PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

PCME QAL 181 Particulate Analyser (previously LMS 181) Including PCME QAL 181 SEN Sensor

Manufactured by:

PCME Ltd
Edison Road
St Ives
Cambridgeshire
PE27 3GH
UK

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 dated July 2012
EN15267-3:2007,
& QAL 1 as defined in EN 14181: 2004

Certification Ranges :

Particulate Concentration	0 to 15 mg/m^3 0 to 100mg/m^3

Project No.	:	674/0293
Certificate No	:	Sira MC090152/01
Initial Certification	:	17 August 2009
This Certificate issued	:	24 September 2014
Renewal Date	:	16 August 2019

Deputy Certification Manager

MCERTS is operated on behalf of the Environment Agency by

Sira Certification Service
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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

On the basis of the assessment and the ranges required for compliance with EU Directives this instrument is considered suitable for use on waste incineration and large coal-fired combustion plant applications. This CEM 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, for LCPD and WID applications for the ranges specified. The lowest certified range for each determinand shall not be more than 1.5X the daily average emission limit value (ELV) for WID applications, and not more than 2.5X the ELV for LCPD and other types of application.

The field trial was conducted over 4 months with the PCME QAL 181 mounted on a cement kiln.

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 Rheinland	Report Ref: 936/21204255/B dated 19/11/06
TÜV Rheinland	Report Ref: 936/21209450/A dated 04/03/09

Product Certified

The PCME QAL 181 measuring system consists of the following parts:

- PCME QAL 181 SEN: Sensor
- PCME QAL 181 CON: Control unit & datalogger
- Air blower

This certificate applies to all instruments fitted with sensor software version 1.4G (serial number SN 31192 onwards) and control unit software version 7 onwards.

Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: -20°C to +50°C
Instrument IP rating: IP65

Note: If the instrument is supplied with an enclosure, then the ambient temperature shall be monitored inside the enclosure to ensure that it stays within the above ambient temperature range.

Unless otherwise stated the evaluation was carried out on the certification range 0 to 15mg/m^3.

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time Dust					2s	<200s
Repeatability standard deviation at zero point Dust	0.13					<2.0%
Repeatability standard deviation at reference point Dust		0.67				<5.0%
Lack-of-fit Dust	0.30					<3.0%
Influence of ambient temperature zero point Dust		0.70				<5.0%
Influence of ambient temperature reference point Dust			1.30			<5.0%
Influence of voltage variations 190 to 250V Dust					No influence	<2.0%
Influence of vibration (10 to 60Hz (±0.3mm), 60 to 150Hz at 19.6m/s^2)	0.11					To be reported

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Measurement uncertainty Dust (For and ELV of 15 mg/m^3)					Guidance - at least 25% below max permissible uncertainty Note 1 6.1%	 <22.5% (30%)
Calibration function (field) Dust					Note 2 0.87	 >0.90
Response time (field) Dust					 2s	 <200s
Lack of fit (field) Dust				 -2.2		 <3.0%
Maintenance interval Dust					Note 3 4 weeks	 >8 days
Zero and Span drift requirement	For the zero check the laser light is turned off. The result of the check is registered in raw counts. If the deviation of the result exceeds this range, an alarm is generated. For the span and contamination check an element is rotated into a position that brings a light scattering element into the laser beam. The laser light is scattered by that optical element and reflected to the receiver end of the quartz rod in the same way as the scattered light during normal operation. The detector system is not altered during that check. For the contamination check the signal measured in this position is compared to a target value that has been measured at the new system. For the span test the intensity of the laser light is reduced to 75% of the normal value while the scattering element is in the position in the beam. In this test the light intensity detected shall be 70% of the target value stated at the new instrument for the contamination check. An alarm is generated at a deviation of 2% of the target value. Inside the instrument there are two light scattering elements of different intensity mounted to the rotating element. These are both rotated into the path of the laser beam during the automatic checks. The frequency of the zero, span and contamination check can be selected. The results are stored digitally and can be displayed by the control unit.					Clause 6.13 & 10.13 Manufacturer shall provide a description of the technique to determine and compensate for zero and span drift.

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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 Dust	0.40					<3.0%
Change in reference point over maintenance interval Dust		-0.80				<3.0%
Availability Dust					97%	>95%
Reproducibility for concentrations <20mg/m^3 Dust			1.70			<3.3%
Contamination check of in-situ systems Dust					No deviation reported	<2.0%

Note 1: The measurement uncertainty is based on LMS 181 analyser tested in 2005 and supplementary tests performed on PCME QAL 181 in 2009.

Note 2: The calibration function/R^2 values are between 0.67 and 0.87 due to relatively constant dust levels during the field test. The CEMS pass the EN14181 criteria, but not the requirement for EN15267-3 under these circumstances. However during the wind tunnel test where the dust levels were more varied an R^2 of 0.99 was achieved.

Note 3: The PCME QAL181 has a maintenance interval of 4 weeks.

The work detailed below has to be carried out at regular intervals, depending on local conditions:

- Checking of zero point, reference point and contamination by activation of the automatic test cycle,
- Demounting of the sensor from the duct,
- Visual inspection of the sensor,
- Cleaning of the optical surfaces of the measuring volume,
- Checking of the zero point using the cover and of the reference point using the light scattering filters (audit units).

Description

The PCME QAL 181 is a pro-scatter forward light scattering instrument suitable for measuring dust concentration in industrial stacks.

The sensor probe is installed directly into the flue-gas. Particulates in the measuring volume at the end of the probe scatter the laser incident beam. The resulting forward scattered cone of light is transmitted to the detector electronics outside the stack via a heat tolerant quartz rod.

The instrument is connected to a supply of dry clean air to prevent dust entering the interior of the sensor.

The PCME QAL 181 system has automatic zero, span and contamination checks. The results of these tests are recorded within the separate control unit for QAL3 reporting purposes. In the span check, a scattering body is automatically rotated into the laser beam, to check the response to scattered light directly. The instrument is supported by an optional Pro-scatter Audit unit which is an approved reference material for conducting linearity tests as part of AST or QAL 2 procedures.

The instrument is designed for measuring the full range of emissions found on highly abated Incinerator applications and EP controlled Power plant applications having two certification ranges of 0-15mgn/m^3 and 0-100mg/m^3

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 for certificate No. Sira MC090152/00

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.