



(1) **EU-TYPE EXAMINATION CERTIFICATE**
(Translation)

(2) Equipment or Protective Systems Intended for Use in
Potentially Explosive Atmospheres - **Directive 2014/34/EU**

(3) EU-Type Examination Certificate Number:

PTB 05 ATEX 2021 X

Issue: 1

(4) Product: Variable-area flow meters,
type series DK*4**/**/**/** or DK*800/**/**/**

(5) Manufacturer: Krohne Messtechnik GmbH

(6) Address: Ludwig-Krohne-Straße 5, 47058 Duisburg, Germany

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

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 17 of the Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential Test Report PTB Ex 18-28126.

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

EN 60079-0:2012 + A11:2013

EN 60079-11:2012

(10) If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

(11) This EU-Type Examination Certificate relates only to the design and construction of the specified product in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

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



II 2 G Ex ia IIC T6...T1 Gb

Konformitätsbewertungsstelle Sektor Explosionsschutz
On behalf of PTB:

Braunschweig, December 3, 2018

Dr.-Ing. F. Lienesch
Direktor und Professor



(13)

SCHEDULE

(14) **EU-Type Examination Certificate Number PTB 05 ATEX 2021 X, Issue: 1**

(15) Description of Product

The variable-area flow meters of type series DK*4**/**/**/** or DK*800/**/**/** are used to measure the volume flow rate of flammable and non-flammable gases and liquids in vertically aligned pipings. The variable-area flow meters may be equipped with up to two separately certified limit value sensors (ring initiators) which are operated with certified intrinsically safe circuits. The flow meters are available as two different variants, an on-site indicator mounted directly on the measuring tube or a design for the installation in control boards.

For permissible ambient and medium temperatures, reference is made to the following table 1:

| Type of initiator | Maximum permissible ambient / medium temperatures in °C | | | | | | | | |
|-------------------|---|----|---------|--------|----|---------|--------|----|---------|
| | Supply | | | | | | | | |
| | Type 1 | | | Type 2 | | | Type 3 | | |
| | Temperature class | | | | | | | | |
| | T6 | T5 | T4...T1 | T6 | T5 | T4...T1 | T6 | T5 | T4...T1 |
| RC10-14.-NO... | 65 | 65 | 65 | 65 | 65 | 65 | 50 | 65 | 65 |
| RC10-14.-N3... | 70 | 75 | 75 | 65 | 75 | 75 | 50 | 65 | 75 |
| RC15-14.-NO... | 65 | 65 | 65 | 65 | 65 | 65 | 50 | 65 | 65 |
| RC15-14.-N3... | 70 | 70 | 70 | 65 | 70 | 70 | 50 | 65 | 70 |
| | The lowest permissible ambient / medium temperature is -20 °C | | | | | | | | |
| I7R2010-N*** | 70 | 80 | 80 | 65 | 80 | 80 | 50 | 65 | 80 |
| I7R2010-NL*** | 70 | 80 | 80 | 70 | 80 | 80 | 65 | 80 | 80 |
| I7R2015-N*** | 70 | 80 | 80 | 65 | 80 | 80 | 50 | 65 | 80 |
| I7R2015-NL*** | 70 | 80 | 80 | 70 | 80 | 80 | 65 | 80 | 80 |
| | The lowest permissible ambient / medium temperature is -20 °C | | | | | | | | |

Table 1: Permissible ambient / medium temperatures in °C

The indicated values apply under the following conditions:

- The variable-area flow meters are operated in their intended mounting position.
- The variable-area flow meters are not exposed to heat radiation.

SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 05 ATEX 2021 X, Issue: 1

Electrical data:

Supply circuit(s):
(terminals 1/+, - and 2/+, -)

type of protection Intrinsic Safety Ex ia IIC
only for connection to certified intrinsically safe circuits with
the maximum values according to the following table 2:

| | Maximum values per circuit | | |
|--------|----------------------------|------------|------------|
| | U_i [V] | I_i [mA] | P_i [mW] |
| type 1 | 16 | 25 | 34 |
| type 2 | 16 | 25 | 64 |
| type 3 | 16 | 52 | 169 |

