



EUROPEAN UNION RECOGNISED ORGANISATION (EU RO) MUTUAL RECOGNITION TYPE APPROVAL CERTIFICATE

In accordance with Article 10.1 of EU Regulation 391/2009

Certificate No:
MRA000002R
Revision No:
2

This Certificate is issued to

**KROHNE NORWAY AS, KROHNE MARINE
Brevik, Norway**

for

Flow Gauges/Transmitters

with type designation(s)

Electromagnetic Flowmeter and components: Optiflux, Waterflux, Optiprobe and Converters

The product is found to comply with

EU RO Mutual Recognition Technical Requirements for Flow Gauges/Transmitters

Intended service

Electromagnetic Flowmeters intended for a wide range use. See product description on page 2.

Temperature [°C]: -25°C to 70°C

Vibration: ±1.0 mm / 0.7 g (4 hours endurance test)

EMC: All locations with exceptions. See Application/Limitation

IP Code: IP66/67

This is to certify:

that the Product referred to herein has been inspected for the Manufacturer, pursuant to the relevant requirements of the European Union Recognised Organisation Mutual Recognition procedure, required by Article 10.1 of EU Regulation 391/2009, and has been found in accordance with those requirements.

This Certificate is valid until **2025-07-07**.

Issued at **Høvik** on **2021-03-04**

for **DNV**

DNV local station: **Sandefjord**

Approval Engineer: **Ståle Sneen**

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Trond Sjøvåg
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Product description

Components	Type	Explosion Protection	Nominal Size (mm)	Output	Power Supply
Sensor for remote type	OPTIFLUX 1000 2000 4000	Non-Ex Type	2.5, 4, 6, 10, 15, 25, 32, 40, 50, 65, 80, 100, 125, 150, 200, 250, 300, 350,	N/A	N/A
	OPTIFLUX 2000-Ex 4000-Ex	Ex Type (zone 1)	400, 450, 500, 550, 600, 650, 700, 800, 900, 1000		
	OPTIFLUX 5000 WATERFLUX 3000	Non-Ex Type	2.5, 4, 6, 10, 15, 25, 40, 50, 80, 100, 150, 200,		
	OPTIFLUX 5000-Ex	Ex Type (zone 1)	250, 300		
	OPTIPROBE	Non-Ex Type	DN40, DN80		
	OPTIPROBE Ex	Ex Type (zone 2)			
Compact type (sensor with converter)	OPTIFLUX 1050C 2050C 4050C WATERFLUX 3050C	Non-Ex Type	2.5, 4, 6, 10, 15, 25, 32, 40, 50, 65, 80, 100, 125, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600, 650, 700, 800, 900, 1000	4-20mA/Hart Pulse/frequency Status, Modbus RS485	24VDC 85-250VAC (50/60Hz)
	OPTIFLUX 1100C 2100C 4100C WATERFLUX 3100C	Non-Ex Type, Ex Type (zone 1)			
	OPTIFLUX 2300C 4300C	Non-Ex Type, Ex Type (zone 1)			
	OPTIFLUX 5100C	Non-Ex Type	2.5, 4, 6, 10, 15, 25, 40, 50, 80, 100, 150, 200, 250, 300		
Converter for remote type	IFC 050W	Non-Ex Type	N/A		
	IFC 100W	Non-Ex Type, Ex Type (zone 1)			
	IFC 300F	Non-Ex Type, Ex Type (zone 1)			

Manufactured by

KROHNE Altometer, Kerkeplaat 14,
 3313LC Dordrecht, Postbus 110,
 3300AC Dordrecht,
 the Netherlands

KROHNE Measurement Technology (Shanghai) Co., Ltd.
 (KMTS) Minshen Road 555,
 Songjiang Industrial Zone, Shanghai,
 201612 China

Application/Limitation

- B*: EMC: All locations including bridge and open deck for OPTIFLUX devices and IFC 100W, except OPTIFLUX 1050C, 2050C, 4050C and WATERFLUX 3050C
 EMC: All locations including bridge and open deck for IFC 300F when connected to an approved 24 DC power supply
- C*: IP 66/67 including salt mist test for OPTIFLUX devices, IFC 100W and IFC 300F, except OPTIFLUX 1050C, 2050C, 4050C and WATERFLUX 3050C

"Compact type" requires "Heavy Duty Neck".
 OPTIFLUX 2300C/4300C requires reinforced construction according to drawing PJ201123.

