

# PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

**MGS300**  
**Continuous Emissions Monitoring System**

Manufactured by:  
**MKS Instruments Inc.**  
651 Lowell Street,  
Methuen,  
Massachusetts,  
01810.  
USA

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 4 dated July 2018**  
**EN15267-3:2007,**  
& QAL 1 as defined in EN 14181: 2004

**Certification Ranges:**

CO	0 to 75 mg/m <sup>3</sup>	0 to 300 mg/m <sup>3</sup>	0 to 1500 mg/m <sup>3</sup>
CH <sub>4</sub>	0 to 15 mg/m <sup>3</sup>	0 to 50 mg/m <sup>3</sup>	0 to 500 mg/m <sup>3</sup>
HCL	0 to 15 mg/m <sup>3</sup>	0 to 90 mg/m <sup>3</sup>	0 to 200 mg/m <sup>3</sup>
N <sub>2</sub> O	0 to 50 mg/m <sup>3</sup>	0 to 100 mg/m <sup>3</sup>	0 to 500 mg/m <sup>3</sup>
NO	0 to 200 mg/m <sup>3</sup>	0 to 400 mg/m <sup>3</sup>	0 to 1500 mg/m <sup>3</sup>
NO <sub>2</sub>	0 to 50 mg/m <sup>3</sup>	0 to 100 mg/m <sup>3</sup>	0 to 1000 mg/m <sup>3</sup>
SO <sub>2</sub>	0 to 75 mg/m <sup>3</sup>	0 to 300 mg/m <sup>3</sup>	0 to 2000 mg/m <sup>3</sup>
HF	0 to 3 mg/m <sup>3</sup>	0 to 10 mg/m <sup>3</sup>	
NH <sub>3</sub>	0 to 10 mg/m <sup>3</sup>	0 to 75 mg/m <sup>3</sup>	
CO <sub>2</sub>	0 to 25 Vol.-%		
H <sub>2</sub> O	0 to 40 Vol.-%		

Project No. : 16A30952  
Certificate No : Sira MC130234/02  
Initial Certification : 08 October 2013  
This Certificate issued : 16 November 2018  
Renewal Date : 16 November 2023

Emily Alexander  
Environmental Project Engineer

MCERTS is operated on behalf of the Environment Agency by

## Sira Certification Service

Unit 6, Hawarden Industrial Park  
Hawarden, Deeside, CH5 3US  
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*The MCERTS certificate consists of this document in its entirety.*

*For conditions of use, please consider all the information within.*

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## 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](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 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 conducted on an incinerator for 3 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:

TUV Rheinland report reference: 936/21208291/A dated 26/03/2013

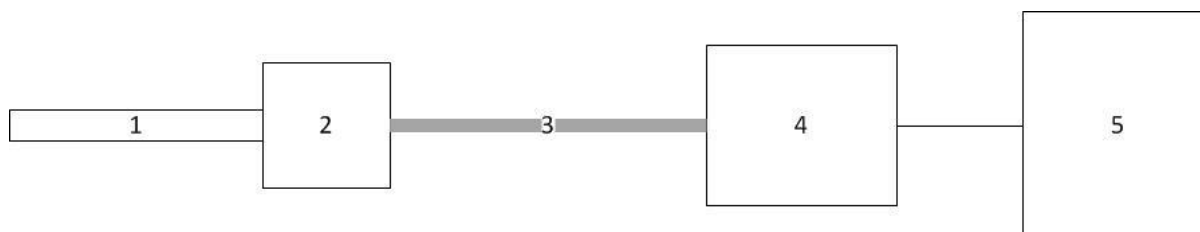
TUV Rheinland report reference: 936/21208291/B dated 03/09/2013

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## Product Certified

The MGS300 measuring system consists of the following parts:



1. Sample Probe	2. Heated Filter	3. Heated Sample Line	4. Gas Conditioning	5. Analyser
Model: MGS300-SP	Model: N/A (Integrated with sample probe)	Model: MGS300-HL  191°C 10m line length	Model: Not required	Model: MultiGas 2030-CEM Cert.

