CUSTOMS UNION

Translated from Russian

CERTIFICATE OF CONFORMITY

EAC

№ ТС **RU C-DE.AA87.B.01261**

Series RU No 0743907

CERTIFICATION BODY Certification Body of Explosion-Proof and Mine Equipment (CB CCVE) of the Limited Liability Company «Certification Centre of Explosion-Proof and Mine Equipment» (OOO «NANIO CCVE»). Location of legal entity: Office 26, level 3, build. 6B , AO «Zavod ECOMASH», VUGI Settlement, Lyubertsy, Lyubertsy district, Moscow region, 140004, Russia; Address of place of business within the scope of accreditation: Offices 26/3,26/4, 26/5, 27/6, 30/1, 32, level 3, build. 6B , AO «Zavod ECOMASH», VUGI Settlement, Lyubertsy, Lyubertsy district, Moscow region, 140004, Russia. Accreditation Certificate No RA.RU.11AA87 issued on 20.07.2015 . Tel.: +7 (495) 558-83-53, +7(495) 558-82-44 E-mail: ccve@ccve.ru.

APPLICANT **Limited Liability Company «KROHNE Engineering»,**
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MANUFACTURER **KROHNE Messtechnik GmbH,**
Ludwig-Krohne-Straße. 5, 47058 Duisburg, Germany

PRODUCTS **Variable area flowmeters DK32, DK34, DK 37 with Ex-marking in accordance with the Schedule (produced in accordance with the technical documentation of the manufacturer KROHNE Messtechnik GmbH for variable area flowmeters DK32, DK34, DK 37) (see forms Nos 0550129, 0550130, 0550131, 0550132).**
Serial production.

TN VED TS codes **9026 10 2100, 9026 80 2000, 9026 10 8100, 9026 80 8000**

MEET THE REQUIREMENTS OF Technical Regulation of the Customs Union TR CU 012/2011 «On safety of equipment intended for use in explosive atmospheres»

THE CERTIFICATE IS ISSUED ON THE BASIS OF Assessment and Testing Report No. 226.2018-T of 15.11.2018 prepared by the Testing Laboratory of Explosion-Proof and Mine Equipment (TL CCVE) of the Limited Liability Company «Certification Centre of Explosion-proof and Mine Equipment» (OOO «NANIO CCVE») (Accreditation Certificate No RA.RU.21AK06 of 19.01.2016);

Certified products production audit report No 116-A/17 of 15.12.2017 prepared by the Certification Body of Explosion-Proof and Mine Equipment (CB CCVE) of the Limited Liability Company «Certification Centre of Explosion-Proof and Mine Equipment» (OOO «NANIO CCVE») (Accreditation Certificate No RA.RU.11AA87 issued on 20.07.2015). Certification scheme 1c.

ADDITIONAL INFORMATION

For the list of standards see the Schedule, form No 0550132.
The storage conditions and storage period are specified in the technical documentation.
The assigned service life is not less than 10 years.

PERIOD OF VALIDITY **From 21.11.2018 to 20.11.2023 INCLUSIVE**

Stamp	**Head (authorized person) of the certification body**	(signature)	**Alexander Sergeevich Zalogin** (initials, surname)
	Expert (auditor) (experts (auditors))	(signature)	**Olga Borisovna Malkovich** (initials, surname)

SCHEDULE
TO CERTIFICATE OF CONFORMITY No. RU C-DE.AA87.B.01261 Sheet 1

Series RU No 0550129

1. PURPOSE

Variable area flowmeters DK32, DK34, DK 37 (hereinafter referred to as the variable area flowmeters) are designed for measuring the volumetric flow rate and volume of flammable and non-flammable gases and liquids in pipelines.

The field of application: hazardous areas in accordance with the Ex-marking, GOST IEC 60079-14-2013.

