

1 EU – Type Examination Certificate

2 Equipment or Protective System Intended for use in Potentially Explosive Atmospheres
Directive 2014/34/EU

3 EU – Type Examination Certificate Number: **KIWA 14ATEX0017 X Issue: 2**

4 Product: **Vortex Flowmeter Series OPTISWIRL 4200**

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 Kiwa Nederland B.V., Notified Body number 0620 in accordance with Article 17 of 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 confidential ATEX Assessment Report No. 141100409, issue 2.

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. 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 ... T2 Gb

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Pieter van Breugel
Certification Officer

Issue date:

19 July 2017

First issue:

6 May 2015

This certificate shall, as far as applicable, be revised before the date of cessation of presumption of conformity of (one of) the included standards above as communicated in the Official Journal of the European Union.

© Integral publication of this certificate in its entirety and without any change is allowed.

13 **SCHEDULE**

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15.1 **Description of Product**

Vortex Flowmeters model OPTISWIRL 4200 C ... i Ex (compact versions with integral sensor) and model OPTISWIRL 4200 F ... i Ex (versions with separate sensor assembly) are used to convert the measurement signal of a vortex sensor into an electrical signal. The different I/O options are described in 15.2, electrical data.

Flowmeters OPTISWIRL 4200 C ... i - Ex consist of a signal converter and an integral sensor. Flowmeters OPTISWIRL 4200 F ... i - Ex consist of a signal converter model VFC 200 F ... i 020 – Ex and a separate sensor assembly model OPTISWIRL 4000 F.

The integral sensor and the separate sensor assemblies are available in different sizes (DN15 - DN300).

The Flowmeter can be provided with an indicator for local read-out and control.

Thermal data

The temperature class in relation to the maximum ambient temperature, the maximum process temperature, material, finish and the sensor size, also depending on the mounting position of the transmitter or terminal enclosure with respect to the sensor, is listed in the following tables:

OPTISWIRL 4200 C ... i Ex and OPTISWIRL 4000 F with transmitter enclosure respectively terminal enclosure, both made with finish, on top of the sensor.

Temperature class	T6	T5	T4	T3			T2		
T ambient [°C]	40	60	65	40	60	65	40	60	65
Sensor size	Maximum process temperature [°C]								
DN15 - DN25	85	65	135	200	200	185	240	210	185
DN40 - DN50	75	65	135	200	195	165	240	195	165
DN60 - DN100	70	65	135	200	165	145	240	165	145
DN150 - DN300	80	65	135	200	200	170	240	200	170

OPTISWIRL 4200 C ... i Ex and OPTISWIRL 4000 F with transmitter enclosure respectively terminal enclosure, both made with finish, at the side of or underneath the sensor.

Temperature class	T6	T5	T4	T3	T2
T ambient [°C]	40	60	65	65	65
Sensor size	Maximum process temperature [°C]				
DN15 - DN25	85	90	135	200	240
DN40 - DN50	85	80	135	200	240
DN60 - DN100	85	75	135	200	240
DN150 - DN300	85	80	135	200	240

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OPTISWIRL 4200 C ... i Ex and OPTISWIRL 4000 F with transmitter enclosure respectively terminal enclosure, both made of blank stainless steel, on top of the sensor.

Temperature class	T6	T5	T4		T3			T2		
T ambient [°C]	40	60	60	65	40	60	65	40	60	65
Sensor size	Maximum process temperature [°C]									
DN15 - DN25	70	60	135	135	200	180	155	225	180	155
DN40 - DN50	65	60	135	135	200	160	140	235	160	140
DN60 - DN100	60	60	135	125	200	140	125	200	140	125
DN150 - DN300	65	60	135	135	200	165	145	220	165	145

OPTISWIRL 4200 C ... i Ex and OPTISWIRL 4000 F with transmitter enclosure respectively terminal enclosure, both made of blank stainless steel, at the side of the sensor.

Temperature class	T6	T5	T4	T3			T2	
T ambient [°C]	40	60	65	65			60	65
Sensor size	Maximum process temperature [°C]							
DN15 - DN25	85	60	135	200			240	240
DN40 - DN50	85	60	135	200			240	225
DN60 - DN100	85	60	135	200			240	225
DN150 - DN300	85	60	135	200			240	240

OPTISWIRL 4200 C ... i Ex and OPTISWIRL 4000 F with transmitter enclosure respectively terminal enclosure, on top of the sensor. All with a finish.

Temperature class	T6	T5	T4		T3, T2		
T ambient [°C]	40	60	60	65	40	60	65
Sensor size	Maximum process temperature [°C]						
DN15 - DN25	60	60	120	120	120	120	120
DN40 - DN50	55	60	120	115	120	120	115
DN60 - DN100	55	60	110	105	120	110	105
DN150 - DN300	60	60	120	115	120	120	115

OPTISWIRL 4200 C ... i Ex and OPTISWIRL 4000 F with transmitter enclosure respectively terminal enclosure, at the side of or underneath the sensor. All with a finish.

