

PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

***P2000 Series Continuous Emission Monitor
with Protea Control Unit***

Manufactured by:

Protea Limited

2 Venture Park
Bretton
Peterborough
PE3 8YD

has been assessed by CSA Group
and for the conditions stated on this certificate complies with:

Environment Agency Guidance
“MCERTS for stack emissions monitoring equipment at industrial installations”
- Continuous emissions monitoring systems(CEMS)
Published 20 October 2020
EN 15267-1:2009, EN15267-2:2009, EN 15267-3:2007
& QAL 1 as defined in EN 14181: 2014

Certification ranges:

NO ₂	0 to 200 ppm, 0 to 5000 ppm
N ₂ O	0 to 300 ppm, 0 to 5000 ppm
NO	0 to 240 ppm, 0 to 1500 ppm
SO ₂	0 to 150 ppm, 0 to 1500 ppm
CO	0 to 150 ppm, 0 to 3500 ppm
CO ₂	0 to 15 Vol.%, 0 to 25 Vol.%
H ₂ O	0 to 30 Vol.%

Project number:	80120837
Certificate number:	Sira MC050060/16
Initial certification:	22 July 2005
This certificate issued:	09 May 2022
Renewal date:	18 December 2025



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Environmental Team Manager

MCERTS is operated on behalf of the Environment Agency by

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The MCERTS certificate consists of this document in its entirety.

For conditions of use, please consider all the information within.

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Approved site application

Any potential user should ensure, in consultation with the manufacturer, that the monitoring system is suitable for the intended application. For general guidance on monitoring techniques refer to the Environment Agency technical guidance on monitoring, available at www.mcerts.net

This instrument is considered suitable for use on waste incineration and large combustion plant applications. This CEMS has been proven suitable for its measuring task (parameter and composition of the flue gas) by use of the QAL 1 procedure specified in EN14181. The lowest certified range for each determinand shall not be more than 1.5 times the daily average emission limit value (ELV) for incineration plants, and not more than 2.5 times the ELV for other types of application.

The field trial was conducted at Aberthaw Power Station in the Vale of Glamorgan for three months.

Basis of certification

This certification is based on the following test report(s) and on CSA Group's assessment and ongoing surveillance of the product and the manufacturing process:

NPL Report Reference 2009070133/102153/QE2100/MCERTS/ProcalP2000/J1
Dated 9th April 2013

NPL Report Reference 102153/QE2100/Procal 2000 Series MCERTs Field Test
Dated 22nd February 2013

NPL Report Reference 200970133/102153/QE2100/MCERTS/ProcalP2000/J2
Dated 2nd July 2013

NPL Report Reference 105435/QE8400/Procal 2000 Series MCERTs Field Test
Dated 8th May 2013

Sira Test and Certification Report Reference N0328
Environmental (Vibration) Test on a Procal Pulsi Gas Analyser Dated March 2000

MS Testing Report Reference TL21087 IP Test report Dated 29th September 2021, Marine Type Approval Testing Salt Mist Dated 16th September 2021, and Marine Type Approval Testing Dated on 11th October 2021

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Product certified

The P2000 series measuring system consists of the following parts:

- P2000 Analyser
- Protea Control Unit
- In-situ heater accessory

This certificate applies to all instruments fitted with software version 2.7.2 (serial number 8501226M) onwards.

Note - the analyser serial numbers manufactured by Protea are '65xxxxxM'.

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Certified performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: -20°C to +50°C

Instrument IP rating: IP65

Results are expressed as error % of certification range, unless otherwise stated.