2. MAIN TECHNICAL DATA

2.1. Model code

2.1.1. Variable area flowmeters DK32, DK 34

DK32 (DK34)	/...	/...	/...	/...	/...	- Ex	-...
	1	2	3	4	5		6

1) Availability of inlet and outlet pressure regulators – not safety relevant
2) Number of limit switches:
   - «no value»: 0
   - K1: one limit switch
   - K2: two limit switches
3) Type of connection of limit switches:
   - «no value»: no limit switches used
   - S: connection plug
   - L: cable gland with a cable
4) Version:
   - «no value»: standard version
   - HT: high temperature version
5) Availability of limit switches:
   - «no value»: no limit switches used
   - A: limit switches are used
6) Compliance with safety level SIL:
   - «no value»: does not comply
   - SK: complies with safety level SIL for limit switches

Note: "No value" positions in the marking can be skipped (not specified in the marking).

2.1.2 Variable area flowmeters DK37

DK37	/...	/...	/...	/...	-...
	1	2	3	4	5

Type of display:
   - M8M: mechanical display without level switches or with one or two limit switches
   - M8E: electronic display
2) Material of display:
   - «no value»: plastic
   - R: stainless steel
3) Availability of inlet and outlet pressure regulators – not safety relevant
4) Number of limit switches:
   - «no value»: 0
   - K1: one limit switch
   - K2: two limit switches
5) Compliance with safety level SIL:
   - «no value»: does not comply
   - SK: complies with safety level SIL for limit switches
   - SE: complies with safety level SIL for current output

Note: "No value" positions in the marking can be skipped (not specified in the marking).

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SCHEDULE
TO CERTIFICATE OF CONFORMITY No. RU C-DE.AA87.B.01261 Sheet 2

Series RU No 0550130

2.2. Ex-marking of variable area flowmeters:

Variable area flowmeters DK32, DK34 — 1Ex ia IIC T6…T3 Gb; II Gb c T6...T1 X; III Db c T150 °C X

Variable area flowmeters DK37 with display M8E — 1Ex ia IIC T6…T3 Gb X; Ex ia IIIC T75°C ... T200°C Db X; II Gb c IIC T6...T3 X, III Db c T150°C X,

Variable area flowmeters DK37 with display M8M — II Gb c IIC T6...T3 X; III Db c T150°C X; 1Ex ia IIC T6…T3 Gb X

Note:
The temperature class in relation to the maximum ambient temperature and the maximum process temperature is specified in 2.3 and 2.5

2.3. Ambient temperature range for variable area flowmeters:
- DK32, DK34 with the type of protection «i»: as per 2.5
- DK32, DK34, DK37 with the type of protection «c»[1]: from minus 40 °C to plus 70 °C
- DK37 with the type of protection «i»: from minus 40 °C to the values as per 2.5

Note:
For DK32 HT and DK34 HT the ambient temperature range is from minus 25 to plus 200 °C for Gb and from minus 25 to plus 150 °C for Db.

2.4. Degree of protection provided by enclosures (IP Code) to GOST 14254-2015 for variable area flowmeters:

DK32, DK34:
- with cable glands — IP65
- without cable glands — IP66/IP68

DK37:
- with plastic display — IP66
- with stainless steel display — IP66/IP67

2.5 The temperature class in relation to the maximum ambient temperature and the maximum process temperature

2.5.1. For DK32, DK34 with the type of protection «i»:

Temperature class	Permissible ambient temperature range, °C	Maximum permissible process temperature, °C	
		DK32	DK34
T6	from -20 to +40	75	80
	from -20 to +50	70	70
	from -20 to +60	60	60
T5	from -20 to +40	100	100
	from -20 to +50	95	100
	from -20 to +60	85	90
T4	from -20 to +40	135	135
	from -20 to +50	130	135
	from -20 to +60	120	130
	from -20 to +90	90	90
T3	from -20 to +40	135	150
	from -20 to +50	130	140
	from -20 to +60	120	130
	from -20 to +90	90	90

Note –
1) The minimum process temperature is - 20 °C

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SCHEDULE
TO CERTIFICATE OF CONFORMITY No. RU C-DE.AA87.B.01261 Sheet 3

