

PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

LaserGas II Monitor

manufactured by:

NEO Monitors AS

Solheimveien 62A
N-1473 Lørenskog
Norway

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

Certification Ranges :

NH ₃	0 to 10 mg/m ³	0 to 15 mg/m ³	
H ₂ O	0 to 40 %vol	0 to 30 %vol	0 to 50 %vol

Certification is awarded in respect of the conditions stated in this certificate

Project No:	674/0411
Certificate No:	Sira MC 100162/01
Initial Certification:	13 January 2010
This Certificate Issued	05 February 2013
Renewal Date:	12 January 2015

Technical Director

MCERTS is operated on behalf of the Environment Agency by

Sira Certification Service

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Registered Office: Rake Lane, Eccleston, Chester, UK CH4 9JN*

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 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.

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 Report Report Number: 936/21205655/D1 dated 25/11/09

Product Certified

The LaserGas II measuring system consists of the following parts:

- Transmitter with purge gas device and evaluation system
- Receiver unit with purge gas device and internal reference cuvette
- Data cable of 5m length for connecting the sender and receiver unit
- Voltage supply
- System software version GM6.1c1
- Evaluation software gmw61, version 1.2.5.1

This certificate applies to all instruments fitted with software version GM6.1c1 onwards (serial number 3152 (NH₃) and serial number 10028 (H₂O) 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 NH₃ 0 to 10 mg/m³ and H₂O 0 to 40 %vol

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time						
NH ₃					<2s	<400s
H ₂ O					<2s	<200s
Repeatability standard deviation at zero point						
NH ₃	0.10					<2.0%
H ₂ O	0.01					<2.0%
Repeatability standard deviation at reference point						
NH ₃	0.00					<2.0%
H ₂ O	0.01					<2.0%
Lack-of-fit						
NH ₃			-2.0			<2.0%
H ₂ O			-1.4			<2.0%
Influence of ambient temperature zero point						
NH ₃		-0.60				<5.0%
H ₂ O	-0.10					<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 ambient temperature reference point						
NH ₃			2.0			<5.0%
H ₂ O	-0.50					<5.0%
Influence of sample gas pressure						
NH ₃					See note 1	<2.0%
H ₂ O						<2.0%
Influence of voltage variations 190 to 250V						
NH ₃	-0.20					<2.0%
H ₂ O	-0.10					<2.0%
Influence of vibration (10 to 60Hz (±0.3mm), 60 to 150Hz at 19.6m/s ²)					No effect	To be reported
Cross-sensitivity at zero with interferents: O ₂ , H ₂ O, CO, CO ₂ , CH ₄ , N ₂ O, NO, NO ₂ , NH ₃ , SO ₂ , HCl						
NH ₃			1.8			<4.0%
H ₂ O	0.00					<4.0%
Cross-sensitivity at reference with interferents: O ₂ , H ₂ O, CO, CO ₂ , CH ₄ , N ₂ O, NO, NO ₂ , NH ₃ , SO ₂ , HCl						
NH ₃			-1.6			<4.0%
H ₂ O			-1.9			<4.0%
Excursion of measurement beam of cross-stack in-situ CEMS						
NH ₃			1.2			<2.0%
H ₂ O		0.65				<2.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Measurement uncertainty						
NH ₃					5.6%	Guidance - at least 25% below max permissible uncertainty
H ₂ O					3.9%	
Calibration function (field)						
NH ₃					0.90	>0.90
H ₂ O					0.99	>0.90
Response time (field)						
NH ₃					2s	<400s
H ₂ O					2s	<200s
Lack of fit (field)						
NH ₃			-1.4			<2.0%
H ₂ O			1.5			<2.0%
Maintenance interval					6 months Note 2	>8 days
Zero and Span drift requirement	<p>The CEMS comprises an internal zero check for NH₃ and H₂O and an internal span check for NH₃. This allows zero and span check of the mounted system without dismounting from the duct.</p> <p>The measured signal is frozen and subtracted from the measured values for the check of zero point. Modulation of the laser is disabled during the check to exclude inference of possible concentration changes within the duct.</p> <p>An ammonia-loaded, sealed cell is introduced to the beam path for the span check of NH₃. The cell is mounted in the receiver unit. Prior to span check, the CEM calculated the absorption signal of the gas concentration during normal operation, which is then continuously subtracted from the absorption signal during span check. The resulting signal corresponds to the constant gas concentration within the internal cell. Temperature and pressure conditions are continuously checked by the internal sensors and included in the calculation.</p>					<p>Clause 6.13 & 10.13</p> <p>Manufacturer shall provide a description of the technique to determine and compensate for zero and span drift.</p>

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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 ₃	0.50					<3.0%
H ₂ O	0.10					<3.0%
Change in reference point over maintenance interval						
NH ₃			-1.3			<3.0%
H ₂ O	-0.40					<3.0%
Availability					99.6%	>95%
Reproducibility						
NH ₃				2.8		<3.3%
H ₂ O			1.9			<3.3%
Contamination check of in-situ systems					No effect	<2.0%

Note 1: The influence of sample gas pressure test has not been conducted.

Note 2: The LaserGas II monitor has a maintenance interval of 6 months. The work detailed below has to be carried out at regular intervals, depending on local conditions:

- Dismounting and visual inspection of the measuring system
- CEM setting check
- Inspection and if necessary, cleaning of the optical interfaces
- Zero and span checks by the internal control cycle. Alternatively, the check can be done manually with the help of an unheated measuring path and reference gas from compressed gas cylinders for the component NH₃ or with the help of the heated measuring path and a gas generator for producing wet test gas for the component H₂O.

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Description:

The LaserGas II monitor works according to the principle of single line measurement and determines the concentration of NH_3 and H_2O in exhaust gas. The CEMS is an optical instrument based on transmitting infrared laser light from a transmitter on one side to a receiver unit on the diametrically opposite side of the stack, and determines absorption of infrared light by the gas molecules present in the stack based on the fact that most gases absorb light at certain wavelengths (infrared single-line absorption spectroscopy principle). Absorption is a direct measure of the gas concentration in the stack.

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 100162/00.
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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