



CERTIFICATE NUMBER
15-HS1356772-PDA

DATE
21 May 2015

ABS TECHNICAL OFFICE
Houston SED Machinery -
Equipment

CERTIFICATE OF DESIGN ASSESSMENT

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

NORSK ANALYSE AS

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 Rev. 1**


This Product Design Assessment (PDA) Certificate 15-HS1356772-PDA, dated 21/May/2015 remains valid until 20/May/2020 or until the Rules or specifications used in the assessment are revised (whichever occurs first).

This PDA is intended for a product to be installed on an ABS classed vessel, MODU or facility which is in existence or under contract for construction on the date of the ABS Rules or specifications used to evaluate the Product.

Use of the Product on an ABS classed vessel, MODU or facility which is contracted after the validity date of the ABS Rules and specifications used to evaluate the Product, will require re-evaluation of the PDA.

Use of the Product for non ABS classed vessels, MODUs or facilities is to be to an agreement between the manufacturer and intended client.

AMERICAN BUREAU OF SHIPPING


Tim Kimble
Engineer

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 the terms and conditions as contained in ABS Rules 1-1-A/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2010).

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Tier: 2 - PDA Issued

Product: Monitoring System, Emissions

Model: ShipCEMS Rev. 1

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).

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 184(59). 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 to provide ppm or percentage ranges.

Rating:

Power Supply: 230VAC Nominal 50/60 Hz;
Enclosure Rating: IP 44 (Analyser Cabinet);
Ambient Temperature Range: 0-55°C
Primary gases: SO₂, CO₂

Components:

ShipCEMS Analyser Cabinet inclusive Analyser Module & Peltier Cooler. - Analyser 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:

The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.

1. When used for continuously monitoring of exhaust gas from an exhaust gas cleaning system, the installation shall comply with the requirements in MEPC 185(59) Annex 9 Sections 6-8.
2. For each installation, an Onboard Monitoring Manual (OMM) is to be submitted to the flag Administration for approval as per Chapter 6.4.17 of the Revised MARPOL Annex VI and NO_x Technical Code (2008) and Section 8 of MEPC.184 (59).
3. 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 NO_x Technical Code (2008).
4. Survey during installation is to be in accordance with Section 5/13.3 of the ABS Guide for Exhaust Emission Abatement

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Notes/Drawing/Documentation:

Drawing Package ShipCEMS, Drawing Package, Revision: -,
NA-E-USM-001-05_ShipCEMS_User_Manual, Users Manual, Revision: -, Pages: 49;
T203287 - DANAK 1913168 - Norsk Analyse AS, Delta Test Report, Revision: -, Pages: 66;
P300-1001, Rev. 04, General Arrangement Drawing Analyzer Cabinet External View;
P300-1002, Rev. 06, General Arrangement Drawing Analyzer Cabinet Interior Hook-Up Locations;
P300-1005, Rev. 06, General Arrangement Drawing Analyzer Cabinet Hook-Up/Wall Mounting External View;
P300-1202, Rev. 03, General Arrangement Drawing Heated Sample Probe Flange DN65-PN6 230Vac Electric Heated;
P300-1401, Re. 01, General Arrangement Drawing Calibration Gas Cylinder Support Frame External View;
P300-1801, Rev. 06, General Arrangement Drawing Sample Conditioning System External View Hook-Up Details;
P300-1804, Rev. 05, General Arrangement Drawing Sample Conditioning Cabinet Hook-Up/Wall Mounting External View;
P300-1805, Rev. 03, General Arrangement Drawing Sample Conditioning System Junction Box Layout;
P300-1901, Rev. 03, General Arrangement Drawing Emergency Stop External/Interior View;
P300-3001, Rev. 05, System Diagram Analyzer Cabinet Stream Switching System;
P300-3002, Rev. 04, System Diagram Analyzer Cabinet PLC & Signal Conditioning;
P300-3801, Rev. 05, System Diagram Sample Conditioning System;
P300-5001, Rev. 03, Termination Diagram - Power Analyzer Cabinet - Interface ShipCEMS SO2/CO2 Analysis;
P300-5002, Rev. 03, Termination Diagram PLC Logo Analyzer Cabinet;
P300-5101, Rev. 06, Termination Diagram Sample Conditioning System Heater & Flow Control Logic Junction Box;
P300-5102, Rev. 06, Termination Diagram Sample Conditioning System Back-Flush Option Junction Box;
P300-5201, Rev. 00, Termination Diagram - Signal Analyzer Cabinet - Interface Emission Monitoring System;
P300-5301, Rev. 03, Termination Diagram Heated Sample Probe Model 222.15/222.17 Plug Connections;
P300-5401, Rev. 03, Termination Diagram Cabinet Cooler System 194 Watt Peltier Element Analyzer Cabinet;
P300-5501, Rev. 03, Termination Diagram Signal SO2/CO2 Analyzer D-Sub Pinout;
P300-5502, Rev. 03, Termination Diagram Signal SO2/CO2 Analyzer D-Sub Pinout;
P300-5601, Rev. 03, Termination Diagram Emergency Power Switch SCS/Analyzer Cabinet;
P300-5701, Rev. 03, Termination Diagram Emergency Power Switch System Layout - Loop.

Terms of Validity:

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STANDARDS

ABS Rules:

Rules for Conditions of Classification, Part 1 2015 Steel Vessels Rules 1-1-4/7.7, 1-1-A3, 1-1-A4, which covers the following:
Steel Vessels Rules: 1-1-A3, 4-9-8/Table 1;

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Offshore Support Vessels Rules: 1-1-A3, 4-9-8/Table 1;
Steel Vessels < 90 M Rules: 1-1-A3,4-7-1/1
Rules for Conditions of Classification, Part 1 - (2015) Offshore Units and Structures 1-1-4/9.7, 1-1-A2, 1-1-A3, which covers the following:
Mobile Offshore Drilling Units: 4-3-4/5;
Section 5 of the ABS Guide for Exhaust Emission Abatement (Up-dated Oct. 2013);

National:
NA

International:

- (1) Resolution MEPC. 184 (59) - Guidelines for Exhaust Gas Cleaning Systems – Schemes A & B, SO₂/CO₂ ratio method for measurement of SO_x emissions.
- (2) Revised MARPOL 73/78 Annex VI Regulation 13 – Nitrogen Oxides (NO_x) and the NO_x 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

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).