Series RU No 0550131

2.5.2. For DK37 with the type of protection «i»:

Temperature class	T6			T5				T4				T3			
Maximum permissible ambient temperature, °C	40	50	60	40	50	60	65	40	50	60	65	40	50	60	65
Type of Variable Area Flowmeter	Maximum permissible process temperature, °C														
DK37 with display M8E	70	-	-	100	95	75	-	135	135	115	100	160	140	115	100
DK37 with display M8M (64 mW)	85	85	75	100	100	100	100	135	135	135	135	200	190	150	135
DK37 with display M8M (169 mW)	40	-	-	90	65	-	-	135	135	110	100	160	135	110	100

Notes:
1) The minimum process temperature is -40 °C.
2) The maximum surface temperature T75 °C was determined for a dust layer thickness of maximum 5 mm and applies to a maximum ambient temperature of 65 °C and a maximum process temperature of 75 °C. For a process temperature over 75 °C the maximum surface temperature is equal to the process temperature.

2.5.3 For DK32, DK34, DK37 with the type of protection «c» the actual maximum surface temperature of the housing depends on the process temperature , and for the versions with heating jacket, on heat transfer fluid.
process temperature range :

- for standard version of Variable Area Flowmeters without valves: from minus 80 to plus 150 °C
- for standard version of Variable Area Flowmeters with valves and FPM/PTFE or FFKM gaskets: from minus 25 to plus 150 °C
- for standard version of Variable Area Flowmeters with valves and PTFE or EPDM gaskets: from minus 25 to plus 150 °C
- for HT version with FFKM gaskets[1]: from minus 25 to plus 200 °C

Note:
1) For Ex Db – from minus 25 to plus 150 °C

2.6 Electrical data of intrinsically safe signal circuits of Variable Area Flowmeters DK32, DK34, only for connection to a certified intrinsically safe circuit of «ia» level and Group IIC, with the following maximum values:
Ui: 16 V, Ii: 25 mA, Pi: 0,064 W, Ci: 150 nF, Li: 150 μH.
2.7 Electrical data of intrinsically safe signal circuits of Variable Area Flowmeter DK37 with a display M8E, only for connection to a certified intrinsically safe circuit of «ia» level and Group IIC, with the following maximum values:
Ui: 30 V, Ii: 120 mA, Pi: 1 W, Ci: 0, Li: 0. (2-wire output 4...20 mA with HART® protocol)
2.8 Electrical data of intrinsically safe signal circuits of Variable Area Flowmeter DK37 with a display M8M, only for connection to a certified intrinsically safe circuit of «ia» level and Group IIC, with the following maximum values:
- with limit switches Pepperl + Fuchs GmbH, models SC2-N0, type 2 and type 3:
  Type 2: Ui: 16 V; Ii: 25 mA; Pi: 64 mW; Ci: 165 nF; Li: 150 μH
  Type 3: Ui: 16 V; Ii: 52 mA; Pi: 169 mW; Ci: 165 nF; Li: 150 μH
- with limit switches Pepperl + Fuchs GmbH, models SJ2-SN, type 2 and type 3:
  Type 2: Ui: 16 V; Ii: 25 mA; Pi: 64 mW; Ci: 45 nF; Li: 100 μH
  Type 3: Ui: 16 V; Ii: 52 mA; Pi: 169 mW; Ci: 45 nF; Li: 100 μH
- with limit switches Pepperl + Fuchs GmbH, models SJ2-S1N, type 2 and type 3:
  Type 2: Ui: 16 V; Ii: 25 mA; Pi: 64 mW; Ci: 75 nF; Li: 100 μH
  Type 3: Ui: 16 V; Ii: 52 mA; Pi: 169 mW; Ci: 75 nF; Li: 100 μH
- with limit switches IFM Electronic GmbH, models I7S2002-N:
  Ui: 16 V; Ii: 25 mA; Pi: 64 mW; Ci: 165 nF; Li: 120 μH
  Ui: 16 V; Ii: 52 mA; Pi: 169 mW; Ci: 165 nF; Li: 120 μH

