



**TYPE APPROVAL CERTIFICATE**  
No. MAC111818XG

**This is to certify** that the product below is found to be in compliance with the applicable requirement of the RINA type approval system.

<i>Description</i>	<b>Monitoring and control system</b>
<i>Type</i>	<b>Continuous Emissions Monitor P2000</b>
<i>Applicant</i>	<b>Protea Ltd Unit 2, Stirling Way, Bretton Peterborough, PE3 8YD UNITED KINGDOM</b>
<i>Manufacturer</i>	<b>Protea Ltd</b>
<i>Place of manufacture</i>	<b>Unit 2, Stirling Way, Bretton Peterborough, PE3 8YD UNITED KINGDOM</b>
<i>Reference standards</i>	<b>RINA Rules for the Classification of Ships - Part C "Machinery, Systems and Fire Protection", Chapter 3, Section 6, Tab.1 and IMO Res. MEPC.259(68) Chapter 6 "Emission Testing" as well as the relevant requirements of Revised MARPOL Annex VI and NOx Technical Code 2008.</b>

*Issued in* **Hamburg** on **May 9, 2018**. *This Certificate is valid until* **May 8, 2023**

RINA Services S.p.A.  
**Giuseppe Russo**

This certificate consists of this page and 1 enclosure



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Continuous Emissions Monitor P2000

### Reference Documents:

Authorisation Letter filed for info under RINA dwg. no. HMMC-11215  
Assembly Drawing approved under RINA dwg. no. HMMC-11216  
Supporting Documents filed for info under RINA dwg. no. HMMC-11217

### Product Description:

P2000 is an infra-red (IR), duct or stack-mounted analyser, designed to provide In-Situ analysis of up to six gasphase emission components. A typical system comprises a stack mounted analyser, an integral calibration function and a Control Unit with options which include a powerful in situ Heater and a stand-alone Analysis Software package.

### Technical Data:

Spectral range:	Specific application dependent wavelengths (up to 8) are selected between 2-12µm
Infra-red source:	Enclosed nichrome filament.
Infra-red detector:	Solid state pyroelectric element.
Sample path length:	1 m
Sample temperature:	Up to 350°C (660°F) (higher temperatures on application)
Cross-sensitivity:	Minimal due to the wavelength selection and advanced algorithms in the processor software.
Accuracy:	Typically ±2% of full scale concentration but dependent on application.
Response time:	Application dependent but typically 120 seconds to T90.
Enclosure:	Aluminium alloy casting with high protection finish, protected to IP65 (NEMA 4X)
Operating Environment:	Operating temperature range -20°C to 55°C (-4°F to 130°F). Optional Analyser Cooler/Heater for greater temperature range
Materials contact with gas:	Calcium Fluoride, Glass, 316 Stainless Steel, Graphite.
Services required:	Power for analyser 115V/230V 100W Power for in situ heater (optional) 115V/230V 1kW Instrument air for the analyser void purge, auto zero and sample cell protection, controlled by the analyser, 2 barG; flow rate 0.5 litre/min constant and 6 litre/min intermittent during Auto-zero (typically 8 minutes every 12 hours).
Interconnection cable:	2 twisted-pair cores with individual screen typically allows up to 1200m separation between Analyser and Procal 1000 Analyser Control Unit..

### Application Fields:

The "P2000" may be used for the continuous monitoring of emissions from the exhaust gas cleaning system.

According to MEPC. 259 (68), Appendix II, Item 6(e), both gas concentrations (CO<sub>2</sub> and SO<sub>2</sub>) will be measured at the same residual water content in the sample (wet) and therefore no dry-to-wet conversion factors are required in the calculation of the CO<sub>2</sub>/SO<sub>2</sub> ratio.

Hamburg May 09, 2018

