

(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 04ATEX2125 X**

(4) Equipment or protective system: **Electro Magnetic Flowmeter Primary Head Series Optiflux 4000 / ... / ... -EEx**

(5) Manufacturer: **Krohne Altometer**

(6) Address: **Kerkeplaat 12, 3313 LC Dordrecht, The Netherlands**

(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 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 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. 2073824.

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

EN 50014 : 1997 + A1, A2
EN 50019 : 2000
EN 50281-1-1 : 1998 + A1

EN 50017 : 1998
EN 50020 : 2002

EN 50018 : 2000 + A1
EN 50028 : 1987

(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 according 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 2 GD

EEx me ia IIC or EEx de ia IIC or
EEx qe ia IIC or EEx e ia IIC
T6 ... T3 or T5 ... T3
T85 °C ... T150 °C or T85 °C ... T160 °C or
T85 °C ... T180 °C

Arnhem, 31 August 2004
 KEMA Quality B.V.



T. Pijpker
 Certification Manager

* This Certificate may only be reproduced in its entirety and without any change

SCHEDULE

to EC-Type Examination Certificate KEMA 04ATEX2125 X

Description

The Electro Magnetic Flowmeter Primary Head, series Optiflux 4000 / ... / ... -EEx is used to convert the flow of a conducting fluid into an electrical signal. An associated flow transmitter is used to supply the field coils of the primary head and to convert the measured electrode signal into an output signal.

The type of explosion protection for the various sizes of primary heads is as follows:

DN10 - DN20: encapsulation "m" (field coils) and increased safety "e" (field coil wiring) or

DN25 - DN150: flameproof enclosure "d" (field coils and field coil wiring) or

DN25 - DN300: powder filling "q" (field coils) and increased safety "e" (field coil wiring) or

DN200 - DN3000: increased safety "e" (field coils and field coil wiring).

The terminal compartment is in type of explosion protection increased safety "e".

The electrodes are in type of explosion protection intrinsic safety "i".

Ambient temperature range -40 °C ... +60 °C.

Minimum process temperature -40 °C.

The relation between temperature class, maximum surface temperature, maximum process temperature and ambient temperature is shown in the following tables:

Primary head in type of explosion protection "me" and in type of explosion protection "qe" sizes DN200-300

Temperature class	Max. process temperature		
	$T_a \leq 40\text{ °C}$	$40\text{ °C} < T_a \leq 50\text{ °C}$	$50\text{ °C} < T_a \leq 60\text{ °C}$
T6	75 °C	70 °C	70 °C
T5	95 °C	90 °C	75 °C
T4	130 °C	115 °C	75 °C
T3	150 °C	115 °C	75 °C

Primary head in type of explosion protection "d"

Temperature class	Max. process temperature		
	$T_a \leq 40\text{ °C}$	$40\text{ °C} < T_a \leq 50\text{ °C}$	$50\text{ °C} < T_a \leq 60\text{ °C}$
T6	70 °C	70 °C	70 °C
T5	85 °C	85 °C	85 °C
T4	120 °C	120 °C	120 °C
T3	180 °C	180 °C	180 °C

Primary head in type of explosion protection "qe" sizes DN25-150

Temperature class	Max. process temperature		
	$T_a \leq 40\text{ °C}$	$40\text{ °C} < T_a \leq 50\text{ °C}$	$50\text{ °C} < T_a \leq 60\text{ °C}$
T5	60 °C	55 °C	not possible
T4	110 °C	105 °C	100 °C
T3	180 °C	180 °C	180 °C

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Primary head in type of explosion protection "e"

Temperature class	Max. process temperature		
	$T_a \leq 40\text{ °C}$	$40\text{ °C} < T_a \leq 50\text{ °C}$	$50\text{ °C} < T_a \leq 60\text{ °C}$
T6	60 °C	60 °C	60 °C
T5	80 °C	75 °C	75 °C
T4	115 °C	115 °C	115 °C
T3	160 °C	150 °C	140 °C
T3 *	130 °C	130 °C	130 °C

(*) Reduced maximum temperatures at T3 for primary heads series Optiflux 4000 / ... / RT-EEEx

The maximum surface temperature T based on a maximum ambient temperature of 60 °C is 85 °C or the process temperature whichever is higher.

The degree of ingress protection of the apparatus enclosure is IP64 according to EN 60529.

Electrical data

Field coil circuit $U \leq 40\text{ V}$ (pulsed)
(terminals 7, 8 and 9) $I \leq 125\text{ mA}$ (fuse protected)

Electrodes circuit in type of explosion protection intrinsic safety EEx ia IIC,
(terminals 1, 2, 3 and 4) only for connection to a certified intrinsically safe circuit,
with the following maximum values:

$$\begin{aligned} U_i &= 20\text{ V} \\ I_i &= 175\text{ mA} \\ C_i &= 0\text{ nF} \\ L_i &= 0\text{ mH} \end{aligned}$$

The aforementioned intrinsically safe circuits shall, from the safety point of view, be considered to be connected to ground.

Installation instructions

When used in a potentially explosive atmosphere, requiring the use of apparatus of equipment category 2G, certified cable entry devices shall be used that are suitable for the application and correctly installed.

When used in a potentially explosive atmosphere, requiring the use of apparatus of equipment category 2D, certified cable entry devices with a degree of ingress protection of at least IP6X according to EN 60529 shall be used that are suitable for the application and correctly installed.