Table 2: Maximum values per circuit

The effective internal reactances (C_i/L_i) per circuit result from
the values of the ring initiators used according to the
following table 3:

| Type of initiator | C_i [nF] | L_i [μ H] |
|-------------------|------------|------------------|
| RC10-14.-NO... | ≤ 210 | ≤ 100 |
| RC10-14.-N3... | ≤ 150 | ≤ 120 |
| RC15-14.-NO... | ≤ 210 | ≤ 100 |
| RC15-14.-N3... | ≤ 150 | ≤ 70 |
| | | |
| I7R2010-N*** | ≤ 210 | ≤ 100 |
| I7R2010-NL*** | ≤ 150 | ≤ 120 |
| I7R2015-N*** | ≤ 210 | ≤ 100 |
| I7R2015-NL*** | ≤ 150 | ≤ 70 |

Table 3: Effective internal reactances per circuit

The tabulated values already include an internal capacitance
of 60 nF from the input circuitry.

Changes with respect to previous editions

- Introduction of a new variant intended for direct installation in control boards
- Adaption to the current state of standards
- Revision of the operating instructions manual
- Summarization of the specifications from the initial certificate and the 1st and 2nd supplement with the abovementioned modifications to represent the current state of production.

(16) Test Report PTB Ex18-28126

SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 05 ATEX 2021 X, Issue: 1

(17) Specific conditions of use

1. When flammable media are used, the variable-area flow meters of type series DK*4**/**/**/** or DK*800/**/**/** shall be included in the recurring pressure test of the process piping.
2. For permissible ambient/medium temperatures reference is made to table 1 (see also operating instructions manual).
3. To avoid electrostatic charge, the flow meters shall be connected to the local equipotential bonding system as specified in the operating instructions manual.
4. The operation with flammable media outside of the atmospheric conditions ($-20\text{ °C} \leq T \leq +60\text{ °C}$ and $0.8\text{ bar} \leq P \leq 1.1\text{ bar}$) is permissible, provided that these media do not form explosive medium/air-mixtures. The operating company is responsible for the safe operation of the measuring system regarding temperatures and pressures of the media used.

(18) Essential health and safety requirements

Met by compliance with the aforementioned standards.

According to Article 41 of Directive 2014/34/EU, EC-type examination certificates which have been issued according to Directive 94/9/EC prior to the date of coming into force of Directive 2014/34/EU (April 20, 2016) may be considered as if they were issued already in compliance with Directive 2014/34/EU. By permission of the European Commission supplements to such EC-type examination certificates and new issues of such certificates may continue to hold the original certificate number issued before April 20, 2016.

Konformitätsbewertungsstelle, Sektor Explosionsschutz
On behalf of PTB:

Braunschweig, December 3, 2018


Dr.-Ing. F. Lienesch
Direktor und Professor





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

(2) Equipment and Protective Systems Intended for Use in
Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

PTB 05 ATEX 2021 X



(4) Equipment: Miniature flow meters, type series DK* ***/**/**/**

(5) Manufacturer: Krohne Messtechnik GmbH & Co.KG

(6) Address: Ludwig-Krohne-Strasse 5, 47058 Duisburg, Germany

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

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 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 the confidential report PTB Ex 05-24406 .

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

EN 50014:1997 + A1 + A2

EN 50020:2002

(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 in accordance 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 2 G EEx ia IIC T6

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, April 4, 2005


Dr.-Ing. U. Johannsmeyer
Regierungsdirektor



(13)

SCHEDULE

(14)

EC-TYPE-EXAMINATION CERTIFICATE PTB 05 ATEX 2021 X

(15) Description of equipment

The miniature flow meters, type series DK* ***/**/** are used to measure the volume flow rate of flammable and non-flammable gases and liquids. The flow meters may be equipped with up to two separately certified ring initiators which are operated with certified intrinsically safe circuits.

For permissible ambient/medium temperatures reference is made to the following table 1:

| Ring initiator, type | maximum permissible ambient/medium temperature in °C | | | | | | | | |
|----------------------|--|----|---------|--------|----|---------|--------|----|---------|
| | supply | | | | | | | | |
| | type 1 | | | type 2 | | | type 3 | | |
| | temperature class | | | | | | | | |
| | T6 | T5 | T4...T1 | T6 | T5 | T4...T1 | T6 | T5 | T4...T1 |
| RC10-14.-NO... | 65 | 65 | 65 | 65 | 65 | 65 | 50 | 65 | 65 |
| RC10-14.-N3... | 70 | 75 | 75 | 65 | 75 | 75 | 50 | 65 | 75 |
| RC15-14.-NO... | 65 | 65 | 65 | 65 | 65 | 65 | 50 | 65 | 65 |
| RC15-14.-N3... | 70 | 70 | 70 | 65 | 70 | 70 | 50 | 65 | 70 |

Table 1: Maximum permissible ambient/medium temperature in °C

The indicated values apply provided that:

- The miniature flow meters are operated in their intended mounting position.
- The miniature flow meters are not exposed to heat radiation.

