

CERTIFICATE

on Product Conformity (QAL1)

Number of Certificate: 0000028732_01

Certified AMS: LaserGas II for HCl and H₂O

Manufacturer: NEO Monitors AS
Solheimveien 62A
1473 Lørenskog
Norway

Test Institute: TÜV Rheinland Energie und Umwelt GmbH

**This is to certify that the AMS has been tested
and found to comply with:**

**EN 15267-1: 2009, EN 15267-2: 2009, EN 15267-3: 2008
and EN 14181: 2004**

Certification is awarded in respect of the conditions stated in this certificate
(see also the following pages).

The present certificate replaces Certificate No. 0000028732 dated 09 February 2011



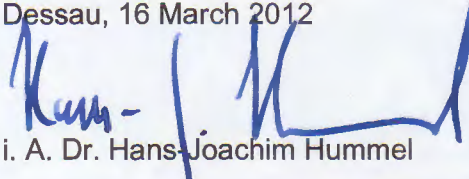
- EN 15267-3 tested
- QAL1 certified
- TUV approved
- Annual inspection


Publication in the German Federal Gazette
(BAnz.) of 02 March 2012

The certificate is valid until:
25 January 2016

Umweltbundesamt
Dessau, 16 March 2012

TÜV Rheinland Energie und Umwelt GmbH
Köln, 15 March 2012


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Am Grauen Stein
51105 Köln

Accreditation according to EN ISO/IEC 17025 and certified according to ISO 9001:2008.

Test report:	936/21212540/B of 09 September 2011
First certification:	26 January 2011
Validity ends:	25 January 2016
Publication:	BAnz. 02 March 2012, No. 36, p. 920, chapter I, No. 4.6

Approved application

The tested AMS is suitable for use at combustion plants according to EC directive 2001-80-EC, at waste incineration plants according to EC directive 2000-76-EC and other plants requiring official approval. The tested ranges have been chosen with respect to the wide application range of the AMS.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a twelve months field test at a municipal waste incinerator.

The AMS is approved for an ambient temperature range of -20 °C to +50 °C.

Any potential user should ensure, in consultation with the manufacturer, that this AMS is suitable for the installation at which it will be installed.

Basis of the certification

This certification is based on:

- test report 936/21212540/A dated 06 October 2010 of TÜV Rheinland Energie und Umwelt GmbH
- test report 936/21212540/B dated 09 September 2011 of TÜV Rheinland Energie und Umwelt GmbH
- suitability announced by the German Environmental Agency (UBA) as the relevant body
- the ongoing surveillance of the product and the manufacturing process
- publication in the German Federal Gazette (BAnz. 02 March 2012, No. 36, p. 920, chapter I, No. 4.6, announcement by UBA from 23 February 2012)

AMS name:

LaserGas II for HCl and H₂O

Manufacturer:

NEO Monitors AS, Lørenskog, Norway

Field of application:

For measurements at plants requiring official approval (i. e. plants in 2000-76-EC, waste incineration directive and 2001-80-EC large combustion plants directive).

Measuring ranges during the suitability test:

Component	Certification range	Supplementary measurement ranges	Unit
HCl	0 - 15	0 - 90	mg/m ³ *
H ₂ O	0 - 40	0 - 30	Vol.-%*

* at 1 m measurement path length

Software version:

GM6.1d5

Restrictions:

None

Notes:

1. The measurement device includes an internal cell for the automatic span check of HCl.
2. The maintenance interval is six months.
3. The AMS has been tested at an active measurement path of 0.513 m in the laboratory test.
4. The AMS has been tested at an active measurement path of 1 m in the field test.
5. Supplementary test (maintenance interval extension) to the announcement of the Umweltbundesamt from 10. January 2011 (BAnz. p. 294, chapter I No. 3.2).

Test report:

TÜV Rheinland Energie und Umwelt GmbH, Köln
Report-No.: 936/21212540/B dated 9 September 2011

Certified product

This certificate applies to automated measurement systems confirming to the following description:

The LaserGas II is an optical instrument based on transmitting infrared laser light from a transmitter unit of one side of the stack to a receiver unit on the diametrically opposite side of the stack. The measuring technique is based on measuring the absorption of light by the gas molecules present in the stack.