Ex-certification is not covered by this certificate. Application in hazardous area to be approved in each case according to the Rules and Ex-Certification/ Special Condition for Safe Use listed in valid Ex-certificate issued by a notified/recognized Certification Body.

Materials, fabrication, and welding of structure part of the flow transmitter is not covered by this certificate. Please observe that this shall be carried out according to the relevant rules for each application. Documentation for the actual application is to be submitted for approval by the manufacturer of the application system in each case.

Type Approval documentation

	Document no.:	Revision:	Description:	
Data sheets:	4000086805	R09	OPTIFLUX 2000 Technical Datasheet	
	4000525103	R06	OPTIFLUX 4000 Technical Datasheet	
	4000525204	R07	OPTIFLUX 5000 Technical Datasheet	
	4002183702	R02	IFC 050 Technical Datasheet	
	4000040504	R04	IFC 100 Technical Datasheet	
	4000295603	R06	IFC 300 Technical Datasheet	
	4001208601	R01	OPTIPROBE Technical Datasheet	
	Manuals:	4000839504	R04	OPTIFLUX 2000 Handbook
		4000818503	R03	OPTIFLUX 4000 Handbook
		4000686302	R02	OPTIFLUX 5000 Handbook
7312252100		R01	OPTIPROBE Quick Start	
7312092200		R02	OPTIFLUX Supplementary instructions	
7313492100		R00	Suppl. to Quick start OPTIPROBE F and IFC 300 F cat III	
7313542100		R01	OPTIFLUX Supplementary instructions	
4002184002		R02	IFC 050 Handbook	
4000041005		R05	IFC 100 Handbook	
4000069803		R04	IFC 300 Handbook	
Drawings:	23138501	2005-06-13	VK DN 10-40, Optiflux 1000	
	23138601	2005-06-13	VK DN 50-150, OPTIFLUX 1000	
	8308310100 &	2019-10-07	Measuring device WATERFLUX: DN25 - DN200	
	8308310200	2019-10-10	or DN250 -DN600	
	PJ201123	2020-11-23	HD Neck/housing	
Test reports:	20809-1	0/2016-06-22	EMC and Env. of IFC 050W and Optiflux 2000F-DN40	
	20809-2	0/2016-06-14	Env. IFC 100W Converter and Optiflux 2000F-DN200	
	20809-3	0/2016-06-14	Environmental testing of Optiflux 2100C-DN40	
	20809-4	1/2016-09-09	Environmental testing of Optiflux 2100C-DN200	
	20809-5	0/2016-06-30	Env. IFC 100W Converter Optiflux 5000F-DN15	
	20809-6	0/2016-06-30	EMC and Env. testing of IFC 300F and Optiprobe	
	20809-7	0/2016-06-24	Environmental testing of Optiflux 5100C-DN15	
	21106	0/2017-06-27	Vibration testing of Optiflux 2050C-DN200	
	21468	0/2019-03-21	EMC and Environmental Testing of OPTIFLUX 2100C, IFC 300 F Ex and OPTIFLUX 5000 Ex	
	30384	0/2020-04-14	EMC testing of OPTIFLUX 1000 & WATERFLUX 3000	
	30534	0/2021-02-23	EMC and Environmental Testing of OPTIFLUX 2300 C	
	10-409(E)	2011-01-07	EMC & Pressure test OF 5000 Ex + IFC 100W	
	10-408(E)	2011-01-07	ENV. test OF 5000 Ex + IFC 100W	
	10-416(E)	2011-01-07	Vibration test OF 5000 Ex + IFC 100W	
	10-417(E)	2011-01-07	Vibration test OF 5100 C	
	10-412(E)	2011-01-07	EMC & Pressure test OF 4000 Ex + IFC 100W	
	10-410(E)	2011-01-07	ENV test OF 4000 Ex + IFC 100W	
	10-413(E)	2011-01-07	Vibration test OF 4000 Ex + IFC 100W	
	10-414(E)	2011-01-07	Vibration test OF 4100 C (stainless steel)	
	10-415(E)	2011-01-07	Vibration test OF 4100 C (carbon steel)	
	10-525(E)	2011-03-07	Vibration test OF 4000 + IFC 100W	
	11-525(E)	2012-02-10	EMC Test OF 4000 + IFC 100W	
	11-526(E)	2012-02-10	ENV Test OF 4000 + IFC 100W	
	11-527(E)	2012-02-10	Vibration test OF 4000 Ex	
11-528(E)	2012-02-10	Vibration test OF 4100 C		
11-529(E)	2012-02-10	Vibration test IFC 100 W		