Electrical data:

Supply circuit(s):
(terminals 1/+, - and 2/+, -)

type of protection Intrinsic Safety EEx ia IIC
only for connection to certified intrinsically safe circuits with the maximum values according to the following table 2:

| | maximum values per circuit | | |
|--------|----------------------------|---------------------|---------------------|
| | U _i [V] | I _i [mA] | P _i [mW] |
| type 1 | 16 | 25 | 34 |
| type 2 | 16 | 25 | 64 |
| type 3 | 16 | 52 | 169 |

Table 2: Maximum values per circuit

The effective internal reactances (C_i/L_i) per circuit result from the values of the ring initiators used according to the following table 3:

| Ring initiator, type | C_i [nF] | L_i [μ H] |
|----------------------|------------|------------------|
| RC10-14.-NO... | ≤ 210 | ≤ 100 |
| RC10-14.-N3... | ≤ 150 | ≤ 120 |
| RC15-14.-NO... | ≤ 210 | ≤ 100 |
| RC15-14.-N3... | ≤ 150 | ≤ 70 |

Table 3: Effective internal reactances per circuit

The values indicated, already include an internal capacitance of 60 nF from the input circuitry.

(16) Test report PTB Ex 05-24406

(17) Special conditions for safe use

1. When flammable media are used, the miniature flow meters, type series DK* ***/**/**/** shall be included in the recurring pressure test of the process piping.
2. For permissible ambient/medium temperatures reference is made to table 1 (see also operating instructions).
3. To avoid electrostatic charge, the flow meters shall be connected to the local equipotential bonding system as specified in the operating instructions.
4. The operation with flammable media outside of the atmospheric conditions ($-20\text{ °C} \leq T \leq +60\text{ °C}$ and $0,8\text{ bar} \leq P \leq 1,1\text{ bar}$) is permissible provided that these media do not form explosive medium/air-mixtures. The operating company is responsible for the safe operation of the measuring system as regards temperatures and pressures of the media used.

(18) Essential health and safety requirements

met by compliance with the standards mentioned above

Zertifizierungsstelle Explosionsschutz

By order:


Dr.-Ing. U. Johannsmeyer
Regierungsdirektor



Braunschweig, April 4, 2005

sheet 3/3

1. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 05 ATEX 2021 X

(Translation)

Equipment: Variable-area flow meters, type series DK* ***/**/**/**

Marking:  II 2 G EEx ia IIC T6

Manufacturer: Krohne Messtechnik GmbH & Co. KG

Address: Ludwig-Krohne-Strasse 5, 47058 Duisburg, Germany

Description of supplements and modifications

In the future the variable-area flow meters of type series DK* ***/**/**/** may also be manufactured and operated according to the test documents listed in the test report. The modifications concern the installation of alternative ring initiators which are separately certified. The table of the maximum permissible ambient and medium temperatures as well as the electrical data are extended correspondingly. Furthermore, this supplement comprises the adaption to the current state of the standard series EN 60079-et sqq. and, therefore, the marking of the equipment.

This will read in future:  II 2 G Ex ia IIC T6...T1

For permissible ambient and medium temperatures, reference is made to the following table 1:

