PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

MCS200HW

Manufactured by:

SICK AG

Rengoldshauser Str. 17 a
88662 Überlingen

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 (CEMS), Version 4 dated July 2018
EN15267-2:2009, EN15267-3:2007,
& QAL 1 as defined in EN 14181: 2014

Certification Ranges :

CO	0 to 75	0 to 10,000	mg/m^3
NO	0 to 150	0 to 2,500	mg/m^3
NO_2	0 to 50	0 to 500	mg/m^3
N_2O	0 to 100	0 to 2,000	mg/m^3
SO_2	0 to 75	0 to 2,500	mg/m^3
HCl	0 to 15	0 to 3,000	mg/m^3
NH_3	0 to 10	0 to 500	mg/m^3
CH_4	0 to 50	0 to 500	mg/m^3
CO_2	0 to 25	-	Vol.-%
H_2O	0 to 40	-	Vol.-%
O_2	0 to 25	-	Vol.-%
TOC	0 to15	0 to 50, 0 to 150, 0 to 500	mg/m^3

Project No. : 70216678
Certificate No : Sira MC19034/00
Initial Certification : 22 March 2019
This Certificate issued : 22 March 2019
Renewal Date : 21 March 2024

Emily Alexander
Environmental Project Engineer

MCERTS is operated on behalf of the Environment Agency by

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Form 1335
Issue 5

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 IED Chapter III and IED Chapter IV 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 IED Chapter IV applications, and not more than 2.5X the ELV for IED Chapter III and other types of application.

The field test was performed on a waste incineration plant for >6 months.

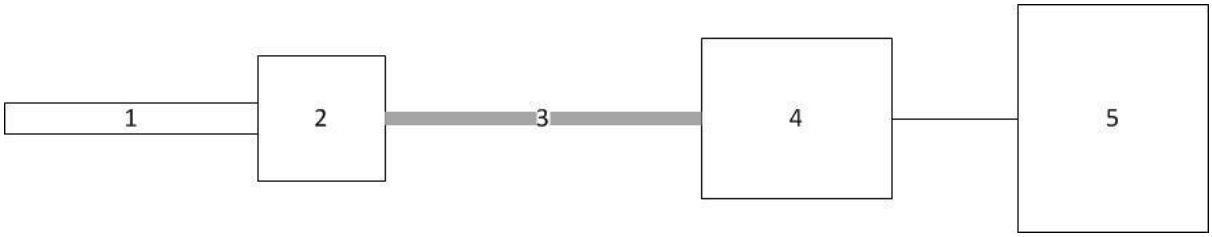
Basis of Certification

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 Test Report 936/21242470/B dated 08 October 2018

Product Certified

The MCS200HW measuring system consists of the following parts:



1. Sample Probe	2. Heated Filter	3. Heated Sample Line	4. Gas Conditioning	5. Analyser
Model: SICK gas sampling unit (SFU)	Model: N/A – integrated with gas sampling unit	Model: Eltherm or equivalent, inner core PTFE at 200°C, length: 50m+ dependent on site	Model: N/A – Sample gas remains hot throughout	Model: MCS200HW Multicomponent analyser, O_2 sensor and GMS811 FIDORi (optional)

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 CEM.
- Additional manifolds and heated valves used to allow more than one analyser to share a sampling system.

This certificate applies to all instruments fitted with software version 1.01 (serial number 17510005) for MCS200HW and software version 4.003 (serial number 18020076) onwards.

Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: +5°C to +50°C
Instrument IP rating: IP54

Note: For outdoor installations the analyser needs to be mounted into an IP65 environment. 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.

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						
CO					150s	<200s
NO					148s	<200s
NO_2					151s	<200s
N_2O					147s	<200s
SO_2					148s	<200s
HCl					171s	<400s
NH_3					185s	<400s
CH_4					153s	<200s
CO_2					148s	<200s
H_2O					153s	<200s
O_2					33s	<200s
TOC					29s	<200s
Repeatability standard deviation at zero point						
CO	0.08					<2.0%
NO	0.12					<2.0%
NO_2	0.03					<2.0%
N_2O	0.03					<2.0%
SO_2	0.03					<2.0%
HCl	0.07					<2.0%
NH_3	0.03					<2.0%
CH_4	0.04					<2.0%
CO_2	0.0					<2.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
H_2O	0.01					<2.0%
O_2	0.0					<0.2%
TOC	0.01					<2.0%
Repeatability standard deviation at reference point						
CO	0.13					<2.0%
NO	0.15					<2.0%
NO_2	0.09					<2.0%
N_2O	0.09					<2.0%
SO_2	0.11					<2.0%
HCl	0.08					<2.0%
NH_3	0.05					<2.0%
CH_4	0.05					<2.0%
CO_2	0.01					<2.0%
H_2O	0.16					<2.0%
O_2	0.01					<0.2%
TOC	0.01					<2.0%

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Lack-of-fit						
CO (0 to 75mg/m^3)	0.27					<2.0%
CO (0 to 10,000mg/m^3)	0.49					<2.0%
NO (0 to 150mg/m^3)		-0.67				<2.0%
NO (0 to 2,500mg/m^3)	0.08					<2.0%
NO_2 (0 to 50mg/m^3)			1.00			<2.0%
NO_2 (0 to 500 mg/m^3)	0.4					<2.0%
N_2O (0 to 100 mg/m^3)	-0.11					<2.0%
N_2O (0 to 2,000 mg/m^3)	0.25					<2.0%
SO_2 (0 to 75 mg/m^3)		-0.71				<2.0%
SO_2 (0 to 2,500 mg/m^3)	-0.44					<2.0%
HCl (0 to 15 mg/m^3)		0.8				<2.0%
HCl (0 to 3,000mg/m^3)		0.91				<2.0%
NH_3 (0 to 10 mg/m^3)			1.00			<2.0%
NH_3 (0 to 500 mg/m^3)	0.4					<2.0%
CH_4 (0 to 50 mg/m^3)		-0.6				<2.0%
CH_4 (0 to 500 mg/m^3)	0.2					<2.0%
CO_2 (0 to 25 vol.-%)		-0.8				<2.0%
H_2O (0 to 40 vol.-%)			-1.00			<2.0%
O_2 (0 to 25 vol.-%)	-0.03					<0.2%
TOC (0 to 15 mg/m^3)	0.27					<2.0%
TOC (0 to 50 mg/m^3)		0.6				<2.0%
TOC (0 to 150 mg/m^3)		-0.67				<2.0%
TOC (0 to 500 mg/m^3)	0.4					<2.0%

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Influence of ambient temperature zero point (+5°C to +50°C)						
CO		0.8				<5.0%
NO			-1.6			<5.0%
NO_2		0.8				<5.0%
N_2O		-0.9				<5.0%
SO_2		0.6				<5.0%
HCl			-1.3			<5.0%
NH_3			-1.5			<5.0%
CH_4			1.5			<5.0%
CO_2	0.2					<5.0%
H_2O	-0.1					<5.0%
O_2	-0.03					<0.50%
TOC			1.2			<5.0%
Influence of ambient temperature reference point (+5°C to +50°C)						
CO			1.5			<5.0%
NO			-1.9			<5.0%
NO_2			1.0			<5.0%
N_2O			-1.1			<5.0%
SO_2		0.5				<5.0%
HCl				-2.0		<5.0%
NH_3				2.0		<5.0%
CH_4				2.0		<5.0%
CO_2	0.4					<5.0%
H_2O	0.3					<5.0%
O_2	-0.11					<0.50%
TOC			1.3			<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						
CO		0.8				<2.0%
NO	0.4					<2.0%
NO_2			-1.0			<2.0%
N_2O		-0.6				<2.0%
SO_2		-0.5				<2.0%
HCl		0.7				<2.0%
NH_3			-1.0			<2.0%
CH_4	-0.4					<2.0%
CO_2	0.4					<2.0%
H_2O	0.3					<2.0%
O_2	0.1					<0.2%
TOC			-1.3			<2.0%
Influence of voltage variations - Zero (196V to 253V)					No influence	
CO	0.1					<2.0%
NO	-0.4					<2.0%
NO_2	0.4					<2.0%
N_2O		-0.8				<2.0%
SO_2	0.2					<2.0%
HCl		0.7				<2.0%
NH_3		0.8				<2.0%
CH_4		-0.8				<2.0%
CO_2	-0.1					<2.0%
H_2O	-0.2					<2.0%
O_2	0.01					<0.2%
TOC		0.8				<2.0%

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Influence of voltage variations – Span (196V to 253V)						
CO	0.1					<2.0%
NO	-0.4					<2.0%
NO_2	0.4					<2.0%
N_2O		-0.8				<2.0%
SO_2	0.2					<2.0%
HCl		0.7				<2.0%
NH_3		0.8				<2.0%
CH_4		-0.8				<2.0%
CO_2	-0.1					<2.0%
H_2O	-0.2					<2.0%
O_2	0.01					<0.2%
TOC		0.8				<2.0%
Cross-sensitivity at zero with interferents: O_2, H_2O, CO_2, CH_4, N_2O, NO, NO_2, NH_3, SO_2, HCl,						
CO (0 to 75mg/m^3)	0.0					<4.0%
NO (0 to 150mg/m^3)		0.89				<4.0%
NO (0 to 2,500mg/m^3)	0.0					<4.0%
NO_2 (0 to 50mg/m^3)				-2.36		<4.0%
NO_2 (0 to 500 mg/m^3)	0.0					<4.0%
N_2O (0 to 100 mg/m^3)	-0.46					<4.0%
N_2O (0 to 2,000 mg/m^3)	0.0					<4.0%
SO_2 (0 to 75 mg/m^3)			-2.81			<4.0%
SO_2 (0 to 2,500 mg/m^3)				3.00		<4.0%
HCl (0 to 15 mg/m^3)				3.00		<4.0%
NH_3 (0 to 10 mg/m^3)		-0.7				<4.0%
CH_4 (0 to 50 mg/m^3)	0.0					<4.0%
CO_2 (0 to 25 vol.-%)	0.0					<4.0%
H_2O (0 to 40 vol.-%)	0.0					<4.0%

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
O_2 (0 to 25 vol.-%)	0.0					<0.4%
TOC (0 to 15 mg/m^3)	0.0					<4.0%
TOC (0 to 50 mg/m^3)	1.8					<4.0%
TOC (0 to 150 mg/m^3)	0.0					<4.0%
Cross-sensitivity at reference with interferents: O_2, H_2O, CO_2, CH_4, N_2O, NO, NO_2, NH_3, SO_2, HCl,						
CO (0 to 75mg/m^3)		0.53				<4.0%
NO (0 to 150mg/m^3)				-2.13		<4.0%
NO (0 to 2,500mg/m^3)		0.88				<4.0%
NO_2 (0 to 50mg/m^3)				3.66		<4.0%
NO_2 (0 to 500 mg/m^3)		0.71				<4.0%
N_2O (0 to 100 mg/m^3)				-3.9		<4.0%
N_2O (0 to 2,000 mg/m^3)				-3.38		<4.0%
SO_2 (0 to 75 mg/m^3)				-1.13		<4.0%
SO_2 (0 to 2,500 mg/m^3)						<4.0%
HCl (0 to 15 mg/m^3)				3.19		<4.0%
NH_3 (0 to 10 mg/m^3)				-2.0		<4.0%
CH_4 (0 to 50 mg/m^3)	0.0					<4.0%
CO_2 (0 to 25 vol.-%)	0.48					<4.0%
H_2O (0 to 40 vol.-%)	0.0					<4.0%
O_2 (0 to 25 vol.-%)	0.11					<0.40%
TOC (0 to 15 mg/m^3)				-2.93		<4.0%
TOC (0 to 50 mg/m^3)				-2.00		<4.0%
TOC (0 to 150 mg/m^3)						<4.0%
Effect of oxygen for TOC CEMS					-0.64 to -0.81	>0.9 to <1.2

Test		Results expressed as % of the certification range				Other results	MCERTS specification
		<0.5	<1	<2	<5		
Response factors for TOC CEMS:							
	Methane					1.05	>0.9 to <1.1
	Aliphatic hydrocarbons					0.91 to 1.08	>0.8 to <1.1
	Aromatic hydrocarbons					0.81 to 0.99	>0.75 to <1.15
	Dichloromethane					1.11 to 1.12	>0.7 to <1.0
	Aliphatic alcohols					0.79 to 0.83	>0.7 to <1.0
	Ester and ketones					0.76	>0.5 to <1.0
	Organic acids					0.83	>0.9 to <1.1
Measurement uncertainty						Guidance - at least 25% below max permissible uncertainty	
CO	(For an ELV of 50 mg/m^3)					5.1	<7.5% (10%)
NO	(For an ELV of 98 mg/m^3)					7.0	<15% (20%)
NO_2	(For an ELV of 33 mg/m^3)					8.5	<15% (20%)
N_2O	(For an ELV of 100 mg/m^3)					6.0	<15% (20%)
SO_2	(For an ELV of 50 mg/m^3)					7.5	<15% (20%)
HCl	(For an ELV of 10 mg/m^3)					9.3	<30% (40%)
NH_3	(For an ELV of 10 mg/m^3)					5.5	<30% (40%)
CH_4	(For an ELV of 50 mg/m^3)					3.9	<22.5% (30%)
CO_2	(For an ELV of235 Vol.-%)					2.1	<7.5% (10%)
H_2O	(For an ELV of 40 Vol.-%)					2.1	<7.5% (10%)
O_2	(For an ELV of 25 Vol.-%)					2.2	<7.5% (10%)
TOC	(For an ELV of 10 mg/m^3)					8.9	<22.5% (30%)

