



PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

DUSTHUNTER SF100

manufactured by:

SICK Maihak GmbH

*Bergener Ring 27
01458 Ottendorf-Okrilla
Germany*

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 3.1 dated July 2008,
EN15267:2007,
& QAL 1 as defined in EN 14181: 2004**

Certification Ranges :

Dust 0 to 50 SE*
 0 to 5 SE
 0 to 20 SE
 0 to 100 SE
 0 to 200 SE

*0 to 50 scattered light intensity units (SE) \equiv 0-15 mg/m³

Project No: 674/0391C
Certificate No: Sira MC090147/00
Initial Certification: 04 August 2009
This Certificate Issued 04 August 2009
Renewal Date: 03 August 2014

Technical Director

MCERTS is operated on behalf of the Environment Agency by

Sira Certification Service

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Dartford, Kent, UK, DA1 4AL
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Approved Site Application

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. Operators with installations falling under the Large Combustion Plant Directive or Waste Incineration Directive 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 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 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 15 months with the SF100 mounted on a municipal waste incinerator.

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 Rhineland Report Number 936/21210461/E dated 18.03.2009

Product Certified

The measuring system consists of the following parts:

- Sender unit DHSF-T
- Connection cable to connect the sender unit to the control unit
- Scattered light receiver DHSF-R
- Connection cable to connect the scattered light receiver to the sender/receiver unit
- Control unit MCU for data control, evaluation and output
 - With integral purge air supply, for internal pressure -50... +2 mbar
 - Without purge air supply, therefore additionally requiring:
- Optional external purge air unit for internal duct pressure -50... +30 mbar

This certificate applies to all instruments fitted with software version: 1.026 (MCU), 1.3.04 (sensor) and 02.16 (SOPAS ET) serial number: SN07478637 (MCU controller), SN07478656 (S/R unit), and SN07478660 (reflector/scattered light measuring device) onwards.

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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: IP66

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 5 scattered light intensity units

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time					28s (with 30s integration time)	<200s
Repeatability standard deviation at zero point	0.13					<2.0%
Repeatability standard deviation at span point	0.50					<5.0% of ELV
Lack-of-fit						
0-5 SE			1.1			<3.0%
0-20 SE		0.9				<3.0%
0-50 SE		0.9				<3.0%
0-100 SE		1.0				<3.0%
0-200 SE			1.6			<3.0%
Influence of ambient temperature zero point	0.3					<5.0%
Influence of ambient temperature span point	0.0					<5.0%
Influence of voltage variations 190 to 250V		0.7				<2.0%
Influence of vibration (10 to 60Hz (±0.3mm), 60 to 150Hz at 19.6m/s ²)	0.3					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 (for an ELV of 10mg/m ³)					7.0%	Guidance - at least 25% below max permissible uncertainty 22.5% in EN15267-3
Calibration function (field)					0.87 Note 1	>0.90
Response time (field)					28s (with 30s integration time)	<200s
Lack of fit (field)			1.1			<3.0%
Maintenance interval					6 months Note 2	>8 days
Zero and Span drift requirement Clause 6.13 & 10.13 Manufacturer shall provide a description of the technique to determine and compensate for zero and span drift.	<p><u>Statement from the manufacturer:</u></p> <p>Zero value measurement The sender diode is switched off for zero point control so that no signal is received. This means possible drifts or zero point deviations are detected reliably in the overall system (e.g. due to an electronic defect). An error signal is generated when the 'zero value' is outside the specified range.</p> <p>Control value measurement (Span test) Sender beam intensity changes between 70% and 100% during the determination of the control value. The light intensity received is compared against the standard value. The AMS generates an error signal for deviations >±2%. The error message is cleared again when the next check cycle runs successfully. The control value is determined with high precision through statistical evaluation of a high number of intensity changes (500 changes with 70 measurements each for scattered light measurement). A theoretically calculated value (70%) is given at very low concentrations of dust (less than approx. 1 mg/m³). The control value is calculated with the control reflector swivelled in.</p>					
Change in zero point over maintenance interval	0.0					<3.0%
Change in span point over maintenance interval				2.6		<3.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Availability					99.3%	>95%
Reproducibility		0.8				<3.3%

Note 1 – The calibration function result / R^2 value of 0.87 is due to low dust levels. The CEMS pass the EN14181 criteria, but not the requirement for EN15267-3, which is an R^2 value of 0.9. This criterion is based on the premise of wide spread of data over the measurement range. Lower and/or clusters of data would lower the R^2 value, although a CEM still could be well within the criterion for the variability test given in EN14181

Note 2 – The SF100 has a maintenance interval of 6 months. In the case of new installations the measuring system should be tested by all means at weekly or biweekly intervals via visual inspection.

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

- Visual inspection of the AMS
- Examination of the sender unit and scattered light receiver by swinging the units away from the duct and inspecting them visually. The optical surfaces should be cleaned if necessary
- Determination of zero and span point
- Examination of the purge air supply
- Check cycle operation including a check of zero and span point and of the contamination signal

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Description:

The DUSTHUNTER SF100 forward light scatter consists of a separate sender and receiver units that require installation on opposing sides of the stack.

The measuring system operates as a scattered light measuring device with forward dispersion. The scattered light principle is used especially suitable for measurement of low particle concentrations due to a high measuring sensitivity. A laser diode irradiates the dust particles in the gas flow with modulated light in the visual range (wavelength approx. 650 nm). The light scattered by the particles is collected by a highly sensitive receiver set at an angle of approximately 10 to 15° to the axis of the beam. The scattered-light measurement is independent of the path length. The measurement volume within the gas duct is defined by the intersection of the transmitted beam and receiver aperture. The collected signal is amplified and fed to the evaluation system

The sender output of the sender laser diode is continuously monitored by measuring a part of the beam with the help of a microchip attached to the diode. The signal produced by the microchip is transmitted to the monitor receiver, enabling even the smallest changes in brightness of the emitted light beam to be registered and taken into account when determining the measurement signal.

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 090147/00.
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.

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