Certificate No:
TAA0000378

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Emission Monitoring System

with type designation(s)
ShipCEMS COMPACT

Issued to
Norsk Analyse AS
Barkåker, **Norway**

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

Issued at **Høvik** on **2023-06-30**
This Certificate is valid until **2025-06-29**.
DNV local station: **East & South Norway CMC**

Approval Engineer: **Frode Nygård**

for **DNV**

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.

Product description

The ShipCEMS COMPACT continuous emission monitoring system is designed to monitor and report traces of gas substances contained in scrubber exhaust gas.

The analyzer have capabilities to measure multiple variants of gasses such as NO_x, CO, H_2O, CO_2, SO_2, CH_4 and O_2 on request.

The ShipCEMS COMPACT Cabinet (SCC) comprises the following units as required:

Analyser Module	Tunable T2500-30 or T2000-30 CEMS Analyser
PLC	WAGO 750-8102 [1)]
HMI	SIMATIC KTP-700 [2)]
Sample Probe (SP)	-

[1)] Hardware is covered by separate type approval certificate TAA00001J4
[2)] Hardware is covered by separate type approval certificate TAA0000341

Software versions at time of testing:

Software Version	Release date	Description
V1.3	2022-10-20	Operating Firmware (PLC)
V1.3	2022-10-20	User Interface (HMI)

Measuring range: SO_2: 0…1000ppm, CO_2: 0…15%, NO: 0-2000 ppm, NO_2: 0-500 ppm, CO: 0-2000 ppm, CH_4: 0-10000 ppm, O_2: 0-25%, H_2O: 0-10000 ppm

Communication Interface: Modbus TCP/IP or RS-485
Power supply: 110-220V AC 60 Hz, 1700W (including Probe)

Place of manufacture

Norsk Analyse AB
Nyängsgatan 5, 66434 Grums,
Sweden

Application/Limitation

DNV shall be informed prior to installation of ShipCEMS COMPACT onboard DNV classed vessels. A reference to this type approval shall be included. The Type Approval covers hardware and software listed under Product description.

When the ShipCEMS is used in installations intended to comply with requirements for SO_2 and CO_2 analyzer specified in Chapter 6 of MEPC.340(77) - (adopted on 26 November 2021) “2021 Guidelines for Exhaust Gas Cleaning Systems” the following requirements are to be met:

- Accuracy (NTC 2008, App. III, 1.6)
- Precision (NTC 2008, App. III, 1.7)
- Noise (NTC 2008, App. III, 1.8)
- Zero and span drift (NTC 2008, App. III, 1.9/1.10)
- Calibration curve (NTC 2008, App. IV, 5.5.1)
- Interference effect (NTC 2008, Appendix IV, 9)

The ShipCEMS COMPACT marine continuous emission monitoring system shall be installed, calibrated and operated in compliance with the manufacturer’s instructions and in accordance with the requirements of DNV Pt.4 Ch.6 and in accordance of the NOx Technical Code 2008, Chapter 5 and associated appendices.
This Type Approval certificate does not cover the exhaust gas sample lines.

Correct configuration and set up for each delivery to be tested during commissioning after installation.

Application 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 for evaluation and approval before implemented on board. Certification of modified functionality may be required for the particular vessel.

Software update notification
When the type approved software is revised (affecting all future deliveries) DNV is to be informed by forwarding updated software version documentation. If the changes are judged to affect functionality for which rule requirements apply a new functional type test may be required and the certificate may have to be renewed to identify the new software version.

Type Approval documentation

Tests carried out
Applicable tests according to class guideline DNV-CG-0339, August 2021.
Functional testing according to factory acceptance test procedure FAT

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

A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE