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PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

StackGuard Dust Concentration Monitor

manufactured by:

Dr. Sigrist AG
Sigrist Photometer AG
Hofurlistraße 1
CH-6373 Ennetbürgen
Switzerland

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 2, Revision 1 (April 2003)

Certification Ranges :

Dust Concentration	0 to 0.05 mg/m ³ PLA
	0 to 0.1mg/m ³ PLA
	0 to 0.3 mg/m ³ PLA
	0 to 1 mg/m ³ PLA *
	0 to 10 mg/m ³ PLA

* Within the field test measuring range 0 to 1 mg/m³ PLA corresponding to a range of 0 to 13 mg/m³ dust (PLA stands for Polystyrene-Latex Aerosol)

Project No: 674/0206
Certificate No: Sira MC 060081/04
Initial Certification: 10 July 2006
This Certificate Issued: 10 June 2010
Renewal Date: 09 July 2011

Technical Director

MCERTS is operated on behalf of the Environment Agency by

Sira Certification Service

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Approved Site Application

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.

The manufacturer states that the system must be installed at a weather-protected location on a flat surface with sufficient load-bearing capacity and states that the Photometer and Control unit have an IP65 rating however the protection rating for the entire installation is IP40.

Any potential user should ensure, in consultation with the manufacturer, that the emission monitoring system is suitable for the process on which it will be installed. For general guidance on stack emission monitoring techniques refer to Environment Agency Technical Guidance Note M2: Monitoring of stack emissions to air. This is available on the Agency's website at www.mcerts.net

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 Group	Report No: 936/21202165/A dated 9 February 2005
TÜV Rheinland Group	Report No: 936/21204792/A dated 2 November 2005

TÜV reports are accepted on the basis of the Environment Agency's document 'MCERTS – Guidance on the acceptance of German type approval test reports for CEMS' Version 2 (October 2003)

Product Certified

The StackGuard measuring system consists of the following parts:

- StackGuard Photometer
- Heated re-circulating system
- SIGAR 2 electronic control unit

This certificate applies to all instruments fitted with software version 1.0 onwards (serial number 710'000 onwards for the StackGuard and 720'000 onwards for the SIGAR 2).

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Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: -20°C to $+50^{\circ}\text{C}$

Unless otherwise stated the evaluation was carried out on the certification range 0 to 1 mg/m^3 PLA.

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<4		
Linearity	0.3					$<\pm 2\%$
Temperature dependent zero drift	0.2					$<0.3\%/^{\circ}\text{C}$
Temperature dependent upper reference point drift	0.3					$<0.3\%/^{\circ}\text{C}$
Response time					< 100 s	<200s
Detection limit	0.05				See note 1	<2%
Integral performance ^{Note 5}				2.3		<20%
Availability ^{*Note 5}					99.0%	>95%
Mains voltage (190V to 250V)	0.01					<2%
Zero drift during field test	0.00					< 3% /week
Upper reference point drift during field test ^{Note 5}	0.25					< 3%/week
Reproducibility ^{Note 5}					54	> 30
Vibration test (10 to 60Hz ($\pm 0.3\text{mm}$), 60 to 150Hz at 19.6m/s^2)					See note 2	Not specified
Sample gas pressure					See note 3	To be reported

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Test	Results expressed as % of the certification range				Other results	MCERTS* specification
	<0.5	<1	<2	<4		
Sample gas temperature					See note 4	To be reported
Maintenance Interval *Note 5					3 month	To be reported

- Note 1: The detection limit is presented as % of the certification range of 0 to 13mg/m³ (Corresponds to 0 to 1mg/m³ PLA)
- Note 2: StackGuard is an extractive dust monitor and the manufacturer requires the system to be mounted on a flat surface with sufficient load-bearing capacity and would typically eliminate stack mounting. Test is not applicable.
- Note 3: StackGuard is an extractive dust monitor with a pump sampling system. Test is not applicable.
- Note 4: StackGaurd is an extractive dust monitor with no active detection parts exposed to the flue gas temperature. Test is not applicable.
- Note 5: The field test was performed on a municipal waste incinerator for six months. The measuring range during the field trial corresponded to a range of 0 to 13mg/m³ dust using manual gravimetric measurement.

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Description:

The Sigrist StackGuard is a continuous extractive particulates emissions monitor, which uses laser light scattering as a means of detection for the measurement of low and higher dust concentrations in various applications. The certified StackGuard system consists of the Photometer unit, heated circular sampling line & electronic control unit SIGAR 2.

The moisture content of the stack gas dictates whether the dust concentration can be measured in situ in the stack or requires extraction. Only hot, dry stack gases that have no risk of water droplets occurring as a result of condensation are suitable for in situ measurement. Wet gases have to be extracted and heated above the dew point to avoid error in the readings by the resultant droplets as performed by Stackguard. The extractive measurement has the benefit of permitting the connection of sensors for measuring gases like O₂, CO, NO_x, and SO_x to the sampling ring pipe.

The StackGuard uses a filtered purge air system to avoid dust particle build-up on the optical windows and walls of the flow cell which falsifies the readings.

Dust concentration measurement is required in mg/m³ or mg/dscm (dry standard cubic metre), however the intensity of the scattered light produced by a given dust particle depends greatly on particle characteristics such as size, shape, colour, relative density etc. Consequently, an absolute measurement of the dust concentration in mg/dscm is only possible with an application-specific calibration which is obtained by comparing the measured value with a manual gravimetric measurement. The StackGuard performs a regular check of the stability of the zero and reference point, to eliminate variances between calibration intervals. If excessive drift is found an alarm is given.

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 MC 060081/03.
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.

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