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

Certificate No:
MRA0000040

In accordance with Article 10.1 of EU Regulation 391/2009

This Certificate is issued to

KROHNE NORWAY AS, KROHNE MARINE

Brevik, **Norway**

for
Level Gauges/Transmitters

with type designation(s)
OPTIWAVE-M 7400 C, OPTIWAVE 7400 C, OPTIWAVE-M 7500 C, OPTIWAVE 7500 C

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

Intended service
Level gauging applications for non-essential systems that provide control, monitoring, alarm, or safety functions. See product description on page 2.

Temperature [°C]:	**-25°C to 70°C**
Vibration:	**±1.0 mm / 0.7 g**
EMC:	**All locations including bridge and open deck**
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 **2029-04-10**.

Issued at **Høvik** on **2024-04-11**

DNV local unit: **Sandefjord**

for **DNV**

Approval Engineer: **Ståle Sneen**

Frederik Tore Elter
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

OPTIWAVE-M 7400 C
24 GHz Radar (FMCW) Level Transmitter for all liquids.
DN100 Horn antenna.
DN80 and DN100 Drop antenna PTFE or PP.

OPTIWAVE 7400 C
VFDE00abcde1fgh0ijklmnopq

		Regional Directives
a =	*	All regions
		Ex Approvals
b =	**0**	Without
	*	All EX approvals
		Industry / Safety
c =	**6**	Ship approval (DNV)
	7	Ship approval (DNV) + SIL 2/3
		Construction
d =	**0**	Without certified flange
	3	NACE design (MR0175 / MR0103 / ISO 15156)
	4	ASME B31.3
	B	NACE (MR0175 / MR0103 / ISO 15156) + ASME B31.3
		Converter version (housing material - protection class)
e =	**2**	C / Compact version (aluminium housing - IP66/IP68 0.1 barg)
	3	C / Compact version (stainless steel housing - IP66/IP68 0.1 barg)
		Cable entry / Cable gland
f =	*	All cable entries / cable glands
		Display
g =	**0**	Without display (No display, cover without window)
	4	Plug-in display (cover with window)
	K	Plug-in display (cover with window) + St St Marine Cover
	L	Plug-in display (cover with window) + St St Marine Cover + Locking system
		Display - documentation language
h =	*	All display languages available
		Process conditions / Process seal
i =	*	All process conditions / process seals, TABLE 1 in document no. OW-M-7x00-01
		Antennas
j =	**0**	Without
	1	Metallic Horn, DN40 (1.5") 316L
	2	Metallic Horn, DN50 (2") 316L
	3	Metallic Horn, DN65 (2.5") for BM26 A 316L
	4	Metallic Horn, DN80 (3") 316L
	5	Metallic Horn, DN100 (4") 316L
	E	Drop, DN80 (3") PTFE
	F	Drop, DN100 (4") PTFE
	K	Drop, DN80 (3") PEEK
		Antenna extension / Flange plate or thread protection
k =	**0**	Without
	1	105 mm (4") 316L
	2	210 mm (8") 316 L
	D	Without antenna extension / With flange plate protection PTFE
	M	105 mm (4") for PTFE Drop
	N	210 mm (8") for PTFE Drop
		Process connection
lmn =	***	All Process connections, TABLE 2 in document no. OW-M-7x00-01
		Calibration certificate
o =	**0**	Without: Accuracy ±2 mm (±0.08")
	1	Calibration certificate ±2 mm (±0.08") up to 10 m (32.81 ft) 2 points
	2	Calibration certificate ±2 mm (±0.08") up to 10 m (32.81 ft) 5 points
	3	Calibration certificate ±2 mm (±0.08") up to 10 m (32.81 ft) 5 points specified by the customer min. ≥1000 mm (39.4")

		Options
p =	**0**	Without
	2	Purging system with G 1/4 connection
		Accessories / Tag plate
q =	**0**	Without
	1	Weather protection
	2	Adaptor for OPTIWAVE 7300 C process connection system before June 2009
	3	Stainless steel tag plate (18 characters max.)
	6	Weather protection + stainless steel tag plate (18 characters max.)