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SCHEDULE
TO CERTIFICATE OF CONFORMITY No. RU C-DE.AA87.B.01261 Sheet 4

Series RU No 0550132

3. DESCRIPTION OF DESIGN AND MEANS PROVIDING EXPLOSION PROTECTION

The principle of operation of variable area flowmeters is based on the measurement of the height of the float, moving along a conical, vertically mounted pipe due to the movement of the process medium, forming an annular gap between it and the walls of the pipe so that the forces acting on the float (the force of gravity, the pushing force and the flow head) become equal. The height of the float movement is linearly related to the flow rate of the process medium.

The Variable Area Flowmeters consist of a vertical conical measuring pipe made of metal, in which the float of a special shape moves freely up and down. The position of the float is transmitted to the display by magnetic coupling.

The Variable Area Flowmeters DK 37 are equipped with a display M8, which can be mechanical (M), or can have an electronic converter (E).

The displays M8 in mechanical design (M) have a mechanical indicator of the current flow rate and can be supplied with one (K1) or two (K2) limit switches. The displays M8 with electronic converter (E) have an electronic indicator with an output signal of 4-20 mA.

The Variable Area Flowmeters DK 32 are made with a needle valve and horizontal connection, and DK 34 are made without a needle valve and with vertical connection. Electrical connection is possible via a cable gland (L) or a plug connection (S).

All Variable Area Flowmeters can be equipped with a pressure regulator and limit switches: inlet differential pressure regulator (RE), outlet differential pressure regulator (RA), one limit switch (K1), two limit switches (K2)

Detailed information about the design, installation methods, structure of symbols, operating conditions of Variable Area Flowmeters is given in the Operating Manual MA DK32/34/37.

Explosion protection of Variable Area Flowmeters is provided due to fulfilment of requirements of the following standards:
GOST 31610.0-2014 (IEC 60079-0:2011) «Explosive atmospheres. Part 0. Equipment. General requirements»;
GOST 31610.11-2014 (IEC 60079-11:2011) «Explosive atmospheres - Part 11: Equipment protection by intrinsic safety «i»;
GOST 31441.1-2011(EN 13463-1:2001) Non-electrical equipment for potentially explosive atmospheres. Part 1. General requirements
GOST 31441.5-2011 (EN 13463-5:2003) Non-electrical equipment for potentially explosive atmospheres. Part 5. Protection by constructional safety "c"

4. MARKING

The marking affixed to the housings of the variable area flow meters shall include the following:

- the registered trade mark or the name of the of the manufacturer;
- the type of product;
- the serial number and the year of production;
- the ambient temperature range;
- the Ex-marking;
- the special explosion safety mark;
- the warnings on the nameplate;
- the name of the certification body and the certificate reference

and other information that the manufacturer shall specify in the marking if required in the technical documentation.

5. SPECIAL CONDITIONS OF SAFE USE

The symbol **X** placed after the Ex-marking means that the following conditions (special conditions of safe use) specified in the Operating Manual shall be met when using the variable area flow meters :

5.1 If any damage affecting the integrity of the enclosure is found the housing of the flowmeter shall be replaced.

5.2 The appropriate measures shall be taken to prevent building-up of electrostatic charge on painted and non-metallic parts of variable area flowmeters.

Special conditions of use marked with the symbol X shall be included in the accompanying documentation to be supplied with each product.

Changes to the approved design (composition) of products which have effect on explosion protection shall only be made with the approval of NANIO CCVE in accordance with the requirements of the TR CU 012/2011.

Surveillance audit: in 2019, 2020, 2021, and 2022.

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I confirm the correctness of the translation from Russian.
Translator of NANIO CCVE A.S. Yaroslavtseva

I certify the signature of A.S. Yaroslavtseva.
Technical Director of NANIO CCVE B.V. Chernov