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Calibration function (field)						
CO		0.93				>0.90
NO		0.99				>0.90
NO_2		0.99				>0.90
N_2O		0.99				>0.90
SO_2		0.90				>0.90
HCl		0.90				>0.90
NH_3		0.99				>0.90
CH_4		0.99				>0.90
CO_2		0.96				>0.90
H_2O		0.92				>0.90
O_2		0.98				>0.90
TOC		0.99				>0.90
Response time (field)						
CO					149s	<200s
NO					147s	<200s
NO_2					143s	<200s
N_2O					145s	<200s
SO_2					148s	<200s
HCl					166s	<400s
NH_3					172s	<400s
CH_4					147s	<200s
CO_2					138s	<200s
H_2O					141s	<200s
O_2					28s	<200s
TOC					51s	<200s

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Lack of fit (field)						
CO	-0.4					<2.0%
NO		0.67				<2.0%
NO_2		0.8				<2.0%
N_2O	0.3					<2.0%
SO_2	0.27					<2.0%
HCl			-1.00			<2.0%
NH_3			1.8			<2.0%
CH_4		-0.6				<2.0%
CO_2		0.84				<2.0%
H_2O		0.5				<2.0%
O_2	0.1					<0.2%
TOC			-1.4			<2.0%
Maintenance interval					3 months	Note 1 >8 days
Zero and Span drift requirement	The measuring system performs automatic daily zero checks for the components measured with infrared spectroscopy and for the components determined with the help of the FID. There is an option to feed test gas automatically or manually to the measuring system. Moreover, the instrument has an optional adjustment cell. It is possible to check the position of the zero point with suitable instrument air and the position of the span point with adjustment cell by triggering the internal test cycle. It is possible to record zero and span drift by using the analogue output for example. This complies with the requirements for QAL3 according to EN 14181.					Clause 6.13 & 10.13 Manufacturer shall provide a description of the technique to determine and compensate for zero and span drift.

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Change in zero point over maintenance interval						
CO		-0.8				<3.0%
NO		-0.6				<3.0%
NO_2		0.7				<3.0%
N_2O		0.5				<3.0%
SO_2	0.3					<3.0%
HCl			-1.6			<0.2%
NH_3			1.5			<3.0%
CH_4		0.6				<3.0%
CO_2	0.2					<3.0%
H_2O	-0.1					<3.0%
O_2	0.09					<0.2%
Change in reference point over maintenance interval						
CO			-1.6			<3.0%
NO				2.2		<3.0%
NO_2				2.4		<3.0%
N_2O				2.9		<3.0%
SO_2				2.8		<3.0%
HCl				-2.9		<3.0%
NH_3				2.9		<3.0%
CH_4				-2.2		<3.0%
CO_2		0.5				<3.0%
H_2O		-0.6				<3.0%
O_2	0.09					<0.2%
Availability					98.1%	>95% (>98% for O_2)

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Reproducibility						
CO			1.1			<3.0%
NO		0.8				<3.0%
NO2	0.3					<3.0%
N2O		0.5				<3.0%
SO2		0.9				<3.0%
HCl			1.3			<3.0%
NH3			1.1			<3.0%
CH4	0.2					<3.0%
CO2	0.2					<3.0%
H2O	0.4					<3.0%
O2	0.09					<0.2%

Note 1: The MCS200HW has a maintenance interval of 3 months. The work details below has to be carried out as regular intervals, depending on local conditions. Maintenance work includes carrying out a zero and reference point check by applying test gases or by tripping the internal and reference point cycle. When using the internal test cycle, a nitrogen feed via the sample gas probe is recommended for the leak test of the test system. In this case, the zero point position of the oxygen sensor can also be determined. Please refer to manufacturer's instructions for further information.

Description

The MCS200HW is an extractive hot-wet multi component IR gas analyser for flue gas measurement. Via sampling system flue gas is extracted from the stack and transported with an integrated ejector pump to the analyzer. All components from the gas sampling unit to the measuring cell are heated to a temperature above the acid dew points. The MCS200HW uses gas filter as well as bi-frequency correlation principle. For the measurement of oxygen an oxygen sensor is used. Optionally a flame ionization detector model GMS811 FIDORi can be integrated for measurement of total organic carbon.
Integrated adjustment filters can be used as an alternative to test gases for QAL3 checks of the IR measuring components.

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 MC190348/00

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.