



CERTIFICATE NUMBER
EFFECTIVE DATE
EXPIRY DATE
ABS TECHNICAL OFFICE

20-1993266-1-PDA
07-Jun-2023
02-Jun-2025
Houston ESD - Ship Equipment

CERTIFICATE OF Product Design Assessment

This is to certify that a representative of this Bureau did, at the request of

NORSK ANALYSE AS

located at

WIRGENESVEI 10, , BARKAAKER, TONSBERG, Norway, 3157

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the pages attached to this certificate.

Product: **Monitoring System, Emissions**
Model: **ShipCEMS - See ratings for more information.**
Endorsements:
Tier: **2 - PDA Issued**

This Product Design Assessment (PDA) Certificate remains valid until 02/Jun/2025 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

American Bureau Of Shipping


Jess Woodrich Totten, Engineer/Consultant

NOTE: This certificate evidences compliance with one or more of the Rules, Guides, standards or other criteria of ABS or a statutory, industrial or manufacturer's standards. It is issued solely for the use of ABS, its committees, its clients or other authorized entities. Any significant changes to the aforementioned product without approval from ABS will result in this certificate becoming null and void. This certificate is governed by ABS Rules 1-1-A3/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2010)

NORSK ANALYSE AS
WIRGENESVEI 10
BARKAAKER TONSBORG
Norway 3157
Telephone: 47 3337 5100
Fax: 47 3337 5149
Email: norway@norskanalyse.no
Web: www.norskanalyse.com

Tier: 2 - PDA Issued

Product: Monitoring System, Emissions
Model: ShipCEMS - See ratings for more information.
Endorsements:

Intended Service:

Continuously monitors the concentration (parts per million and percentage) of the exhaust gases most associated with air pollution from ships, Mobile Offshore Drilling Units (MODU) and other sources of air pollution in the marine environment; including the primary gases: sulphur dioxide (SO₂) and carbon dioxide (CO₂), optionally NO_x and CO.

Description:

Marine and Offshore Applications - an emission monitoring system that monitors exhaust emissions from maritime vessels and Mobile Offshore Drilling Units (MODU). The system is intended for use to verify SO_x emissions from vessels with Exhaust Gas Cleaning Systems installed to meet the requirements of the Revised MARPOL Annex VI Regulation 14 under the guidance of MEPC 340(77). The system also provides the calculation of CO₂ Index, based on operational data as per the requirements of MEPC. Circ.471. The system analyzes exhaust gas species including Sulphur Dioxide (SO₂), Carbon Dioxide (CO₂) and provides mass totals of these gases using the calculations contained within the NO_x Technical Code (2008).

The ShipsCEMS analyzer system consists of a sensor and probe assembly with a power supply and communication unit. The system monitors CO₂ and SO₂ emitted from stacks or exhaust ducts. The analyzer outputs the measured gas based on 4-20 mA signals or as Modbus/Profibus TCP/IP to provide ppm or percentage ranges.

Rating:

Models:

ShipCEMS Classic AC1 / Analyzer Module: Ultramat 6 / Streams: 1-4 / Measured Components: SO₂, CO₂

ShipCEMS Classic AC2 / Analyzer Module: Ultramat 7 / Streams: 1-4 / Measured Components: SO₂, CO₂

ShipCEMS Classic AC2R (Redundant) / Analyzer Module: 2x Ultramat 7 / Streams: 1-4 / Measured Components: SO₂, CO₂

ShipCEMS Classic AC2E (Extended) / Analyzer Module: Tunable 2000-series / Streams: 1-4 / Measured Components: SO₂, NO_x, CO, CO₂, O₂, CH₄

ShipCEMS Classic AC2ER (Extended + redundant) / Analyzer Module: 2x Tunable 2000-series / Streams: 1-4 / Measured Components: SO₂, NO_x, CO, CO₂, O₂, CH₄

Power Supply: 120 - 230VAC Nominal 50/60 Hz;

Enclosure Rating: IP 44 (Analyzer Cabinet);

Ambient Temperature Range: 0-55°C

Primary gases: SO₂, CO₂

Components:

ShipCEMS Analyzer Cabinet inclusive Analyzer Module & Peltier Cooler. - Analyzer probe, ShipCEMS Sample Conditioning System incl. Tube Bundle - ShipCEMS Front End PLC, Solenoids and Calibration Gas Cylinder

Service Restriction:

Unit Certification is not required for this product.