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 MGS300 instruments fitted with software version 0.2 (serial number 016842381 onwards).

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## Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: 5°C to 40°C  
Instrument IP rating: IP20

Note: The requirement for the protection class of the enclosure is not fulfilled. The measuring system needs to be installed with an IP65 enclosure to meet the requirements of EN 15267-3. 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 % reading, unless otherwise stated.

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time						
NH <sub>3</sub>					120s	<400s
CO					105s	<200s
SO <sub>2</sub>					116s	<200s
NO					119s	<200s
NO <sub>2</sub>					145s	<200s
HCl					136s	<400s
HF					124s	<400s
CH <sub>4</sub>					110s	<200s
CO <sub>2</sub>					106s	<200s
H <sub>2</sub> O					105s	<200s
N <sub>2</sub> O					106s	<200s

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Repeatability standard deviation at zero point						
NH <sub>3</sub>		0.50				<2%
CO	0.20					<2%
SO <sub>2</sub>	0.30					<2%
NO	0.10					<2%
NO <sub>2</sub>	0.10					<2%
HCl	0.40					<2%
HF		0.50				<2%
CH <sub>4</sub>	0.40					<2%
CO <sub>2</sub>	0.00					<2%
H <sub>2</sub> O	0.10					<2%
N <sub>2</sub> O	0.10					<2%
Repeatability standard deviation at reference point						
NH <sub>3</sub>			1.2			<2%
CO	0.20					<2%
SO <sub>2</sub>	0.10					<2%
NO	0.20					<2%
NO <sub>2</sub>	0.10					<2%
HCl		0.70				<2%
HF			1.1			<2%
CH <sub>4</sub>		0.70				<2%
CO <sub>2</sub>	0.10					<2%
H <sub>2</sub> O	0.20					<2%
N <sub>2</sub> O	0.10					<2%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Lack-of-fit						
NH <sub>3</sub>		0.60				<2%
CO		0.72				<2%
SO <sub>2</sub>		0.80				<2%
NO		0.55				<2%
NO <sub>2</sub>			1.0			<2%
HCl		0.73				<2%
HF			1.0			<2%
CH <sub>4</sub>		-0.67				<2%
CO <sub>2</sub>	0.40					<2%
H <sub>2</sub> O	0.25					<2%
N <sub>2</sub> O		0.82				<2%
Influence of ambient temperature zero point						
NH <sub>3</sub>				-2.3		<5%
CO	-0.40					<5%
SO <sub>2</sub>			1.4			<5%
NO	0.10					<5%
NO <sub>2</sub>		0.50				<5%
HCl	0.40					<5%
HF			-1.0			<5%
CH <sub>4</sub>		0.60				<5%
CO <sub>2</sub>	0.10					<5%
H <sub>2</sub> O	-0.10					<5%
N <sub>2</sub> O	-0.30					<5%