EU RO MR TA PQA scheme initial assessment checklist, DNV GL Sandefjord 2020-07-02

Marking of product

The products to be marked with:

- manufacturer name
- model name
- serial number

Other conditions

The FLOW GAUGES/TRANSMITTERS have been verified for compliance with EU Mutual Recognition Technical Requirements for FLOW GAUGES/TRANSMITTERS version 0.0. The testing covers IACS UR E10 Rev.7, including 5 g / 11 ms impact (shock) test according to IEC 60068-2-27.

Environmental test parameters	DNV location classes
Temperature: -25°C and 70°C	D
Vibration: ±1.0 mm / 0.7 g, for general applications	A
Humidity: 95%RH @ 55°C, damp heat cyclic	B
EMC: All locations with exceptions	A/B*
Enclosure: IP66 / IP67 (IP-ratings according to IEC 60529)	B/C*

*See Application / Limitation.

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.

The main elements of the assessment are:

- Ensure that type approved documentation is available
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given
- Ensuring traceability between manufacturer's product type marking and the type approval certificate

Periodical assessment will be performed annually and at renewal of the certificate.

Generic Statement for EU RO MR Type Approval Certificate

When a product is presented with this EU RO MR Type Approval Certificate for given application, its acceptability with regards to the limitations stated in the certificate conditions defined in 1b, 1c and 1d of the applied Technical Requirement will be evaluated by the EU RO in charge of classing the ship or being in charge of the unit/system certification.

In accordance with Article 10 of Regulation (EC) No 391/2009 of the European Parliament and of the Council of 23 April 2009 "on common rules and standards for ship inspection and survey organizations", the following organizations, recognized by the EU on this date, have agreed on the technical and procedural conditions under which they will mutually recognize this certificate:

- American Bureau of Shipping (ABS);
- Bureau Veritas (BV);
- China Classification Society (CCS);
- Croatian Register of Shipping (CRS);
- DNV;
- Indian Register of Shipping (IRS);
- Korean Register (KR);
- Lloyd's Register Group Ltd. (LR);
- Nippon Kaiji Kyokai General Incorporated Foundation (ClassNK);
- Polish Register of Shipping (PRS);
- RINA Services S.p.A. (RINA);
- Russian Maritime Register of Shipping (RS).

The scheme for the mutual recognition of class certificates for materials, equipment and components laid down by Article 10(1) of Regulation (EC) No 391/2009 is only enforceable within the Union in respect of ships flying the flag of a Member State. As far as foreign vessels are concerned, the acceptance of relevant certificates remains at the discretion of relevant non-EU flag States in the exercise of their exclusive jurisdiction, notably under the United Nations Convention on the Law of the Sea (UNCLOS). (In accordance with COMMISSION IMPLEMENTING REGULATION (EU) No 1355/2014 amending Regulation (EC) No 391/2009 - recital (25)).