



# PRODUCT CONFORMITY CERTIFICATE

This is to certify that the  
**DUSTHUNTER C200**

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 0.1 Ext*
(transmission	0 to 0.05 Ext
measurement)	0 to 0.2 Ext
	0 to 0.5 Ext
	0 to 1.0 Ext
Dust	0 to 50 SE*
(scattered light	0 to 5 SE
Measurement)	0 to 20 SE
	0 to 100 SE
	0 to 200 SE

\*0 to 0.1 Ext (at 5m optical path length) and 0 to 50 SE (scattered light units)  $\equiv$  0-15 mg/m<sup>3</sup> dust

Project No: 674/0391D  
Certificate No: Sira MC090150/00  
Initial Certification: 17 August 2009  
This Certificate Issued: 17 August 2009  
Renewal Date: 16 August 2014

Technical Director

*MCERTS is operated on behalf of the Environment Agency by*

**Sira Certification Service**

12 Acorn Industrial Park, Crayford Road, Crayford  
Dartford, Kent, UK, DA1 4AL

Tel: 01322 520500 Fax: 01322 520501

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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](http://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 C200 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 Rheinland Report Number 936/21210461/D dated 18.03.09

## Product Certified

The measuring system consists of the following parts:

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

This certificate applies to all instruments fitted with software version 1.026 (MCU) 01.03.04 (Sensor unit) and 02.16 (SOPAS ET operating software), serial number 07478656 (SR unit) 07478637 (MCU), 07478660 (R/SL unit) 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: IP 66

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 0.1 Ext / 0 to 50 SE

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time					28s (with 30s damping time)	<200s
Repeatability standard deviation at zero point						
Transmission	0.1					<2.0%
Scattered light	0.1					<2.0%
Repeatability standard deviation at span point (0 to 15mg/m <sup>3</sup> )						
Transmission	0.3					<5.0% ELV
Scattered light	0.5					<5.0% 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%
0-0.1 Ext		1.0				<3.0%
0-0.2 Ext		0.8				<3.0%
0-0.5 Ext		0.7				<3.0%
0-1.0 Ext	0.1					<3.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Influence of ambient temperature zero point						
Transmission		-0.9				<5.0%
Scattered light	0.2					<5.0%
Influence of ambient temperature span point						
Transmission		0.7				<5.0%
Scattered light	0.0					<5.0%
Influence of voltage variations 190 to 250V (0 to 5mg/m <sup>3</sup> )						
Transmission		0.7				<2.0%
Scattered light		0.9				<2.0%
Influence of vibration (10 to 60Hz (±0.3mm), 60 to 150Hz at 19.6m/s <sup>2</sup> ) (0 to 15mg/m <sup>3</sup> )						To be reported
Zero	0.1					
Span	0.3					
Measurement uncertainty (for an ELV of 10mg/m <sup>3</sup> )						Guidance - at least 25% below max permissible uncertainty
Transmission					8.4%	22.5% in EN15267-3
Scattered light					7.0%	
Calibration function (field)					See Note 1	
Transmission					0.89	>0.90
Scattered light					0.87	>0.90
Response time (field)					28s (with 30s damping time)	<200s
Lack of fit (field)						
Transmission			1.8			<3.0%
Scattered light		0.8				<3.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Maintenance interval					6 months See 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 manufacturer:</u></p> <p><b>Zero value measurement</b> 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><b>Control value measurement (Span test)</b> Sender beam intensity changes between 10% 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 &gt;±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; 50 changes with 70 measurements for each transmission measurement). The control value is calculated with the control reflector swivelled in.</p>					
Change in zero point over maintenance interval						
Transmission	-0.5					<3.0%
Scattered light	0.0					<3.0%
Change in span point over maintenance interval						
Transmission				2.9		<3.0%
Scattered light				2.6		<3.0%
Availability					99.3%	>95%
Reproducibility						
Transmission				2.9		<3.3%
Scattered light		0.8				<3.3%

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Note 1 – The calibration function result /  $R^2$  value of 0.87 / 0.89 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 C200 has a maintenance interval of 6 months. In the case of a new installation the measuring system should be tested by all means in weekly or biweekly intervals via visual inspection.

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

- Visual inspection of the AMS
- Examination of the sender/receiver unit and the reflector/ scattered light measuring device by swing out and visual inspection. 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 zero check of zero and span point and of the contamination signal

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### **Description:**

The DUSTHUNTER C200 measuring system combines the transmittance and scattered light measuring principles. It consists of a sender/receiver unit and a reflector/scattered light receiver unit that requires 2 sided installation onto the stack. The measuring system operates as transmissometer with double beam path and a scattered light measuring device with forward dispersion.

For the transmission measurement a high performance LED sends light in the visible range through the active measuring path containing particles, to the reflector where it is returned back to the receiver. While passing through the measurement path twice, the transmitted light is attenuated by the particles within the measurement path and then captured by the receiver. Continuous monitoring of the sender output (partial beam to monitor receiver) registers the smallest changes in brightness of the light beam sent which serves to determine the measurement signal.

The more sensitive scattered light principle is used especially for measurement of low particle concentrations. Modulated light in the visible range (wavelength approx. 650 nm) from a laser diode irradiates the particles of gas. Light scattered by the particles is collected by a highly sensitive receiver mounted at an angle of approximately 10 to 15° towards the axis of the beam. The measurement volume within the gas duct is defined by the intersection of transmitted beam and receive aperture. The collected signal is amplified and fed to the evaluation system.

The sender output of the laser diode is continuously monitored by measuring a part of the beam with the help of a microchip attached to the diode. The signal sent by the microchip is transmitted to the monitor receiver, so smallest changes in brightness of the light beam sent can be registered which then can be taken into account to determine the measuring 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 MC090150/00.
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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