PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

ProtIR 204M Mobile FTIR multigas analyser

Manufactured by:

Protea Ltd
10 Prosperity Court
Middlewich
Cheshire
CW10 0GD

has been assessed by Sira Certification Service
And for the conditions stated on this certificate complies with:

MCERTS Performance Standards for Continuous Emission Monitoring Systems, Version 3.4, Annex F dated July 2012

Certification Ranges :

NO	0 to 200 mg/m^3
CO	0 to 75 mg/m^3
SO_2	0 to 75 mg/m^3
O_2	0 to 20.9 %Vol
HCl	0 to 15 mg/m^3
H_2O	0 to 40%Vol
NH_3	0 to 15 mg/m^3

Project No.	:	70005025
Certificate No	:	Sira MC150282/02
Initial Certification	:	05 October 2015
This Certificate issued	:	20 December 2018
Renewal Date	:	05 October 2020

Emily Alexander
Environmental Project Engineer

MCERTS is operated on behalf of the Environment Agency by

Sira Certification Service
Unit 6, Hawarden Industrial Park
Hawarden, Deeside, CH5 3US
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Form 1335
Issue 5

Certificate Contents

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 Monitoring Technical Guidance Notes available at www.mcerts.net

For general guidance on stack emission monitoring techniques refer to Environment Agency Technical Guidance Note M2: Monitoring of stack emissions to air. Operators with installations falling under Chapter III (large combustion-plant) or Chapter IV (waste incineration plant) of the Industrial Emissions Directive (IED)(2010/75/EU) must refer to Technical Guidance Note M20: Quality Assurance of Continuous Emission Monitoring Systems, for guidance on the suitability of CEMS for their installations. M2 and M20 are available on the Agency's website at www.mcerts.net

On the basis of the assessment and the ranges required for compliance with the IED this system is considered suitable for use on waste incineration and large coal or oil-fired combustion-plant applications.

The analyser was assessed on the basis of a six month field trial mounted on a waste incinerator. An additional trial was conducted on the oxygen channel for 769 hours on a waste incinerator.

Please note: This is a transportable instrument which is suitable for periodic use as a temporary back-up to CEMS, or for compliance monitoring work.

Basis of Certification

This certification is based on the following Test Report(s) and on Sira's assessment and ongoing surveillance of the product and the manufacturing process:

TÜV Köln, 936/801003/A, dated 01.10.2001
TÜV Köln, 936/801003/B, supplementary report for HF, dated 16.10.2001
TÜV Köln, 936/21208939/A, dated 10.02.2009
Sira Report 674/0304 dated 23.07.2015
R11332a Field Test Report
2014 MCERTS Protea witnessed testing and system audit 15.4.2015
R1133-1a Test house monitoring report
674/0304 Sira Report dated 02.04.2008 (witness field trial report)
Certification is also based on ABB certificate Sira MC030016/03

Product Certified

The ProtIR 204M mobile FTIR measuring system consists of the following parts:

- ProtIR 204M FTIR analyser with built in Zirconia oxygen sensor
- Controlling laptop running Protea Analyser Software, for control and analysis
- On-board pressure sensors for checking and managing sample flow
- Sampling pump, (instrument was tested with a KNF pump)
- Heated sample lines of 50 metres and 20 metres were tested
- Heated sample probe and filter (instrument was tested with M&C probe)

This certificate applies to all instruments fitted with software version 2.6.5.3 and serial number P204M/B/xxxx onwards.

Certified Performance

The instrument was evaluated for use under the following conditions:
Ambient Temperature Range: +5°C to +40°C

Unless otherwise stated the evaluation was carried out on the certification range: NO 0 to 200 mg/m^3, CO 0 to 75 mg/m^3, SO_2 0 to 75 mg/m^3, O_2 0 to 20.9 % vol, HCl 0 to 15 mg/m^3, H_2O 0 to 40%Vol, NH_3 0 to 15 mg/m^3

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<4		
Response time						
NO					151s	<200s
CO					152s	<200s
SO_2					135s	<200s
HCl					153s	<200s
H_2O					152s	<200s
NH_3					158s	<200s
O_2					153s	<200s
Detection Limit						
NO		0.6				<2%
CO			1.1			<2%
SO_2		0.6				<2%
HCl			1.7			<2%
H_2O	0.3					<2%
NH_3			1.4			<2%
O_2	0.06					<0.2%
Lack OF fit						
NO			1.4			<2%
CO		0.95				<2%
SO_2		0.8				<2%
HCl			1.9			<2%
H_2O			1.3			<2%
NH_3			1.8			<2%
O_2	0.19					<0.3% vol

