Certificate No:
TAA0000387

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Flow Meter

with type designation(s)
Rheonik RHMx with RHE42 or RHE45

Issued to
Rheonik Messtechnik GmbH
Odelzhausen, **Germany**

is found to comply with
DNV rules for classification – Ships, offshore units, and high speed and light craft

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.

Location classes:

Temperature	**B**
Humidity	**B**
Vibration	**A**
EMC	**B**
Enclosure	**B, C**

Issued at **Hamburg** on **2023-02-17**
This Certificate is valid until **2028-02-16**.
DNV local unit: **Hamburg – CMC North/East**

Approval Engineer: **Dariusz Lesniewski**

for **DNV**

Joannis Papanuskas
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

Coriolis mass flow meter for measurement of mass flow, volume flow, temperature, density
Sensor incl. transmitter with or w/o display: RHM**x**, RHE42/RHE45
(**x** = 015, 02, 03, 04, 06, 10, 15, 20, 30, 40, 60, 80 or 100)
Sensor:

- Nominal pressure: 40 bar / 16 bar for x = 80, 100
- Housing material: Stainless steel SS304 or SS316
- Wetted parts material: 1.4571 (SS 316Ti), 1.4435 (SS316L), 1.4404 (SS316L)
- Process connection: Flange DIN/JIS/ANSI DN15/15A/1/2" (x=015) up to DN200/200A/8"(x=100)
- Electrical connection: Aluminium / SS316 box, M20 plug (others optional, as per data sheets)
- Degree of protection: IP66
- Ex-protection according to respective Ex-proof certificates

Transmitter: RHE45

- Housing: Aluminium box directly mounted to the sensor box
- Degree of protection: IP66
- Display: Backlit LCD, colour, optional
- Power supply: 12-24V DC (Type approved power supply to be used)
- Connection: connectors M12 / 12 pin
- Interface: Modbus RTU (RS485)
- Inputs: 1 or 2 digital, potential-free, programmable, 12-24 V
- Outputs: 2 digital, potential-free, programmable, pulse or status, 12-24 V push-pull
  2, programmable, 4-20mA
- Firmware: Ver. 3.xy

Transmitter: RHE42

- Housing: Remote or directly mounted aluminium enclosure
- Remote connection cable of type ARHE-C4, length 3m up to 10m
- Ex-protection according to respective Ex-proof certificate
- Degree of protection: IP65 / IP66
- Display: Backlit LCD, colour, optional
- Power supply: 12-24V DC (Type approved power supply to be used)
- Connection: cable entry 2 x ½ NPT for power and I/O
- Interface: Modbus RTU (RS485)
- Inputs: 1 or 2 digital, potential-free, programmable, 12-24 V
- Outputs: 2 digital, potential-free, programmable, pulse or status, 12-24 V push-pull
- 2, programmable, 4-20mA
- Firmware Ver. 3.xy

Approval conditions

The Type Approval covers hardware listed under Product description. When the hardware is used in applications to be classed by DNV, documentation for the actual application is to be submitted for approval by the manufacturer of the application system in each case. Reference is made to DNV rules for classification of ships Pt.4 Ch.9 Control and monitoring systems.

Approved for applications in piping systems included in pipe class I, II, III as specified in Part 4. Ch. 6 - Machinery, Piping systems.

Pipe Class	Flow Sensor Range
I	RHM015, 02, 03, 04, 06, 10, 15, 20, 30, 40, 60
II, III	RHM015, 02, 03, 04, 06, 10, 15, 20, 30, 40, 60, 80, 100

Production testing
Each sensor unit is to be pressure tested with 1.5 times the nominal design pressure. Appropriate works certificate to be issued with reference to the serial number.
Case-by-case approval for other applications and media.

Application/Limitation

Type approved power supply to be used.

Type Approval documentation

Tests carried out

Applicable tests according to class guideline DNV-CG-0339, August 2021.

Marking of product

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

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 is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE