

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Miscellaneous Transmitter

with type designation(s)
TTurb

Issued to

TriOS Mess- und Datentechnik GmbH
Rastede, Germany

is found to comply with

DNV GL 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 GL.

Temperature A
Humidity B
Vibration A
EMC B
Enclosure B (IP68)

Issued at **Hamburg** on **2020-12-17**

This Certificate is valid until **2025-12-16**.

DNV GL local station: **Hamburg – CMC North/East**

for **DNV GL**

Approval Engineer: **Jens Dietrich**

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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 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.



Product description

Turbidity Sensors TTurb 100, TTurb 400 and TTurb 1000

Measurement technology:	LED light source Photodiode detector
Measurement principle	Nephelometry
Parameters	Turbidity as FNU; mg/L; NTU; TSSeq
Measuring range	0...100, 0...400, 0...1000 FNU
Measurement accuracy	± (5 % + 0.5)
Detection limit	0.5 FNU for TTurb 100 2 FNU for TTurb 400 and TTurb 1000
Measurement wavelength	860 nm, FWHM 30 nm
Reaction time T100	6 s
Measurement interval	≥ 3 s
Interface	Ethernet (TCP/IP) RS-485 (Modbus RTU)
Power Supply	12...24 VDC (± 10 %)
Connection	8-pin M12 plug

Application/Limitation

The Type Approval covers hardware listed under Product description. When the hardware is used in applications to be classed by DNV GL, 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 GL rules for classification of ships Pt.4 Ch.9 Control and monitoring systems.

Product certificate

If specified in the Rules, ref. Pt.4 Ch.9 Sec.1, the control and monitoring system in which the above listed hardware is used shall be delivered with a product certificate. For each such delivery the certification test is to be performed at the manufacturer of the application system before the system is shipped to the yard. The test shall be done according to an approved test program.

Tests carried out

Applicable Tests according to DNV GL CG-0339, December 2019

Marking of product

Maker, type designation, serial number.

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



Job Id: **262.1-030658-1**
Certificate No: **TAA00002X2**

- 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