PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

atmosFID TOC analyser

manufactured by:

PROTEA Ltd
10 Prosperity Court
Middlewich
Cheshire, CW10 0GD
UK

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

Environment Agency Guidance
"MCERTS for stack emissions monitoring equipment at industrial installations"
cl. 7.1 CEMS - Published 20 October 2020
EN 15267-1, EN 15267-2, EN15267-3
& QAL 1 as defined in EN 14181:2014

Certification ranges:

Total organic carbon (TOC)	0 to 15mg/m^3
	0 to 30mg/m^3
	0 to 150mg/m^3
	0 to 500mg/m^3

Project number:	80056313
Certificate number:	Sira MC200363/00
Initial certification:	29 October 2020
This certificate issued:	29 October 2020
Renewal date:	28 October 2025

Andrew Young
Environmental Team Manager

MCERTS is operated on behalf of the Environment Agency by

Sira Certification Service
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UKAS PRODUCT CERTIFICATION 0011

The MCERTS certificate consists of this document in its entirety.
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Form 1335
Issue 8

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 technical guidance on monitoring, available at www.mcerts.net

This instrument is considered suitable for use on waste incineration 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 waste incineration plants, and not more than 2.5 times the ELV for other types of application.

The field test was performed over a period of more than 3 months (102 days) at a waste incineration plant.

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:

Test Report: TÜV SÜD Industrie Service GmbH, Munich, report no. 3003564, 9th March 2020.

Product certified

The Protea atmosFID TOC analyser measuring system consists of the following parts:

atmosFID - 19" rack analyser with embedded operating software. atmosFID contains internal pump for sampling
atmosFID sample gas probe - probe tube for insertion into the stack
atmosFID heated filter - primary filtration of the sample, heated pre-filter mounted at the probe
atmosFID heated sample line - powered via the atmosFID analyser to 180 ºC. PTFE sample tube

1. Sample probe	2. Heated filter	3. Heated sample line	4. Analyser
Model: atmosFID Sample gas probe	Model: atmosFID Heated filter	Model: atmosFID sample line. Heated to 180ºC with PTFE tube	Model: atmosFID 19" rack analyser with embedded operating software

Allowable variations could include:

- A different brand or model of sampling system of the same type, provided that there is evidence the alternative system works with similar types of CEMS.
- Additional manifolds and heated valves used to allow more than one analyser to share a sampling system. e.g. Protea atmosFIR FTIR CEM analyser

This certificate applies to all instruments fitted with software version: CE 1.76, DGA 2.0, I/O 2.0 and QPC 2.0, and serial number - 1810017 onwards.

Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient temperature range: 5°C to +40°C
Instrument IP rating: IP40

Note: The area of use is restricted to locations with protection from the temperatures within the tested temperature range(5-40°C). A roof over the point of assembly and protection from precipitation or spray are mandatory.

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						
TOC 0 to 15mg/m^3					13s	<200s
0 to 30 mg/m^3					13s	<200s
0 to 150mg/m^3					15s	<200s
0 to 500mg/m^3					19s	<200s
Repeatability standard deviation at zero point						
0-15mg/m^3	0.05					<2.0%
Repeatability standard deviation at reference point						
0-15mg/m^3	0.07					<2.0%
Lack-of-fit						
TOC 0 to 15mg/m^3	0.4					<2.0%
0 to 30mg/m^3		0.6				<2.0%
0 to 150mg/m^3	-0.4					<2.0%
0 to 500mg/m^3			-1.1			<2.0%
Influence of ambient temperature zero point (5°C to 40°C)						
0-15mg/m^3				2.7		<5.0%
Influence of ambient temperature reference point (5°C to 40°C)						
0-15mg/m^3		0.5				<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 flow for extractive CEMS 0-15mg/m^3		-0.96				<2.0%
Influence of voltage variations at zero (196V to 253V) 0-15mg/m^3	-0.06					<2.0%
Influence of voltage variations at span (196V to 253V) 0-15mg/m^3	0.13					<2.0%
Cross-sensitivity at zero with interferents: O_2, H_2O, CO, CO_2, N_2O, NO, NO_2, NH_3, SO_2, HCl 0-15mg/m^3				3.8		<4.0%
Cross-sensitivity at reference with interferents: O_2, H_2O, CO, CO_2, N_2O, NO, NO_2, NH_3, SO_2, HCl 0-15mg/m^3				3.9		<4.0%
Effect of oxygen for TOC CEMS			1.98			<2.0%
Response factors for TOC CEMS:						
Methane					1.05 to 1.08	0.9 to 1.2
Aliphatic hydrocarbons					0.90 to 1.10	0.9 to 1.1
Aromatic hydrocarbons					0.85 to 1.06	0.8 to 1.1
Dichloromethane					1.01 to 1.07	0.75 to 1.15
Aliphatic alcohols					0.7 to 0.8	0.70 to 1.0
Ester and ketones					0.8 to 0.8	0.7 to 1.0
Organic acids					0.6 to 0.6	0.5 to 1.0
Measurement uncertainty					Guidance - at least 25% below max permissible uncertainty	
0-15mg/m^3					9.0	<22.5% (30%)

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Calibration function (field) 0-15mg/m^3					0.99	>0.90
Response time (field) 0-15mg/m^3					23s	<200s
Lack of fit (field) 0-15mg/m^3		-0.86				<2.0%
Maintenance interval					4 weeks	>8 days
Zero and span drift requirement	All deviations at zero point were < +/-3% from the certification range during the entire period of the field test. All deviations at the span point were < +/-3% from the certification range during the entire period of the field test. These results demonstrated there were no deviations >3% from the calibration range during the 102 days. The maintenance interval was set based on the drift behaviour during the field test suitability test. A maintenance interval of 4 weeks was therefore defined for checking adjustment. The CEMS should be adjusted at an interval of 24 hours using the automatic adjustment function at zero and span point. Zero gas can be provided by connecting synthetic air or using the internal zero gas generator.					Clause 6.13 & 10.13 Manufacturer shall provide a description of the technique to determine and compensate for zero and span drift.
Change in zero point over maintenance interval 0-15mg/m^3	-0.4					<3.0%
Change in reference point over maintenance interval 0-15mg/m^3			1.9			<3.0%
Availability 0-15mg/m^3					97.8	>95%
Reproducibility 0-15mg/m^3		0.8				<3.3%

Description

The atmosFID flame-ionization-detector (FID) continuously measures the total organic carbon (TOC) concentration in the stack emission sample gas.

Within the FID analyser chamber is a hydrogen flame burning in an electrical field. The flame is fed by high purity fuel gas (atmosFID can use hydrogen gas or a hydrogen/helium mix) and hydrocarbon free combustion air. The sample gas to be analyzed is then fed into this flame.

The hydrocarbons within the sample gas are "cracked" in the flame and the resulting fragments are then ionized. The ion current generated by these ions is related is proportional to the organic carbon content of the gas. Protea can provide a response factor list for a range of specific organic molecules that the atmosFID can measure.

The atmosFID consists of:

- atmosFID 19” rack analyser
- Embedded Operation and Datalogging Software 2.0
- Heated sample line with PTFE core (powered from atmosFID)
- Heated sample probe and filter

Protea’s PAS-Pro and atmosDAHS Emissions Reporting software can be used for data logging and reporting of TOC readings from atmosFID in CEM applications.

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’.

2. The design of the product certified is held and maintained by TUV Rheinland for certificate No. Sira MC200363/00

3. If a certified product is found not to comply, Sira 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 Sira certificates’.

5. This document remains the property of Sira and shall be returned if requested by Sira.