| Type of initiator | Maximum permissible ambient / medium temperatures in °C | | | | | | | | |
|-------------------|---|----|---------|--------|----|---------|--------|----|---------|
| | Supply | | | | | | | | |
| | Type 1 | | | Type 2 | | | Type 3 | | |
| | Temperature class | | | | | | | | |
| | T6 | T5 | T4...T1 | T6 | T5 | T4...T1 | T6 | T5 | T4...T1 |
| RC10-14.-NO... | 65 | 65 | 65 | 65 | 65 | 65 | 50 | 65 | 65 |
| RC10-14.-N3... | 70 | 75 | 75 | 65 | 75 | 75 | 50 | 65 | 75 |
| RC15-14.-NO... | 65 | 65 | 65 | 65 | 65 | 65 | 50 | 65 | 65 |
| RC15-14.-N3... | 70 | 70 | 70 | 65 | 70 | 70 | 50 | 65 | 70 |
| | The lowest permissible ambient / medium temperature is -20 °C | | | | | | | | |
| I7R2010-N*** | 70 | 80 | 80 | 65 | 80 | 80 | 50 | 65 | 80 |
| I7R2010-NL*** | 70 | 80 | 80 | 70 | 80 | 80 | 65 | 80 | 80 |
| I7R2015-N*** | 70 | 80 | 80 | 65 | 80 | 80 | 50 | 65 | 80 |
| I7R2015-NL*** | 70 | 80 | 80 | 70 | 80 | 80 | 65 | 80 | 80 |
| | The lowest permissible ambient / medium temperature is -20 °C | | | | | | | | |

Table 1: Permissible ambient / medium temperatures in °C

1. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 05 ATEX 2021 X

The indicated values apply under the following conditions:

- The variable-area flow meters are operated in their intended mounting position.
- The variable-area flow meters are not exposed to heat radiation.

Electrical data:

Supply circuit(s):
(terminals 1/+, - and 2/+, -)

type of protection Intrinsic Safety Ex ia IIC
only for connection to certified intrinsically safe circuits with
the maximum values according to the following table 2:

| | Maximum values per circuit | | |
|--------|----------------------------|------------|------------|
| | U_i [V] | I_i [mA] | P_i [mW] |
| type 1 | 16 | 25 | 34 |
| type 2 | 16 | 25 | 64 |
| type 3 | 16 | 52 | 169 |

Table 2: Maximum values per circuit

The effective internal reactances (C_i/L_i) per circuit result from
the values of the ring initiators used according to the
following table 3:

| Type of initiator | C_i [nF] | L_i [μ H] |
|-------------------|------------|------------------|
| RC10-14.-NO... | ≤ 210 | ≤ 100 |
| RC10-14.-N3... | ≤ 150 | ≤ 120 |
| RC15-14.-NO... | ≤ 210 | ≤ 100 |
| RC15-14.-N3... | ≤ 150 | ≤ 70 |
| | | |
| I7R2010-N*** | ≤ 210 | ≤ 100 |
| I7R2010-NL*** | ≤ 150 | ≤ 120 |
| I7R2015-N*** | ≤ 210 | ≤ 100 |
| I7R2015-NL*** | ≤ 150 | ≤ 70 |

Table 3: Effective internal reactances per circuit

The tabulated values already include an internal capacitance
of 60 nF from the input circuitry.

All further specifications of the EC-type examination certificate as well as the "Special Conditions"
apply without changes also to this 1st supplement.

Applied standards

EN 60079-0:2006

EN 60079-11:2007

Assessment and test report:

PTB Ex 09-29134

Zertifizierungssektor Explosionsschutz

By order:

Braunschweig, October 28, 2009

Dr.-Ing. U. Johannsmeyer
Direktor und Professor



2. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 05 ATEX 2021 X

(Translation)

Equipment: Variable-area flow meters, type series DK* ***/**/**/**

Marking:  II 2 G Ex ia IIC T6...T1

Manufacturer: Krohne Messtechnik GmbH
formerly
Krohne Messtechnik GmbH & Co. KG

Address: Ludwig-Krohne-Straße 5, 47058 Duisburg, Germany

Description of supplements and modifications

In the future the variable-area flow meters of type series DK* ***/**/**/** may also be manufactured and operated according to the test documents listed in the test report. The modifications concern the adaption to the current state of the standards, the marking of the equipment as well as marginal modifications on the EMC-filter board which do not affect explosion protection. Furthermore the legal form of the company changes as stated above.

In the future the marking will be specified with EPL as follows:

 II 2 G Ex ia IIC T6...T1 Gb

The "Special Conditions", the "Electrical Data" and all further specifications of the EC-type examination certificate and the 1st supplement apply without changes also to this 2nd supplement.

Applied standards

EN 60079-0:2012

EN 60079-11:2012

Test report: PTB Ex 15-25204

Konformitätsbewertungsstelle: Sektor Explosionsschutz

Braunschweig, December 17, 2015

On behalf of PTB:

Dr.-Ing. U. Johannsmeyer
Direktor und Professor



Sheet 1/1

EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.