The measuring principle is called infrared single-line absorption spectroscopy and is based on the fact that most gases absorb light at certain wavelengths. The absorption is a direct function of the gas concentration in the stack.

The tested system comprises the following parts:

- Transmitter with purge gas device and evaluation system
- Receiver unit with purge gas device and internal reference cuvette
- Data cable of 5 m length for connecting the sender and receiver unit
- Voltage supply
- Heated measuring path (active measuring path length: 0.513 m)
- System software, Version GM6.1d5

General notes

This certificate is based upon the equipment tested. The manufacturer is responsible for ensuring that on-going production complies with the requirements of the EN 15267. 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 systems shall be subject to regular surveillance.

If a product of the current production does not conform to the certified product, TÜV Rheinland Energie und Umwelt GmbH must be notified at the address given on page 1.

A certification mark with an ID-Number that is specific to the certified product is presented on page 1 of this certificate. This can be applied to the product or used in publicity material for the certified product.

This document as well as the certification mark remains property of TÜV Rheinland Energie und Umwelt GmbH. With revocation of the publication the certificate loses its validity. After the expiration of the validity of the certificate and on requests of the TÜV Rheinland Energie und Umwelt GmbH this document shall be returned and the certificate mark must not be employed anymore.

The relevant version of this certificate and the validity is also accessible on the internet Address: **qal1.de**.

Certification of LaserGas II for HCl and H₂O is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

Initial certification according to EN 15267:

Certificate No. 0000028732: 09 February 2011

Validity of the certificate until: 25 January 2016

Test report: 936/21212540/A of 06 October 2010,
TÜV Rheinland Energie und Umwelt GmbH, Köln

Publication: BAnz. 26 January 2011, No. 14, p. 295, Chapter I No. 3.2:
Announcement by UBA from 10 January 2011

Supplementary testing according to EN 15267:

Certificate No. 0000028732_01:16 March 2012

Validity of certificate until: 25 January 2016

Test report: 936/21212540/B of 09 September 2011,
TÜV Rheinland Energie und Umwelt GmbH, Köln

Publication: BAnz. 02 March 2012, No. 36, p. 920, chapter I, No. 4.6:
Announcement by UBA from 23 February 2012

Calculation of overall uncertainty according to EN 14181 and EN 15267-3

Measuring system

Manufacturer	NEO Monitors
Name of measuring system	LaserGas II
Serial number of the candidates	4266 / 4267
Measuring principle	Single-line spectroscopy

Test report

Test laboratory	936/21212540/A	936/21212540/B
Date of report	TÜV Rheinland	TÜV Rheinland
	2010-10-06	2011-09-09

Measured component

Certification range	HCl	0 - 15 mg/m ³
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Evaluation of the cross sensitivity (CS)

(system with largest CS)

Sum of positive CS at zero point	0.00 mg/m ³
Sum of negative CS at zero point	0.00 mg/m ³
Sum of positive CS at reference point	0.00 mg/m ³
Sum of negative CS at reference point	0.00 mg/m ³
Maximum sum of cross sensitivities	0.00 mg/m ³
Uncertainty of cross sensitivity	0.000 mg/m ³

Calculation of the combined standard uncertainty

Tested parameter

	u	u ²
Standard deviation from paired measurements under field conditions *	u _D 0.242 mg/m ³	0.059 (mg/m ³) ²
Lack of fit	u _{lof} 0.081 mg/m ³	0.007 (mg/m ³) ²
Zero drift from field test	u _{d,z} 0.095 mg/m ³	0.009 (mg/m ³) ²
Span drift from field test	u _{d,s} -0.147 mg/m ³	0.022 (mg/m ³) ²
Influence of ambient temperature at span	u _t 0.100 mg/m ³	0.010 (mg/m ³) ²
Influence of supply voltage	u _v 0.025 mg/m ³	0.001 (mg/m ³) ²
Cross sensitivity (interference)	u _i 0.000 mg/m ³	0.000 (mg/m ³) ²
Influence of sample pressure	u _p 0.116 mg/m ³	0.013 (mg/m ³) ²
Uncertainty of reference material at 70% of certification range	u _{rm} 0.121 mg/m ³	0.015 (mg/m ³) ²
Excursion of measurement beam	u _{mb} -0.146 mg/m ³	0.021 (mg/m ³) ²