Temperature class	T6	T5	T4, T3, T2	
T ambient [°C]	40	60	65	
Sensor size	Maximum process temperature [°C]			
DN15 - DN25	85	65	120	
DN40 - DN100	70	65	120	
DN150 - DN300	75	65	120	

Note: For functional reasons, the maximum process temperature can be lower. Refer to the instructions of the manufacturer.

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The minimum ambient temperature is $-40\text{ }^{\circ}\text{C}$; the minimum process temperature is $-40\text{ }^{\circ}\text{C}$.

For the remote versions OPTISWIRL 4200 F ... i Ex, the ambient temperature range for signal converter model VFC 200 F ... i 020 - Ex is:

- 40 $^{\circ}\text{C}$ to +65 $^{\circ}\text{C}$ for temperature class T4;
- 40 $^{\circ}\text{C}$ to +60 $^{\circ}\text{C}$ for temperature class T5;
- 40 $^{\circ}\text{C}$ to +40 $^{\circ}\text{C}$ for temperature class T6.

15.2 Electrical Data

OPTISWIRL 4200 C . i - Ex and VFC 200 F ... i 020 - Ex

Supply/output circuit, current 4 - 20 mA with HART communication (terminals C1 and C2):
in type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with following maximum values:

$U_i = 30\text{ V}$; $I_i = 130\text{ mA}$; $P_i = 1,0\text{ W}$; $C_i = 10\text{ nF}$; L_i is negligibly small.

Binary output (terminals M1 and M2/M4, open collector, respectively M1 and M3, NAMUR):
in type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with following maximum values:

$U_i = 30\text{ V}$; $I_i = 100\text{ mA}$; $P_i = 1,0\text{ W}$; $C_i = 10\text{ nF}$; L_i is negligibly small.

Input circuit, current 4 - 20 mA (terminals I1 and I2):
in type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with following maximum values:

$U_i = 30\text{ V}$; $I_i = 130\text{ mA}$; $P_i = 1,0\text{ W}$; $C_i = 15\text{ nF}$; L_i is negligibly small.

OPTISWIRL 4200 C FF i - Ex, OPTISWIRL 4200 C PA i - Ex, VFC 200 F FF i 020 - Ex and VFC 200 F PA i 020 - Ex

Fieldbus circuit, Fieldbus Foundation respectively Profibus PA (terminals A1/A2 and B1/B2):
in type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with following maximum values:

$U_i = 24\text{ V}$; $I_i = 380\text{ mA}$; $P_i = 5,32\text{ W}$; C_i and L_i are negligibly small;
or for connection to a fieldbus in accordance with the FISCO model.

OPTISWIRL VFC 200 F ... i 020 - Ex

Sensor circuit (terminals 1 to 7 (colour coded)):
in type of protection intrinsic safety Ex ia IIC, with following maximum values:

$U_o = 6,65\text{ V}$; $I_o = 1107\text{ mA}$; $P_o = 650\text{ mW}$; $C_o = 1,5\text{ }\mu\text{F}$; $L_o = 73\text{ }\mu\text{H}$.
The sensor circuit is connected to earth.

OPTISWIRL 4000 F

Sensor circuit (terminals 1 to 7 (colour coded)):
in type of protection intrinsic safety Ex ia IIC, only for connection to Signal converter
VFC 200 F ... i 020 - Ex, with following maximum values:

$U_i = 7\text{ V}$; $I_i = 1107\text{ mA}$; $P_i = 650\text{ mW}$; C_i and L_i are negligibly small.

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15.3 **Instructions**

The instructions provided with the product shall be followed in detail to assure safe operation.

16 **ATEX Assessment Report Number**

141100409, issue 2.

17 **Specific Conditions of Use**

- If installed in an explosive atmosphere of group IIC, electrostatic discharge of enclosure and sensor parts with a lacquer thickness > 200 µm shall be prevented by suitable measures;
- for thermal and electrical data, refer to section 15.

18 **Essential Health and Safety Requirements**

All relevant Essential Health and Safety Requirements are covered by the standards listed at section 9.

19 **Drawings and Documents**

As listed in ATEX Assessment Report No. 141100409, issue 2.

20 **Description of Certificate Changes (for Issue 2 and above)**

Issue 2, Kiwa reference no. 170300300:

- model OPTISWIRL 4200 F ... i Ex: addition of the transmitter and terminal enclosure made of stainless steel with or without finish;
- For functional reasons, some components in the electrical circuits have been removed, modified or added.
- The marking has been modified.
- Addition of two tables with the temperature class in relation to the maximum ambient temperature, the maximum process temperature and the sensor size for model OPTISWIRL 4200 i Ex (transmitter and terminal enclosure made of stainless steel with or without finish).