DNV·GL

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

Certificate No:
MRA000002X

In accordance with Article 10.1 of EU Regulation 391/2009

This Certificate is issued to
KROHNE NORWAY AS, KROHNE MARINE
Brevik, Norway

for
Flow Gauges/Transmitters

with type designation(s)
Mass flow meters MFS 1000, 2000, 6000, 7000, MFC 400F, MFC 010

The product is found to comply with
EU RO Mutual Recognition Technical Requirements for Flow Gauges/Transmitters

Intended service
Coriolis mass flow meters intended for a wide range use. See product description on page 2.

Temperature [°C]:	**-25 and +70**
Vibration:	**±1 mm / 0.7 g**
EMC:	**All locations with exceptions. See application / limitation**
IP Code:	**IP66/IP67**

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 **2025-12-16**.

Issued at **Høvik** on **2020-12-17**
DNV GL local station: **Sandefjord** for **DNV GL**

Approval Engineer: **Nils Jarem**

Marta Alonso Pontes
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 GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") 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.

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Product description

This mass flowmeter is designed for the direct measurement of mass flow rate, product density and product temperature.

KROHNE designation	Tokyo Keiso designation	Comments
Flow Converter:		
MFC 400F	MMC 400F	Mounted separately, connected by signal cable.
MFC 010	NA	Mounted on sensor.
Sensor for mass flow with MFC 010:		
MFS 1000	NA	/x15, /x25, /x40, /x50
MFS 7000	NA	/x06, /x10, /x15, /x25, /x40, /x50, /x80 (x may be S: Stainless, or H: Hastelloy)
Sensor for mass flow with MFC400F / MMC 400F:		
MFS 1000	MMS 1000	/x15, /x25, /x40, /x50
MFS 2000	MMS 2000	/x100, /x150, /x250, /x400
MFS 6000	MMS 6000	/x08, /x10, /x15, /x25, /x50, /x80, /x100, /x150, /x200, /x250, /x300
MFS 7000	MMS 7000	/x06, /x10, /x15, /x25, /x40, /x50, /x80 (x may be S: Stainless, or H: Hastelloy)
Option: MFS 6000	MMS 6000	Short Stem or Extended Stem, ref. Drawings

Rating: MFC 010: 12 V DC
MFC 400F / MMC 400F: 24V AC/DC or 220V AC

Manufactured by

KROHNE Ltd, 34-38 Rutherford drive, Wellingborough, United Kingdom

KMTS, Minshen Road 555, Songjiang Industrial Zone 201612, Shanghai, China

Application/Limitation

EMC: All locations including bridge and open deck except for MFS 1000 and MFS 7000 with MFC 010.

The MFC 010 units shall always be connected to a power supply from Power One, type LOS4301-2 or similar power supply approved by the manufacturer.

This type approval does not cover wetted parts. Suitability of pressure contained wetted parts to be considered for each application according to relevant requirements.

Type Approval documentation

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.

Environmental test parameters		DNV GL 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, see application/limitation	B/A
Enclosure:	IP66/67 including salt mist test (IP-ratings according to IEC 60529)	C

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.

Job Id: **262.4-000187-1**
Certificate No: **MRA000002X**

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 GL;
- 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)).