08207860 02	)	
	F08207860 03	)	
	F08207860 04	)	
	F08207860 05	)	
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	F08207860 07	)	
	F08207860 08	)	
	F08207860 09	)	
	F08207860 14	)	
	F08207860 15	)	19.01.2001
	F08207860 16	)	
	F08207860 19	)	
	F08207860 20	)	
	F08207860 21	)	
	F08207860 22	)	
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	F08207860 33	)	

4. Samples