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time						
NO ₂					126s	<200s
N ₂ O					107s	<200s
SO ₂					132s	<200s
NO					136s	<200s
CO					132s	<200s
CO ₂					193s	<200s
H ₂ O					143s	<200s
Repeatability standard deviation at zero point						
NO ₂	0.01					<2.0%
N ₂ O	0.06					<2.0%
SO ₂	0.14					<2.0%
NO	0.16					<2.0%
CO	0.14					<2.0%
CO ₂	0.01					<2.0%
H ₂ O	0.01					<2.0%
Repeatability standard deviation at reference point						
NO ₂	0.20					<2.0%
N ₂ O	0.23					<2.0%
SO ₂	0.13					<2.0%
NO	0.15					<2.0%
CO	0.19					<2.0%
CO ₂	0.08					<2.0%
H ₂ O	0.08					<2.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Lack-of-fit						
NO ₂		0.54				<2.0%
N ₂ O			1.85			<2.0%
SO ₂	-0.27					<2.0%
NO		0.85				<2.0%
CO	0.33					<2.0%
CO ₂		0.63				<2.0%
H ₂ O			1.52			<2.0%
Influence of ambient temperature zero point						
NO ₂	-0.20					<5.0%
N ₂ O	-0.46					<5.0%
SO ₂		0.85				<5.0%
NO				-2.69		<5.0%
CO			1.32			<5.0%
CO ₂	0.15					<5.0%
H ₂ O	-0.32					<5.0%
Influence of ambient temperature reference point						
NO ₂		0.96				<5.0%
N ₂ O				2.41		<5.0%
SO ₂				4.71		<5.0%
NO				-4.65		<5.0%
CO				-4.14		<5.0%
CO ₂				2.41		<5.0%
H ₂ O			1.30			<5.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Influence of sample gas pressure						
NO ₂		0.64				<2.0%
N ₂ O		-0.54				<2.0%
SO ₂	0.42					<2.0%
NO		-0.53				<2.0%
CO	-0.45					<2.0%
CO ₂		-0.80				<2.0%
H ₂ O	-0.46					<2.0%
Influence of voltage variations 190 to 250V						
NO ₂	0.40					<2.0%
N ₂ O	0.14					<2.0%
SO ₂	-0.41					<2.0%
NO	0.25					<2.0%
CO	0.31					<2.0%
CO ₂	0.30					<2.0%
H ₂ O	0.26					<2.0%
Influence of vibration (10 to 60Hz (±0.3mm), 60 to 150Hz at 19.6m/s ²)					No Effect	To be reported
Cross-sensitivity at zero with interferents: O ₂ , H ₂ O, CO, CO ₂ , CH ₄ , N ₂ O, NO, NO ₂ , NH ₃ , SO ₂ , HCl						
NO ₂				3.00		<4.0%
N ₂ O	0.00					<4.0%
SO ₂				-3.33		<4.0%
NO				-2.14		<4.0%
CO				-2.60		<4.0%
CO ₂		1.48				<4.0%
H ₂ O	0.00					<4.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Cross-sensitivity at reference with interferents: O ₂ , H ₂ O, CO, CO ₂ , CH ₄ , N ₂ O, NO, NO ₂ , NH ₃ , SO ₂ , HCl						
NO ₂				3.00		<4.0%
N ₂ O				-2.20		<4.0%
SO ₂				2.11		<4.0%
NO				3.01		<4.0%
CO				2.22		<4.0%
CO ₂				3.57		<4.0%
H ₂ O				-3.48		<4.0%
Measurement uncertainty						
NO ₂					7.9%	Guidance - at least 25% below max permissible uncertainty
N ₂ O					4.3%	
SO ₂					11.7%	
NO					11.6%	
CO					7.5%	
CO ₂					6.0%	
H ₂ O					5.2%	
Calibration function (field)						
NO ₂					0.9343	>0.90
N ₂ O					0.9999	>0.90
SO ₂					0.9971	>0.90
NO					0.9822	>0.90
CO					0.9430	>0.90
CO ₂					0.9841	>0.90
H ₂ O					0.9546	>0.90

