

PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

***GM35 In-situ Gas Analyser, Model Cross-duct
GM35 In-situ Gas Analyser, Model measuring probe GMP***

Manufactured by:

SICK AG

Nimburger Straße 11
79276 Reute
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 3.5 dated June 2016**

EN15267-3:2007,

& QAL 1 as defined in EN 14181: 2014

Certification Ranges :

CO 0 to 75 mg/m³ *

CO 0 to 225 mg/m³ ** (0 to 10,240 mg/m³ **)

CO₂ 0 to 15 %vol * (0 to 22.5 %vol **)

H₂O 0 to 25 %vol * (0 to 25 %vol **)

* Model Cross Duct with a minimum active measuring path length of 3m (CO), 1.5m (CO₂) and 1m (H₂O)
determined during the field test.

** Model Measuring Probe GMP with an active measuring path length of 1m.

Project No.: 70111336
Certificate No: Sira MC070097/03
Initial Certification: 16 January 2007
This Certificate issued: 16 January 2017
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MCERTS is operated on behalf of the Environment Agency by

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The MCERTS certificate consists of this document in its entirety.

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Certificate Contents

Approved Site Application.....	2
Basis of Certification	2
Product Certified.....	2
Certified Performance	3
Description.....	7
General Notes	8

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.

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 Köln Report No: 936/21202726/A dated 30/06/05
 TÜV Köln Report No: 936/21204254/A dated 01/06/06
 TÜV Köln Report No: 936/212004254/B dated 01/09/06

Product Certified

There are two different system configurations for the GM35 measuring system:

The GM35 in-situ gas analyser, Model Cross-Duct system consists of the following parts:

- Sender/receiver unit (S/R unit) containing the main optical and electronic modules
- Measurement reflector - a gold-plated hollow triple
- Purge air units (SLV4 for S/R-unit and reflector)
- Evaluation unit

The GM35 in-situ gas analyser, Model Measuring Probe GMP system consists of the following parts:

- Measuring Probe GMP with open slot and vertical purge air outlet
- Sender/receiver unit (S/R unit) containing the main optical and electronic modules
- Evaluation unit

This certificate applies to all instruments fitted with software version S/R unit 9062244 PH18, Evaluation unit 9062243 PA18, Purge air unit 9091948 P517 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 65 / NEMA4X

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.

Unless otherwise stated the evaluation was carried out on the certification range CO 0 to 75 mg/m³, CO₂ 0 to 15%vol, H₂O 0 to 25%vol. The evaluation was performed with an active measuring path length of 5.12m.

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time						
CO					< 35s	<200s
CO ₂					< 34s	<200s
H ₂ O					< 35s	<200s
Repeatability standard deviation at zero point						
CO	0.44					<2.0%
CO ₂	0.13					<2.0%
H ₂ O	0.13					<2.0%
Repeatability standard deviation at reference point					Note 1	
CO		0.56				<2.0%
CO ₂	0.40					<2.0%
H ₂ O	0.32					<2.0%
Lack-of-fit						
CO			1.1			<2.0%
CO ₂			1.3			<2.0%
H ₂ O			1.6			<2.0%

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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						
CO		0.91				<5.0%
CO ₂	0.12					<5.0%
H ₂ O		0.96				<5.0%
Influence of ambient temperature reference point						
CO			1.70			<5.0%
CO ₂		0.81				<5.0%
H ₂ O			-1.26			<5.0%
Influence of voltage variations						
All gases		0.9				<2.0%
Influence of vibration (10 to 150Hz at 1 octave per minute and at 19.6m/s)					No effect Note 2	To be reported
Excursion of measurement beam						
CO	0.27					<2.0%
CO ₂	0.00					<2.0%
H ₂ O	0.01					<2.0%
Cross-sensitivity at zero					Note 3	
CO				-2.63		<4.0%
CO ₂	<0.5				Note 4	<4.0%
H ₂ O	<0.5				Note 4	<4.0%
Cross-sensitivity at reference					Note 3	
CO				-2.31		<4.0%
CO ₂				-2.94		<4.0%
H ₂ O				-2.31		<4.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Measurement uncertainty					Guidance - at least 25% below max permissible uncertainty	
CO					6.90%	7.5%
CO ₂					2.15%	7.2%
H ₂ O					2.03%	6.2%
Calibration function (field)						
CO					>0.98	>0.90
CO ₂					>1.00	>0.90
H ₂ O					>0.98	>0.90
Response time (field)					Note 5	
CO					< 35s	<200s
CO ₂					< 34s	<200s
H ₂ O					< 35s	<200s
Lack of fit (field)					Note 5	
CO			1.1			<2.0%
CO ₂			1.3			<2.0%
H ₂ O			1.6			<2.0%
Maintenance interval					12 weeks	>8 days
Zero and Span drift requirement	See description, page 7.					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						
CO			1.33			<3.0%
CO ₂	0.00					<3.0%
H ₂ O		0.59				<3.0%
Change in reference point over maintenance interval						
CO			1.76			<3.0%
CO ₂		0.99				<3.0%
H ₂ O		0.79				<3.0%
Availability					> 99.6%	>95%
Reproducibility						
CO			1.67			<3.3%
CO ₂		1.00				<3.3%
H ₂ O		0.64				<3.3%

