



TYPE APPROVAL CERTIFICATE

Certificate no.:
TAA0000378
Revision No:
1

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 **2025-07-15**

for **DNV**

This Certificate is valid until **2027-06-29**.

DNV local unit: **Sandefjord**

Approval Engineer: **Frode Nygård**

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 USD 300 000.

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 has capabilities to measure multiple variants of gases such as NO_x, CO, H₂O, CO₂, SO₂, CH₄ and O₂ 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
V1.4x	2024-06-25	Operating Firmware (PLC)
V1.4x	2024-06-25	User Interface (HMI)

Measuring range:

Analyser Model type	Range (Span)	Comp.
SSC-AM-SO ₂ -CO ₂ (T2000)	0-200ppm	SO ₂
	0-15%	CO ₂
SSC-AM-ALL (T2500)	0-200ppm	SO ₂
	0-15%	CO ₂
	0-2000ppm	NO
	0-500ppm	NO ₂
	0-2000ppm	CO
SSC-AM-ALL+CH ₄ (T2500)	0-200ppm	SO ₂
	0-15%	CO ₂
	0-2000ppm	NO
	0-500ppm	NO ₂
	0-2000ppm	CO
	0-10000ppm	CH ₄

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.

The equivalence of the alternative sensors for NO_x (NO + NO₂) have been demonstrated under surveillance and to the satisfaction of DNV in accordance with paragraph 5.4.2 of the NTC 2008 and ISO 8178-1:2006, Annex D. See also reference to DNV Statement of Compliance Certificate Doc No.:33557466/DNV.

When the ShipCEMS is used in installations intended to comply with requirements for SO₂ and CO₂ 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

Document no.	Title	Rev	Date
120-28012-1	Test for marine type approval of ShipCEMS COMPACT cabinet	-	2020-12-15
E20013.04	Test for marine type approval of Natural Gas Analyzer Model T2000 & T2500	04	2022-05-25
REP10012	Test report T2000 CEMS analyzer	00	2021-06-21
REP10017	Test report T2500-30 gas analyzer	02	2023-06-19
33557466/DNV	Statement of Compliance NOx ShipCEMS Compact	00	2024-06-21
50118-D44-01	Internal Factory Test Procedure for ShipCEMS COMPACT (DNV Witnessed)	01	2022-04-26
50118-D56-01	Software Specification & Revision History ShipCEMS COMPACT	01	2024-06-26
50118-D120-06	Datasheet ShipCEMS COMPACT	06	-
50118-D21-05	User Manual ShipCEMS COMPACT	05	2025-01-13
50118-D22-02	Installation Manual ShipCEMS COMPACT	02	2023-06-22
50118-1001	ShipCEMS COMPACT, General Arrangement	01	2024-02-05
50118-1003	ShipCEMS COMPACT, General Arrangement Internal view	03	2025-05-05
50118-1004	ShipCEMS COMPACT, Wire Dampers on Unistrut	00	2022-09-29
50118-1201	ShipCEMS COMPACT, General Arrangement, Sample Probe (SP)	01	2024-01-29
50118-3001	ShipCEMS COMPACT, System Diagram	03	2025-04-16
50118-5001	ShipCEMS COMPACT, Termination Drawing - Overview	01	2024-03-21
50118-5002	ShipCEMS COMPACT, Termination Diagram, Power distribution	01	2024-02-05
50118-5003	ShipCEMS COMPACT, Termination Diagram, Signal distribution	03	2024-10-26
50118-5005	ShipCEMS COMPACT, Termination Diagram, Sample Probe (SP)	00	2022-09-29
50118-5006	ShipCEMS COMPACT, Termination Diagram, Condensation drain tank alarm	01	2024-02-05
50118-5008	ShipCEMS COMPACT, Signal distribution, C-serias flow controller	02	2024-10-26
50118-5009	ShipCEMS COMPACT, Signal distribution, F-serias flow controller	01	2024-10-26
50118-6001	ShipCEMS COMPACT, System Block Diagram, P&ID - Distribution overview	00	2022-11-23
50118-6002	ShipCEMS COMPACT, System Block Diagram, Sign & Power - Distr. overview	00	2022-09-29
50118-8201	ShipCEMS COMPACT, Network Map	01	2024-03-07
PDST2500-30	Product Data Sheet T2500-30 CEMS analyser	A1	-
	<i>Type approval assessment report, Grums Sweden, DNV</i>		2025-06-26

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