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<4		
Zero Drift						
NO	0.00					< +/- 2.0% / 24h
CO	0.26					< +/- 2.0% / 24h
SO_2	0.07					< +/- 2.0% / 24h
HCl	-0.04					< +/- 2.0% / 24h
H_2O	-0.12					< +/- 2.0% / 24h
O_2 % vol	0.00					< +/- 2.0% / 24h
Span Drift						
NO	0.03					< +/- 2.0% / 24h
CO	-0.47					< +/- 2.0% / 24h
SO_2	-0.42					< +/- 2.0% / 24h
Sensitivity to Atmospheric Pressure					Not Reported	
Sensitivity to Sample Gas Pressure - zero						
CO	-0.03					<+/- 2.0%
NO	0.47					<+/- 2.0%
SO_2	0.1					<+/- 2.0%
O_2	-0.04					<+/- 2.0%
Sensitivity to Sample Gas Pressure - Span						
CO		-0.57				<+/- 2.0%
NO	0.07					<+/- 2.0%
SO_2			1.28			<+/- 2.0%
O_2	0.12					<+/- 2.0%
Sensitivity to Ambient temperature at zero						
NO	0.06					<0.3%/ºC
CO	0.05					<0.3%/ºC
SO_2	0.20					<0.3%/ºC

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<4		
HCl	0.07					<0.3%/ºC
O_2	0.05					<0.5% vol/ºC
H_2O	0.0					<0.3%/ºC
NH_3	0.1					<0.3%/ºC
Sensitivity to Ambient temperature at span						
NO	0.11					<0.3%/ºC
CO	0.07					<0.3%/ºC
SO_2	0.14					<0.3%/ºC
HCl	0.27					<0.3%/ºC
O_2	0.13					<0.5% vol/ºC
H_2O	0.1					<0.3%/ºC
NH_3	0.2					<0.3%/ºC
Sensitivity to electrical voltage					No influence	2%
Interferents at zero					Note 1	
NO				2.8		<4%
CO				2.8		<4%
SO_2				3.5		<4%
HCl			1.7			<4%
H_2O	<0.5					<4%
NH_3				3.6		<4%
O_2	0.09					<4%
Interferents at span					Note 1	
NO				2.2		<4%
CO				2.4		<4%
SO_2				3.6		<4%
HCl				2.6		<4%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<4		
H_2O	<0.5					<4%
NH_3				3.1		<4%
O_2	0.10					<4%
Losses and leakage in the sampling system					Not Reported	
Standard deviation of repeatability in laboratory at zero						
H_2O	0.11					<+/- 1.0%
CO_2	0.07					<+/- 1.0%
CO	0.03					<+/- 1.0%
NO	0.27					<+/- 1.0%
SO_2	0.02					<+/- 1.0%
HCl		0.65				<+/- 1.0%
O_2	0.02					<+/- 1.0%
Standard deviation of repeatability in laboratory at span level						
H2O		0.59				<+/- 2.0%
CO_2		0.64				<+/- 2.0%
CO	0.33					<+/- 2.0%
NO	0.47					<+/- 2.0%
SO_2		0.62				<+/- 2.0%
HCl			1.23			<+/- 2.0%
O_2	0.04					<+/- 2.0%
Calibration function (field)						
O_2					99%	>95%
Integral Performance (field)						
NO	0.5					<10%
CO			1.6			<10%
SO_2			1.5			<10%

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Test	Results expressed as % of the certification range <0.5	<1	<2	<4	Other results	MCERTS specification
HCl			2.0			<10%
H_2O			2.8			<10%
NH_3			2.6			<10%
Availability					98.2%	>95%
Zero drift (weekly)						
NO, CO, SO_2, HCl, H_2O, NH_3			<2.0			<2%/week
O_2	0.17					<0.2%vol/week
Span drift (weekly)						<4%/week
NO, CO, SO_2, HCl, H_2O, NH_3			<3%			<4%/week
O_2	0.20					<0.2%vol/week
Maintenance Interval					1 month	To be reported

Note 1: Cross sensitivity for NO, CO, SO_2 and HCl tested against: O_2, H_2O, CO_2, CH_4, N_2O, NO, NO_2, NH_3, SO_2, HCl. Cross sensitivity to O_2 and CO tested against: SO_2, CO_2, NO, NO_2, CH_4, H_2O

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Description

The ProtIR 204M is a high resolution multi-component FTIR analyser with a measuring cell path length of 6.4m and temperature normally at 180ºC, but can be adjusted depending on the application.

The analyser is fitted with an integrated sampling control system that ensures conditioned sample gas passes to the analyser, with temperature and pressure instruments giving a continuous status on the analyser's operation.

The 204M contains an on-board zirconia oxygen sensor, allowing for the collection of oxygen results parallel to combustion gas results and the ability to actively correct oxygen content.

The ProtIR 204M analyser is designed to be run with Protea Analyser Software (PAS). This allows for the continuous collection, labelling and storing of spectral data and concentrations from the FTIR. It also lets the user re-calibrate concentration results on previously collected data.

Inputs from other pieces of emissions monitoring equipment allow concentration data from other sources to be logged alongside the FTIR data. The unit can output results of gas concentrations and instrument status levels to plant data control systems, allowing for back-up to fixed CEM systems.

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 Sira Certificates'. The design of the product certified is defined in the Sira Design Schedule V09 for certificate No. Sira MC150282/02

2. If certified product is found not to comply, Sira Certification Service should be notified immediately at the address shown on this certificate.

3. The Certification Marks that can be applied to the product or used in publicity material are defined in 'Regulations Applicable to the Holders of Sira Certificates'.

4. This document remains the property of Sira and shall be returned when requested by the company.