Unused openings shall be closed with suitable certified closing elements.

With the use of conduit, a suitable certified sealing device such as a stopping box with setting compound shall be provided immediately at the entrance to the flameproof enclosure.

Routine tests

An overpressure test according to EN 50018 clause 16 must be carried out on each primary head in type of explosion protection flameproof enclosure "d" at a test pressure of 14 bar during at least 10 seconds.

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An electric strength test of the filling material of the primary heads with the field coils in type of explosion protection powder filling "q" according to EN 50017 clause 13.2 shall be applied.

Electric strength tests according to EN 50019 Clause 6.1 shall be applied during one minute without breakdown as follows:

- On each terminal compartment with 500 V between the field coil circuit and the enclosure and with 1500 V between the field coil circuit and the intrinsically safe sensor circuit.
- On each primary head with field coil wiring in type of explosion protection increased safety "e" (all sizes except DN25 - DN150) with 500 V between the field coils circuit and the enclosure and with 1500 V between the field coils circuit and the intrinsically safe sensor circuit.

Routine tests according to EN 50028 must be carried out on the primary heads with field coils in type of explosion protection encapsulation "m" (sizes DN10 - DN20) as follows:

- Clause 7.1: Visual check;
- Clause 7.2: Each primary head shall withstand a test voltage of 1500 V during one minute without breakdown between the field coils circuit and the enclosure and between the field coils circuit and the intrinsically safe sensor circuit;
- Clause 7.3: Check of the electrical data.

(16) **Report**

KEMA No. 2073824.

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

The relation between temperature class, maximum surface temperature, maximum process temperature and ambient temperature is as shown above in description (15)

A heat resistant cable with a continuous operating temperature of at least 85 °C must be used at the primary heads

- with the field coils in type of explosion protection powder filling "q" of sizes DN25 - DN150 or flameproof enclosure "d" when $40\text{ }^{\circ}\text{C} < T_a \leq 50\text{ }^{\circ}\text{C}$ and process temperature $\geq 155\text{ }^{\circ}\text{C}$ or $T_a > 50\text{ }^{\circ}\text{C}$ and process temperature $\geq 105\text{ }^{\circ}\text{C}$.
- with the field coils in type of explosion protection increased safety "q" when $40\text{ }^{\circ}\text{C} < T_a \leq 50\text{ }^{\circ}\text{C}$ and process temperature $\geq 145\text{ }^{\circ}\text{C}$ or $T_a > 50\text{ }^{\circ}\text{C}$ and process temperature $\geq 110\text{ }^{\circ}\text{C}$.

The field coils in type of explosion protection "q" and "m" must be protected by a 160 mA fuse. The breaking capacity of the fuse must be in accordance with the prospective short circuit current of the supply.

(18) Essential Health and Safety Requirements

Covered by the standards listed at (9).

(19) **Test documentation**

- [illegible]

dated

- | | | |
|----|------------------------|------------|
| 2. | Description (32 pages) | 27.07.2004 |
| 3. | Drawing list | 27.07.2004 |
| 4. | Appendix list | 08.04.2004 |

AMENDMENT 1

to EC-Type Examination Certificate KEMA 04ATEX2125 X

Manufacturer: **Krohne Altometer**

Address: **Kerkeplaat 12, 3313 LC Dordrecht, The Netherlands**

Description

In future the Electro Magnetic Flowmeter Primary Head, series Optiflux 4000 / ... / ... -EEx may also be manufactured according to the documentation stated below.
The modification concerns the marking label.

Electrical data

Unchanged.

Routine tests

Unchanged.

Report

KEMA No. 2085484.

Special conditions for safe use

Unchanged.

Essential Health and Safety Requirements

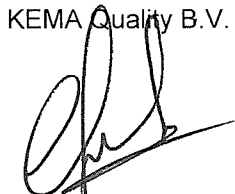
Unchanged.

Test documentation

signed

- | | |
|---------------------------|------------|
| 1. Description (3 pages) | 29.06.2005 |
| 2. Drawing No. 8.30697.10 | 29.06.2005 |

Arnhem, 9 August 2005
KEMA Quality B.V.


C.G. van Es
Certification Manager

AMENDMENT 2

to EC-Type Examination Certificate KEMA 04ATEX2125 X

Manufacturer: **Krohne Altometer**

Address: **Kerkeplaat 12, 3313 LC Dordrecht, The Netherlands**

Description

The type designation of the Electro Magnetic Flowmeter Primary Head, series Optiflux 4000 / ... / ... -EEx may also be Optiflux 2000 / ... / ... -EEx.

All other data remain unchanged.

Electrical data

Unchanged.

Routine tests

Unchanged.

Report

KEMA No. 2087963.

Special conditions for safe use

Unchanged.

Essential Health and Safety Requirements

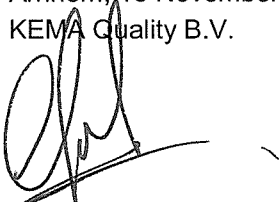
Unchanged.

Test documentation

signed

- | | |
|-----------------------------------|------------|
| 1. Description, rev. 1 (2 pages) | 07.11.2005 |
| 2. Drawing no. 8.30697.08, rev. B | 07.11.2005 |

Arnhem, 18 November 2005
KEMA Quality B.V.



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Certification Manager