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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 reference point						
NH <sub>3</sub>				-3.0		<5%
CO		0.90				<5%
SO <sub>2</sub>			-1.6			<5%
NO			1.2			<5%
NO <sub>2</sub>		-0.80				<5%
HCl				-2.0		<5%
HF				3.3		<5%
CH <sub>4</sub>				2.0		<5%
CO <sub>2</sub>			1.2			<5%
H <sub>2</sub> O			-1.3			<5%
N <sub>2</sub> O			1.6			<5%
Influence of sample gas flow for extractive CEMS						
NH <sub>3</sub>		0.70				<2%
CO		0.60				<2%
SO <sub>2</sub>		-0.80				<2%
NO		-0.70				<2%
NO <sub>2</sub>		0.80				<2%
HCl			1.0			<2%
HF			1.0			<2%
CH <sub>4</sub>		-0.70				<2%
CO <sub>2</sub>		-0.70				<2%
H <sub>2</sub> O	0.30					<2%
N <sub>2</sub> O		0.60				<2%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Influence of voltage variations 190 to 250V						
NH <sub>3</sub>		0.70				<2%
CO		-0.60				<2%
SO <sub>2</sub>		0.60				<2%
NO		-0.50				<2%
NO <sub>2</sub>		0.60				<2%
HCl		0.80				<2%
HF		0.70				<2%
CH <sub>4</sub>		0.70				<2%
CO <sub>2</sub>		0.60				<2%
H <sub>2</sub> O		-0.60				<2%
N <sub>2</sub> O		0.60				<2%
Influence of vibration (10 to 60Hz (±0.3mm), 60 to 150Hz at 19.6m/s <sup>2</sup> )					Not applicable for extractive systems	To be reported
Cross-sensitivity at zero with interferents: O <sub>2</sub> , H <sub>2</sub> O, CO, CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, NO, NO <sub>2</sub> , NH <sub>3</sub> , SO <sub>2</sub> , HCl.						
NH <sub>3</sub>				-3.1		<4%
CO				-2.8		<4%
SO <sub>2</sub>				-2.4		<4%
NO		0.82				<4%
NO <sub>2</sub>		-0.50				<4%
HCl				3.4		<4%
HF				-3.3		<4%
CH <sub>4</sub>			1.8			<4%
CO <sub>2</sub>	0.00					<4%
H <sub>2</sub> O	0.00					<4%
N <sub>2</sub> O			1.5			<4%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Cross-sensitivity at reference with interferents: O <sub>2</sub> , H <sub>2</sub> O, CO, CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, NO, NO <sub>2</sub> , NH <sub>3</sub> , SO <sub>2</sub> , HCl.						
NH <sub>3</sub>				-3.6		<4%
CO				2.0		<4%
SO <sub>2</sub>				-2.8		<4%
NO				-3.2		<4%
NO <sub>2</sub>				-2.6		<4%
HCl				3.4		<4%
HF			-1.7			<4%
CH <sub>4</sub>				-2.8		<4%
CO <sub>2</sub>			1.6			<4%
H <sub>2</sub> O			1.8			<4%
N <sub>2</sub> O				3.0		<4%
Converter efficiency					Not applicable	>95%
Measurement uncertainty					Guidance - at least 25% below max permissible uncertainty	
NH <sub>3</sub> (For and ELV of 10 mg/m <sup>3</sup> )					6.2%	<30% (40%)
CO (For and ELV of 50 mg/m <sup>3</sup> )					6.2%	<7.5% (10%)
SO <sub>2</sub> (For and ELV of 50 mg/m <sup>3</sup> )					7.0%	<15% (20%)
NO (For and ELV of 130 mg/m <sup>3</sup> )					6.8%	<15% (20%)
NO <sub>2</sub> (For and ELV of 50 mg/m <sup>3</sup> )					4.1%	<15% (20%)
HCl (For and ELV of 10 mg/m <sup>3</sup> )					8.1%	<30% (40%)
HF (For and ELV of 1 mg/m <sup>3</sup> )					19.3%	<30% (40%)
CH <sub>4</sub> (For and ELV of 10 mg/m <sup>3</sup> )					7.0%	<22.5% (30%)
CO <sub>2</sub> (For and ELV of 10 Vol.-%)					3.3%	<7.5% (10%)
H <sub>2</sub> O (For and ELV of 40 Vol.-%)					3.4%	<7.5% (10%)
N <sub>2</sub> O (For and ELV of 50 mg/m <sup>3</sup> )					4.5%	<15% (20%)

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Calibration function (field)						
NH <sub>3</sub>					0.9864	>0.90
CO					0.9084	>0.90
SO <sub>2</sub>					0.9976	>0.90
NO					0.9617	>0.90
NO <sub>2</sub>					0.9507	>0.90
HCl					0.9411	>0.90
HF					0.9935	>0.90
CH <sub>4</sub>					0.9569	>0.90
CO <sub>2</sub>					0.9864	>0.90
H <sub>2</sub> O					0.9018	>0.90
N <sub>2</sub> O					0.9861	>0.90
Response time (field)						
NH <sub>3</sub>					121s	<400s
CO					112s	<200s
SO <sub>2</sub>					116s	<200s
NO					116s	<200s
NO <sub>2</sub>					137s	<200s
HCl					132s	<400s
HF					123s	<400s
CH <sub>4</sub>					99s	<200s
CO <sub>2</sub>					112s	<200s
H <sub>2</sub> O					114s	<200s
N <sub>2</sub> O					99s	<200s