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time (field)						
NO ₂					85s	<200s
N ₂ O					82s	<200s
SO ₂					80s	<200s
NO					78s	<200s
CO					81s	<200s
CO ₂					61s	<200s
H ₂ O					90s	<200s
Lack of fit (field)						
NO ₂			-1.47			<2.0%
N ₂ O		-0.95				<2.0%
SO ₂		-0.87				<2.0%
NO			1.71			<2.0%
CO			1.60			<2.0%
CO ₂			1.86			<2.0%
H ₂ O			-1.57			<2.0%
Maintenance interval					Note 1 1 Month	>8 days
Zero and Span drift requirement	<p>The CEMs have check facilities that can be operated manually or be programmed to be carried out at different time intervals.</p> <p>The automatic zero facility was operating successfully at the specified times. The span test facility gave satisfactory results (and these were also within specification throughout the field test with no adjustment). The status signals operated correctly.</p>					<p>Clause 6.13 & 10.13</p> <p>Manufacturer shall provide a description of the technique to determine and compensate for zero and span drift.</p>

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Change in zero point over maintenance interval						
NO ₂		0.80				<3.0%
N ₂ O		0.80				<3.0%
SO ₂				-2.50		<3.0%
NO				-2.30		<3.0%
CO				2.30		<3.0%
CO ₂	0.00					<3.0%
H ₂ O	0.30					<3.0%
Change in reference point over maintenance interval						
NO ₂			1.30			<3.0%
N ₂ O			1.80			<3.0%
SO ₂				-2.90		<3.0%
NO				2.90		<3.0%
CO				2.10		<3.0%
CO ₂				2.90		<3.0%
H ₂ O				2.30		<3.0%
Availability						
SO ₂ , NO, CO, CO ₂ , H ₂ O					95.4%	>95%
NO ₂ , N ₂ O					99.2%	>95%
Reproducibility						
NO ₂			1.60			<3.3%
N ₂ O		0.80				<3.3%
SO ₂				2.60		<3.3%
NO				2.60		<3.3%
CO				2.40		<3.3%
CO ₂				2.40		<3.3%
H ₂ O		0.60				<3.3%

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Note 1: The P2000 has a maintenance interval of 1 month. The work details below have to be carried out at regular intervals, depending on local conditions:

Check that the analyser(s) and associated units are functioning correctly by logging and comparing the “test screen” readings with those previously logged.

Select zero gas purge and verify the P2000 indicates zero within 2% of span, then select span gas and verify it is within 2% FSD of the cylinders' certified concentrations.

If the system outputs are connected to a plant DCS verify that the current readings are displayed correctly on the DCS display.

Before leaving site ensure that the system is left in its normal operational mode.

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Description

The P2000 analyser comprises a stack mounted probe and a separate control unit. The analyser performs measurements of the components of stack gases and operates by using the infrared absorption of the gases being measured.

Selected infrared wavelengths signals are sequentially measured by the analyser, seven times per second, each corresponding to an absorption feature of the individual gas.

Both measurement and reference wavelength filters are used together with gas filter correlation cells to determine changes in absorption. These changes are mapped to concentration using a mathematical algorithm, which also corrects for the influence of pressure, temperature, and interfering gases. Sample pressure change compensation must be enabled.

The output of the separate analyser control unit can be configured by the user to display transmitted and concentration in various units.

General Notes

1. This certificate is based upon the equipment tested. The Manufacturer is responsible for ensuring that on-going production complies with the standard(s) and performance criteria defined in this certificate. The manufacturer is required to maintain an approved quality management system controlling the manufacture of the certified product. Both the product and the quality management system shall be subject to regular surveillance according to 'Regulations Applicable to the Holders of CSA Group Testing UK Ltd Certificates'.
2. The design of the product certified is defined in the CSA Group design schedule V15 for certificate No. Sira MC050060/16.
3. If a certified product is found not to comply, CSA Group should be notified immediately at the address shown on this certificate.
4. The certification marks that can be applied to the product or used in publicity material are defined in 'Regulations Applicable to the Holders of CSA Group Testing UK Ltd Certificates'.
5. This document remains the property of CSA Group and shall be returned when requested by CSA Group.

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