Note 1: The repeatability at reference point values were taken from the ambient temperature test.

Note 2: Vibration testing performed on the cross-duct analyser.

Note 3: Cross sensitivity test has been conducted with the following interferents: O₂, H₂O, CO, CO₂, CH₄, N₂O, NO, NO₂, NH₃, SO₂ and HCl.

Note 4: All deviations below 0.5% are considered to be negligible and not reported.

Note 5: Field response time and lack of fit not tested. Results reported are from laboratory tests.

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Description

The GM35 in-situ system allows continuous measurement of CO, CO₂ and H₂O in waste gas channels. The in-situ measurement is carried out directly in the gas stream across the entire duct cross-section via a measuring probe. The light from the sender/receiver unit passes through the active measuring path and is reflected. The reflected light is then directed by the lens-splitting mirror through a filter or cell wheel to detectors. By filtering the light received into its spectral components, the receiver elements record the absorption of the gas molecules at characteristic points of the spectrum in the IR range 1.6 to 4.9µm. The algorithms of the GM35 electronics process the measurement signals from the receiver elements along with the associated parameters in accordance with the correlation procedure with optical filters for CO₂ and H₂O and gas-filled cells for CO.

There are two different configurations of the GM35 system. The GM35 in-situ analyser, Model Cross-Duct collects the measured values directly in the gas duct across the entire duct cross-section. The system consists of a sender/receiver unit, measurement reflector, purge air unit and evaluation unit.

The GM35 in-situ analyser, Model Measuring Probe GMP collects the measured values directly in the gas duct with the help of a measuring probe, which is installed in the duct. The measuring probe contains an open slot which is the active measuring path and the gas is measured by passing through this slot. The required reflector is installed at the end of the probe. A continuous supply of purge air is required for the operation of the GMP measuring probe. The output of air into the duct is performed at an angle of 90° to the direction of the gas flow. The purge air supply is identical to the one in the Cross-Duct version except only one supply unit is required due to the design. The sender/receiver unit and evaluation unit are identical for both configurations and are operated with the same software.

The GM35 measuring system has automatic check cycles to monitor zero and reference point stability. The zero point is first determined by positioning a zero point reflector in the beam path. Reference filters are then moved into position to calculate the reference check point. If the check cycles reveal that the system is not functioning in accordance with the specifications, the GM35 measuring system outputs the appropriate error and warning messages.

Zero point CO, CO₂ and H₂O Channel

An internal zero point reflector is pivoted into the light path in timed, adjustable intervals. Light from the S/R unit is reflected back on to the detector and thereby the zero points of all channels are measured. The acquired zero point value is saved during the zero point adjustment of the system. Deviations to the zero point value from the initial adjustment during control cycles in the following measuring operation are established and the actual measured value at the zero point is issued at the analogue output for 90 seconds. At the same time the status is indicated by the test relay. Deviations >2% of the chosen measuring range are indicated by plain text message and the status relay.

Control point CO Channel

The GM35 has an inbuilt swivel element containing a cell filled with a 1,000 ppm*m NO concentration. It is swung into the light path in addition to the zero point reflector during the control cycle and measures the reference and concentration value. These control values are then scaled across 70% of the selected measuring range. The established control values CV_CO portray the changes inside the control cells to the CO concentration, in percentage, compared to values established during basic calibration of the system. Deviations of this kind are scaled on 70% of the measuring range and given out for 90 seconds at the analogue output. Deviation >2% of the selected measuring range is indicated by plain text message and triggers the status relay.

Control point CO₂ / H₂O

The edge filter is pivoted in for this purpose and the extinction at the CO₂ and H₂O wavelength is assessed. The values monitored during the control cycle are compared with the saved values and their changes added in percentage to the 70% output. Deviation >2% of the selected measuring range is indicated by warning and the status relay.

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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 MC070097/03
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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