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Lack of fit (field)						
NH <sub>3</sub>			-1.20			<2%
CO			-1.07			<2%
SO <sub>2</sub>		0.67				<2%
NO			1.00			<2%
NO <sub>2</sub>		0.80				<2%
HCl		-0.67				<2%
HF			1.33			<2%
CH <sub>4</sub>			1.00			<2%
CO <sub>2</sub>			-1.20			<2%
H <sub>2</sub> O		0.75				<2%
N <sub>2</sub> O			1.40			<2%
Maintenance interval					3 Months Note 1	>8 days
Zero and Span drift requirement	The AMS allows for recording zero and span drifting and thus fulfils the requirements of QAL3 according to EN14181.					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						
NH <sub>3</sub>			1.0			<3%
CO		0.60				<3%
SO <sub>2</sub>		-0.80				<3%
NO	-0.10					<3%
NO <sub>2</sub>	0.40					<3%
HCl	-0.10					<3%
HF		0.70				<3%
CH <sub>4</sub>	0.30					<3%
CO <sub>2</sub>	0.00					<3%
H <sub>2</sub> O	-0.20					<3%
N <sub>2</sub> O	0.20					<3%
Change in reference point over maintenance interval						
NH <sub>3</sub>			1.2			<3%
CO		0.80				<3%
SO <sub>2</sub>			-1.4			<3%
NO			-1.0			<3%
NO <sub>2</sub>			-1.2			<3%
HCl			1.2			<3%
HF			1.4			<3%
CH <sub>4</sub>		0.60				<3%
CO <sub>2</sub>			1.0			<3%
H <sub>2</sub> O			1.3			<3%
N <sub>2</sub> O			1.0			<3%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Availability					96.1%	>95%
Reproducibility						
NH <sub>3</sub>			1.1			<3.3%
CO		0.60				<3.3%
SO <sub>2</sub>		0.90				<3.3%
NO		0.80				<3.3%
NO <sub>2</sub>	0.40					<3.3%
HCl		0.90				<3.3%
HF				2.0		<3.3%
CH <sub>4</sub>		0.90				<3.3%
CO <sub>2</sub>	0.30					<3.3%
H <sub>2</sub> O		0.60	1.1			<3.3%
N <sub>2</sub> O						<3.3%

Note 1: The MGS300 has a maintenance interval of 3 months. The work detailed below has to be carried out at regular intervals, depending on local conditions:

- A leak check of the system should be carried out every 3 months.
- Filters and seals on the sample probe should be replaced annually.

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## Description

The MGS300 is a multi component gas analyser, based on Fourier Transform Infrared (FTIR) technology. The system is configured as an extractive analyser and includes a MultiGas 2030- CEM Cert. spectrometer, along with the integrated sampling components required to extract flue gas from the emission source and transfer it to the FTIR gas cell for analysis. In this configuration the MGS300 is capable of directly analysing hot, wet samples without the need for sample conditioning. The MultiGas 2030 is a high resolution (0.5 cm<sup>-1</sup>) FTIR with 5.11 metre path length gas cell and thermoelectrically (TE) cooled MCT detector. The analyser uses a permanent library of internal calibration references to eliminate the need for span gases during routine operation. The sampling system components include an MGS300-SP heated sample probe/filter assembly and an MGS300-HL heated line. An MGS300-EP eductor pump is also included to facilitate the continuous flow of sample through the system. The sample probe prevents particulate materials from reaching the gas cell and sampling system components, including the eductor pump, operate at an elevated temperature of 191°C to prevent the condensation of sample components. The MGS300 incorporates an integrated control system for fully automated, failsafe operation. A user interface displays gas composition data as well as system status information and instrument conditions/events are continually stored in a log file. Gas composition values are available for external data logging through 16 x 4-20 mA analogue outputs or via optional data transmission interfaces (DTI).

## 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 MC130234/00
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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