* The larger value is used :

"Repeatability standard deviation at span" or

"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_c)

$$u_c = \sqrt{\sum (u_{\max, j})^2} \quad 0.39 \text{ mg/m}^3$$

Total expanded uncertainty

$$U = u_c * k = u_c * 1.96 \quad 0.77 \text{ mg/m}^3$$

Relative total expanded uncertainty

U in % of the ELV 10 mg/m³ 7.7

Requirement of 2000/76/EC and 2001/80/EC

U in % of the ELV 10 mg/m³ 40.0

Requirement of EN 15267-3

U in % of the ELV 10 mg/m³ 30.0

Calculation of overall uncertainty according to EN 14181 and EN 15267-3

Measuring system

Manufacturer	NEO Monitors	
Name of measuring system	LaserGas II	
Serial number of the candidates	4266 / 4267	
Measuring principle	Single-line spectroscopy	

Test report

Test laboratory	936/21212540/A	936/21212540/B
Date of report	TÜV Rheinland	TÜV Rheinland
	2010-10-06	2011-09-09

Measured component

Certification range	H ₂ O	0 - 40 Vol.-%
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Evaluation of the cross sensitivity (CS)

(system with largest CS)

Sum of positive CS at zero point	0.00	Vol.-%
Sum of negative CS at zero point	0.00	Vol.-%
Sum of positive CS at reference point	0.00	Vol.-%
Sum of negative CS at reference point	0.00	Vol.-%
Maximum sum of cross sensitivities	0.00	Vol.-%
Uncertainty of cross sensitivity	0.000	Vol.-%

Calculation of the combined standard uncertainty

Tested parameter

	u		u ²	
Standard deviation from paired measurements under field conditions *	u _D 0.622	Vol.-%	0.387	(Vol.-%) ²
Lack of fit	u _{lof} -0.058	Vol.-%	0.003	(Vol.-%) ²
Zero drift from field test	u _{d,z} 0.185	Vol.-%	0.034	(Vol.-%) ²
Span drift from field test	u _{d,s} -0.323	Vol.-%	0.104	(Vol.-%) ²
Influence of ambient temperature at span	u _t 0.115	Vol.-%	0.013	(Vol.-%) ²
Influence of supply voltage	u _v 0.189	Vol.-%	0.036	(Vol.-%) ²
Cross sensitivity (interference)	u _i 0.000	Vol.-%	0.000	(Vol.-%) ²
Influence of sample pressure	u _p 0.077	Vol.-%	0.006	(Vol.-%) ²
Uncertainty of reference material at 70% of certification range	u _{rm} 0.323	Vol.-%	0.105	(Vol.-%) ²
Excursion of measurement beam	u _{mb} -0.182	Vol.-%	0.033	(Vol.-%) ²

* The larger value is used :

"Repeatability standard deviation at span" or

"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_c)

$$u_c = \sqrt{\sum (u_{\max, j})^2} \quad 0.85 \text{ Vol.-%}$$

Total expanded uncertainty

$$U = u_c * k = u_c * 1.96 \quad 1.66 \text{ Vol.-%}$$

Relative total expanded uncertainty

U in % of the range 40 Vol.-% 4.2

Requirement of 2000/76/EC and 2001/80/EC

U in % of the range 40 Vol.-% 10.0

Requirement of EN 15267-3

U in % of the range 40 Vol.-% 7.5

** For this component no requirements in the EC-directives 2001/80/EG und 2000/76/EG are given.
The chosen value is recommended by the certification body.