

TYPE APPROVAL CERTIFICATE

This is to certify:

That the PAH Transmitter

with type designation(s)
enviroFlu-HC 500, enviroFlu-HC 5000

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	A
Enclosure	B (IP68)

Issued at **Hamburg** on **2019-08-13**

This Certificate is valid until **2024-04-15**.

DNV GL local station: **Hamburg CMC**

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.



Product description

UV-fluorometer for detection of PAH (Polycyclic Aromatic Hydrocarbons) in water.
Power supply: 12...24VDC (+/-10%)
Interface, analog output: 4...20mA
Connector: M12 industrial connector with 5m fixed mounted cable
Material: Measuring head: POM black with fused silica
Housing: Stainless steel 1.4571

Hardware version: V3.0
Software version: V1.80

Version	Component	Measurement	Smallest range	Typical range
enviroFlu-HC 500	PAH _(phe equivalents)	Fluorescence	0 – 50 µg/l	0 – 500 µg/l
enviroFlu-HC 5000	PAH _(phe equivalents)	Fluorescence	0 – 500 µg/l	0 – 5000 µg/l

The measuring range is depending on the washwater flow rate and can be adjusted in accordance with the requirements of Resolution MEPC.259(68) adopted on 15. May 2015 "2015 Guidelines for exhaust gas cleaning systems - Section 10 "Washwater".

The enviroFlu is intended for installation on-board vessels operating an exhaust gas cleaning system (EGCS). The enviroFlu is found to be in compliance with the requirements of Resolution MEPC.259(68) - 2015 Guidelines for exhaust gas cleaning adopted on 15 May 2015, Chapter 10, "Washwater".

enviroFlu-HC 500/5000 meet the following requirements:

- Principle of detection for PAH_{PHE Eq} (MEPC.259(68), 10.1.3.3)
- Measurement range for PAH_{PHE Eq} (MEPC.259(68), 10.1.3.3)
- Turbidity influences on PAH_{PHE Eq} (MEPC.259(68), 10.2.3)

The operating temperature is from 5°C to 55°C, whereas the specified detection limits are only valid in the temperature range between 5°C to 40°C.

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. After certification the clause for software control will be put into force.

Software control

All changes in software are to be recorded as long as the system is in use on board. Documentation of major changes is to be forwarded to DNV GL for evaluation and approval before implemented on board. Certification of modified functionality may be required for the particular vessel.

Correct on-board configuration and integration into the wash water monitoring system will still be subject to verification against the requirements of MEPC.259(68) for each delivery and is to be tested during commissioning after installation.

The enviroFlu sensor shall be installed, operated and calibrated in accordance with the requirements and intervals as specified in the operating instructions. Air bubbles in the washwater flow at the place of PAH_(phe equivalent) measurement should be avoided. In case the turbidity of the washwater is

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Certificate No: **TAA00002FB**

above 5 NTU, the enviroFlu-HC must be compensated for turbidity otherwise PAH_(phe equivalent) deviates more than 5%.

Tests carried out

Applicable tests according to DNV GL CG-0339, November 2016.
Tests according to the relevant parts of the referenced MEPC resolution.

Marking of product

Manufacturer name, product type, serial number, interface, power supply, measurement range.

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