If the manufacturer or purchaser request an ABS Certificate for compliance with a specification or standard, the specification or standard, including inspection standards and tolerances, must be clearly defined.

Comments:

1. The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.
2. When used for continuously monitoring of exhaust gas from an exhaust gas cleaning system, the installation shall comply with the requirements in MEPC 340(77) Sections 6 through 8.
3. For each installation, an Onboard Monitoring Manual (OMM) is to be submitted to the flag Administration for

NORSK ANALYSE AS
WIRGENESVEI 10
BARKAAKER TONSBERG
Norway 3157
Telephone: 47 3337 5100
Fax: 47 3337 5149
Email: norway@norskanalyse.no
Web: www.norskanalyse.com

Tier: 2 - PDA Issued

approval as per Chapter 6.4.17 of the Revised MARPOL Annex VI and NOx Technical Code (2008) and Section 8 of MEPC 340(77) .

4. For installation, the span gases are to be provided in order to comply with the requirements of Chapter 6 of the Revised MARPOL Annex VI and NOx Technical Code (2008).

5. Survey during installation is to be in accordance with Section 5/13.3 of the ABS Guide for Exhaust Emission Abatement.

6. Requirements of MEPC 340(77), Chapter 6.6 and 6.7 regarding SO2 losses have to be observed.

7. Each particular application and installation is to be specifically approved in conjunction with the relevant system. Equipment is not to be installed in weather exposed areas.

Notes/Drawing/Documentation:

Please see attached drawing list.

Terms of Validity:

This Product Design Assessment (PDA) Certificate remains valid until 02/Jun/2025 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

STANDARDS

ABS Rules:

Rules for Conditions of Classification, Part 1 2023 Marine Vessels Rules 1-1-4/7.7, 1-1-A3, 1-1-A4, which covers the following:

Marine Vessels Rules: 4-9-3/11, 4-9-9/13.1, 4-9-9/Table 1;

Rules for Conditions of Classification, Part 1 - 2023 Offshore Units and Structures 1-1-4/9.7, 1-1-A2, 1-1-A3, which covers the following:

Mobile Offshore Units Rules: 4-3-4/5;

Section 5 of the ABS Guide for Exhaust Emission Abatement (Updated June 2022)

National:

NA

International:

(1) Resolution MEPC. 340(77) - 2021 Guidelines for Exhaust Gas Cleaning Systems

(2) Revised MARPOL 73/78 Annex VI Regulation 13 – Nitrogen Oxides (NOx) and the NOx Technical Code 2008, Chapter 6.4 - 'Direct measurement and monitoring method (DMM)'

(3) MEPC/Circ.471 - Interim Guidelines for Voluntary Ship CO2 Emission Indexing for Use In Trials – Calculation of the CO2 emission index from operational data.

(4) IACS E10 - Test Nos. 3-11 & 13-18;

Government:

NA

NORSK ANALYSE AS
WIRGENESVEI 10
BARKAAKER TONSBORG
Norway 3157
Telephone: 47 3337 5100
Fax: 47 3337 5149
Email: norway@norskanalyse.no
Web: www.norskanalyse.com

Tier: 2 - PDA Issued

EUMED:
NA

OTHERS:

Reporting of totalized mass emissions (NO_x, SO_x, CO₂, CO and CH₄) from marine diesel engines and marine boilers – to Manufacturers Standards utilizing the calculations contained in the NO_x Technical Code (2008).