



CERTIFICATE NUMBER 23-2445633-PDA

EFFECTIVE DATE 4-October-2023

EXPIRATION DATE 3-October-2028

ABS TECHNICAL OFFICE Yokohama Engineering Services

CERTIFICATE OF

Product Design Assessment

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

GREEN INSTRUMENTS A/S

located at

ERHVERVSPARKEN 29, DK-9700 BROENDERSLEV, Denmark

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 Exhaust Gas Measuring and Monitoring Device

Model G7200 Multi Gas Monitoring System

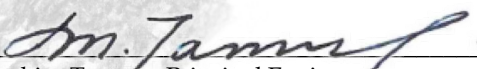
Endorsement Other

This Product Design Assessment (PDA) Certificate remains valid until 3/October/2028 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


Motohiro Tamura, Principal 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 ABS Rules 1-1-A3/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2010)

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Tier: 3 - Type Approved, unit certification not required

Product: Exhaust Gas Measuring and Monitoring Device

Model: G7200 Multi Gas Monitoring System

Endorsements:

Intended Service:

Emissions measuring device for Exhaust Gasses

Description:

Monitoring of CO₂, SO₂, NO₂, NO, CH₄, CO, N₂O, HC, H₂O and other relevant gasses

Rating:

Power Supply: 230 VAC - 50/60 Hz

Material/Enclosure: Painted mild steel RAL 7035/IP55

Measuring range:

- CO₂: 0 - 10 % or 0 - 20%
- SO₂: 0 - 200 ppm or 0 - 300 ppm
- NO₂: 0 - 100 ppm
- NO: 0 - 1000 ppm
- CH₄: 0 - 5000 ppm
- H₂O: 0 - 20000 ppm
- Other ranges upon request

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. 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.
3. Compliance with ABS Guide for Exhaust Emission Abatement has not been reviewed.
4. The measurement principles of analyzers are to be in accordance with Sec. 7 of MEPC.340(77).
5. Analyzer performance should be in accordance with the requirements of sections 1.6 to 1.10 of appendix III of the NOX Technical Code 2008.
6. Installations are to be in accordance with the manufacturer's instruction.
7. Where this system is installed on the vessel with EEMS Notation requested, the following documents are to be submitted in accordance with 6-3-5/3 of the Marine Vessels Rules.
 - (1) Details of the exhaust emission sampling and piping systems, including details of probes, pre-filters, heated lines, air supply arrangements, pure and calibration gas lines, design pressures, temperatures, materials, and insulation.
 - (2) Descriptions and schematic diagrams for the control and monitoring systems, including set points for abnormal conditions and details of the location and position at which exhaust emissions monitoring probes are to be located.
 - (3) Details of all electrical equipment installed for the EEMS equipment and associated systems.
 - (4) Schematic diagrams and operational descriptions of the exhaust emission monitoring equipment and associated systems power supply arrangements.
 - (5) Electrical one line diagrams depicting type, size, and protection of electrical cables used in the EEMS control and monitoring equipment.
 - (6) Operating and maintenance instruction manuals.
 - (7) Testing procedures during installation and commissioning trials.
8. Following minimum requirements of Exhaust Emission Monitoring Systems are to be complied.

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(1) Due consideration is to be given to the safety implications related to the handling and proximity of exhaust gases, the measurement equipment, and the storage and use of pressurized pure and calibration gases. Such implications are to be documented in the operation and maintenance manuals and suitable warning notices positioned at the sample points and measurement equipment in accordance with 6-3-5/9.1 i) of the Marine Vessels Rules.

(2) Hot surfaces of pre-filters or heated lines likely to make contact with the crew during operation are to be suitably guarded or insulated. Where the surface temperatures are likely to exceed 220°C (428°F) and where any leakage, under pressure or otherwise, of fuel oil, lubricating oil or other flammable liquid is likely to make contact with the sampling components or exhaust pipes, these surfaces are to be suitably insulated with noncombustible materials that are impervious to such liquids. Insulation material not impervious to oil is to be encased in sheet metal cladding or an equivalent impervious sheath in accordance with 6-3-5/9.5 iii) of the Marine Vessels Rules.

9. This system is Computer-based System Category II of 4-9-3 of the Marine Vessels Rules.

Notes/Drawing/Documentation:

- (1) Drawing No. 11296 Rev.0, P&ID - G7200 Multi Gas Monitoring System,
- (2) Drawing No. 11350 Rev.0, G7200 - Electrical Documentation - Multi Gas Monitoring System,
- (3) Drawing No. 11703 Rev.0, G7200 - Installation Layout 1 & 2 Stacks Multi Gas Monitoring System,
- (4) Drawing No. 11891 Rev.0, G7200 - Component Overview - 2 Stacks Multi Gas Monitoring System,
- (5) Drawing No. 11950 Rev.0, G7200 - Component Overview - 1 Stack Multi Gas Monitoring System,
- (6) Drawing No. 11956 Rev.0, G7200 - Arrangement Drawing Multi Gas Monitoring System,
- (7) Drawing No. 104677, Multi Gas Monitoring System User Manual,
- (8) Drawing No. P23-0082-1, Test Report of G7200-Exhaust Gas Monitoring System dated 9 Aug. 2023 issued by EKTOS Testing & Reliability Services A/S,
- (9) Drawing Title: G7200 Multi Gas Monitoring System, Test Plan - Environmental test, dated 14 March 2023,
- (10) Drawing Title: G7200 IP Rating Assessment
- (11) Drawing Title: G7200 Multi Gas Monitoring System, System description,
- (12) Drawing Title: G7200 Multi Gas Monitoring System, Test Plan - Performance Test
- (13) Drawing Title: G7200 Multi Gas Monitoring System, Test Report - Performance Test, dated 4 May 2023,
- (14) Drawing Title: S152402 Software Quality Assurance Plan,
- (15) Certificate No. DK015773 Certificate of ISO9001:2015,
- (16) Drawing Title: List of approved electronic components G7200 Multi Gas Monitoring System,
- (17) Drawing Title: Production Control Plan,
- (18) Drawing No. 7P05581, Vibration test on Sample Probe 03101, dated 23 Aug. 2017, issued by RISE Research Institutes of Sweden AB.

Terms of Validity:

This Product Design Assessment (PDA) Certificate remains valid until 03/Oct/2028 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:

2023 Marine Vessels Rules 1-1-4/7.7, 1-1/Appendix 3 & 4, 4-8-3/Table 2, 4-9-9/Table 1 & Table 2, 6-3-5/9.3 iv) & 6-3-5/9.5 ii)

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2023 Mobile Offshore Units Rules 1-1-4/9.7 and 1-1/Appendix 2 & 3, 4-3-1/Table 2

2023 Facilities on Offshore Installations 1-1-4/9.7, 1-1/Appendix 2 & 3

National:

NA

International:

NA

Government:

NA

EUMED:

NA

OTHERS:

IACS UR E10 (Rev.8)

MEPC.340(77) Appendix 3 of NOx Technical Code 2008