Process conditions and process connections: Refer to document no. OW-M-7x00-01
HW and FW revision: Refer to document no. 4003518003 (OPTIWAVE 7400 C Handbook)

OPTIWAVE-M 7500 C
80 GHz Radar (FMCW) Level Transmitter for all liquids.
40mm and 70mm Lens antenna.

OPTIWAVE 7500 C
VFDF00abcde1fgh0ijklmnopq

		Regional Directives
a =	*	All regions
		Ex Approvals
b =	**0**	Without
	*	All EX approvals
		Industry / Safety
c =	**6**	Ship approval (DNV)
	7	Ship approval (DNV) + SIL 2/3
		Construction
d =	**0**	Without certified flange
	3	NACE design (MR0175 / MR0103 / ISO 15156)
	4	ASME B31.3
	B	NACE (MR0175 / MR0103 / ISO 15156) + ASME B31.3
		Converter version (housing material - protection class)
e =	**2**	C / Compact version (aluminium housing - IP66/IP68 0.1 barg)
	3	C / Compact version (stainless steel housing - IP66/IP68 0.1 barg)
		Cable entry / Cable gland
f =	*	All cable entries / cable glands
		Display
g =	**0**	Without display (No display, cover without window)
	4	Plug-in display (cover with window)
	K	Plug-in display (cover with window) + St St Marine Cover
	L	Plug-in display (cover with window) + St St Marine Cover + Locking system
		Display - documentation language
h =	*	All display languages available
		Process conditions / Process seal
i =	*	All process conditions / process seals, TABLE 3 in document no. OW-M-7x00-01
		Antennas
j =	**3**	Lens, DN40 (1.5") PEEK
	4	Lens, DN70 (2.75") PEEK
	A	Lens, DN40 (1.5") PTFE
	B	Lens, DN70 (2.75") PTFE
		Antenna extension / Flange plate or thread protection
k =	**0**	Without
	1	112 mm (4.4") 316L
	A	With flange plate protection PEEK
	B	With thread protection PEEK
	C	With flange plate protection PTFE
		Process connection
lmn =	***	All Process connections, TABLE 4 in document no. OW-M-7x00-01
		Calibration certificate
o =	**0**	Without: Accuracy ±2 mm (±0.08")
	1	Calibration certificate ±2 mm (±0.08") up to 10 m (32.81 ft) 2 points
	2	Calibration certificate ±2 mm (±0.08") up to 10 m (32.81 ft) 5 points

	3	Calibration certificate ±2 mm (±0.08") up to 10 m (32.81 ft) 5 points specified by the customer min. ≥1000 mm (39.4")
		Options
p =	**0**	Without
	2	Purging system with G 1/4 connection
		Accessories / Tag plate
q =	**0**	Without
	1	Weather protection
	3	Stainless steel tag plate (18 characters max.)
	6	Weather protection + stainless steel tag plate (18 characters max.)

Process conditions and process connections: Refer to document no. OW-M-7x00-01
HW and FW revision: Refer to document no. 4004375401 (OPTIWAVE 7500 C Handbook)

Manufactured by

KROHNE Messtechnik GmbH
Ludwig-Krohne-Straße 5
47058 Duisburg, Germany

Application/Limitation

Radar level transmitters for use in non-essential systems that provide control, monitoring, alarm, or safety functions.

Must always be connected to an approved power supply unit.

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.

Type Approval documentation

Marking of product

The products to be marked with:
- manufacturer name
- model name
- serial number
- power supply ratings

Other conditions

The pressure transmitters have been verified for compliance with EU Mutual Recognition Technical Requirements for Level gauges/transmitters version 0.2, dated 2023-01-01.

Applicable tests according to IACS Unified Requirements E10 rev. 7 and rev. 8 have been verified.

Environmental test parameters		DNV location classes
Temperature:	-25°C and +70°C	D
Vibration:	±1.0 mm / 0.7 g	A
Humidity:	95%RH @ 55°C, damp heat cyclic	B
EMC:	All locations including bridge and open deck	B
Enclosure:	IP66 / IP67 (IP-ratings according to IEC 60529) + Salt mist test	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.

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).

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)).