TYPE APPROVAL CERTIFICATE

Certificate no.:
TAA00002AS
Revision No:
3

This is to certify:

that the Monitoring System

with type designation(s)
EGC Water Analyzer

issued to
TriOS Mess- und Datentechnik GmbH
Rastede, **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.

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

Issued at **Hamburg** on **2024-03-12**
This Certificate is valid until **2029-02-04**.
DNV local unit: **Hamburg – CMC North/East**

for **DNV**

Approval Engineer: **Jens Dietrich**

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

The EGC Water Analyzer cabinet consists of the following main sub-components:
-Enclosure Rittal KS1469.500 with Plexiglas window, IP56
-Monitoring unit TriBox3 providing with HMI display for measurements data and configuration
-enviroFlu Polycyclic Aromatic Hydrocarbon (PAH) sensor
-TTurb Turbidity sensor
-TpH-D ph sensor
-Flow sensor, magnetic-inductive, Bürkert type 8041
-Flow cells for sensor mounting
-Power supply connection- and switch-box
-Terminals for Ethernet connectivity (Modbus TCP/IP)
-Terminals for analogue outputs (6 x 4...20mA)
-Wash water inlet connector with pressure reducer
-Wash water outlet with ball valve; Wash water sample taking with ball valve
Power supply: 230VAC, 50Hz (Range: 100-240VAC, 50-60Hz).
TriBox3 Software: V1.5.x.

Range of Application:
The "TriOS EGC Water Analyzer" is intended for installation on-board vessels operating an exhaust gas cleaning system (EGCS).
The TriOS EGC Water Analyzer is found to be in compliance with the requirements of Resolution MEPC.340(77) – "2021 Guidelines for exhaust gas cleaning systems", Chapter 10.2 "Discharge water monitoring".

"TriOS EGC Water Analyzer" meets the following requirements:

- Definition of Phenanthrene equivalent, $PAH_{PHE\ Eq}$	(MEPC.340(77), 2.3.1, Table 3);
- Principle of detection for $PAH_{PHE\ Eq}$	(MEPC.340(77), 10.1.3.3);
- Measurement range for $PAH_{PHE\ Eq}$	(MEPC.340(77), 10.1.3.3);
- Turbidity influences on $PAH_{PHE\ Eq}$	(MEPC.340(77), 10.2.4);
- Permission deviation of the discharge water monitoring equipment for a turbidity range 0-100 FNU;	(MEPC.340(77), 10.2.2),
- Principle of detection for pH	(MEPC.340(77), 10.2.4);
- Resolution for pH	(MEPC.340(77), 10.2.3);
- Temperature compensation for pH	(MEPC.340(77), 10.2.3);
- Principle of detection for Turbidity	(MEPC.340(77), 10.2.6);
- Sampling frequency	(MEPC.340(77), 10.4.1).

Technical Data

TriOS EGC Water Analyzer			
Component	Type(s)	Sensor type	Range
$PAH_{PHE\ Eq}$	enviroFlu-HC 500 enviroFlu-HC 5000	Fluorescence	0 – 80 µg/L 0 –800 µg/L
Turbidity	TTurb	90° infrared scattering	0 – 1000 FNU
pH	TpH-D	pH potential combination electrode with NTC thermistor	0 – 14
Temperature			2 – 40°C
Controller	TriBox3	Data processing, logging and reporting device	-

The PAH values from enviroFlu are corrected on the controller TriBox3 with the measured values of TTurb. The original PAH values and the turbidity corrected PAH values are displayed and stored on the TriBox3.

Approval conditions

The following documentation of the actual application is to be submitted for approval in each case:
- Reference to this Type Approval Certificate
- System block diagram
- Power supply arrangement (may be part of the System block diagram)

The Type Approval covers hardware and software listed under Product description.

As long as the units are covered by the Type Approval, a product certificate according to Pt.4 Ch.9 Sec.1 [1.4] will not be required. Correct on-board configuration and integration into the exhaust gas cleaning system (EGCS) will still be subject to verification against the requirements of MEPC.340(77) (e.g. point of sampling, minimum sample flow) for each delivery and is to be tested during commissioning after installation.

"TriOS EGC Water Analyzer" shall be installed, operated and calibrated in accordance with the requirements and intervals as specified in the operating instructions.

The particulars of the system stipulated in MEPC.340(77), 8.2 as well as SW version are to be recorded in the Onboard Monitoring Manual (OMM).

Software control
All changes in software are to be recorded as long as the system is in use on board. Re-test of compliance according to MEPC.340(77) maybe required. Documentation of major changes is to be forwarded to DNV for evaluation and approval before implemented on board. Certification of modified functionality may be required for the particular vessel.

Tests carried out

-Applicable tests according to DNV CG-0339, August 2021
- Requirements in Resolution MEPC.340(77) adopted on 26 November 2021
"2021 Guidelines for exhaust gas cleaning systems", Chapter 10.2 "Discharge Water"

Marking of product
Manufacturer name, type, serial number, power supply.

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