

CERTIFICATE

about Product Conformity (QAL1)

Number of Certificate: 0000028732

Certified AMS: LaserGas II for HCl and H₂O

Manufacturer: NEO Monitors AS
Solheimveien 62 A
N-1471 Lørenskog
Norway

Test Institute: TÜV Rheinland Energie und Umwelt GmbH

**This is certifying 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).



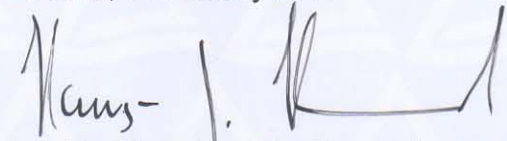
- EN 15267-3 tested
- QAL1 certified
- TÜV approved
- Annual inspection

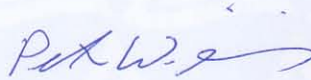
Publication in the German Federal Gazette
(BAnz.) of 26 January 2011

The certificate is valid until: 25 January 2016

Umweltbundesamt
Dessau, 9 February 2011

TÜV Rheinland Energie und Umwelt GmbH
Köln, 7 February 2011


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

Test report: 936/21212540/A of 6 October 2010
Run of validity until: 25 January 2016
Publication BAnz. 26 January 2011, No. 14, p. 295, Chapter I No. 3.2

Approved application

The certified AMS is suitable for use at combustion plants according to EC directive 2001-80-EC, at waste incinerations plants according to EC directive 2000-76-EC and other plants requiring official permission. 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 three months test on municipal waste incineration plant.

The AMS is approved for the temperature range from -20°C to +50°C.

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

Basis of the certification

This certification is based on the test report 936/21212540/A of 6 October 2010 of TÜV Rheinland Energie und Umwelt GmbH, on the relevant body (German Umweltbundesamt) assessment and ongoing surveillance of the product and the manufacturing process and the publication in the German Federal Gazette (BAnz. 26 January 2011, No. 14, p. 295, Chapter I No. 3.2: UBA publication from 10 January 2011):

AMS name:

LaserGas II for HCl and H₂O

Manufacturer:

NEO Monitors AS, Norway

Application:

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

Measuring ranges of the suitability test:

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

* at 1 m measurement path

Software version:

GM6.d5

Remarks:

1. Wet test gases have to be used for checks of HCL and H₂O.
2. The maintenance interval is 4 weeks.
3. The AMS has been tested at an active measurement path of 0.513 m on the laboratory.
4. The AMS has been tested at an active measurement path of 1 m on the field.

Test report:

TÜV Rheinland Energie und Umwelt GmbH, Köln
Report-No.: 936/21212540/A from 6 October 2010

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 certified product is found no longer to comply with the applicable European Standard, TÜV Rheinland Energie und Umwelt GmbH should be notified at the address shown on page 1.

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

This document as well as the certification mark remains the 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 seen at 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: 9 February 2011

Validity of the certificate until: 25 January 2016

Test report: 936/21212540/A of 6 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.

Calculation of overall uncertainty for QAL1 in EN 14181 and EN 15267-3

Manufacturer data

Manufacturer	NEO monitors
Name of measuring system	LaserGas II
Serial Number	4266 / 4267
Measuring Principle	Single-line spectroscopy

TÜV Data

Approval Report	936/21212540/A / 2010-10-06
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Editor	Schneider
Date	2010-10-06

Measurement Component

Certificated range	HCl 15 mg/m³
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Evaluation of the cross sensitivity (CS)

Sum of positive CS at zero point	0.00 mg/m³
Sum of negative CS at zero point	0.00 mg/m³
Sum of positive CS at reference point	0.00 mg/m³
Sum of negative CS at reference point	0.00 mg/m³
Maximum sum of cross sensitivities	0.00 mg/m³
Uncertainty of cross sensitivity	0.00 mg/m³

Calculation of the combined standard uncertainty

Test Value

	u	u²
Standard deviation from paired measurements under field conditions *	u_D 0.242 mg/m³	0.059 (mg/m³)²
Lack of fit	u_{lof} 0.081 mg/m³	0.007 (mg/m³)²
Zero drift from field test	$u_{d,z}$ 0.061 mg/m³	0.004 (mg/m³)²
Span drift from field test	$u_{d,s}$ 0.113 mg/m³	0.013 (mg/m³)²
Influence of ambient temperature at span	u_t 0.100 mg/m³	0.010 (mg/m³)²
Influence of supply voltage	u_v 0.025 mg/m³	0.001 (mg/m³)²
Cross sensitivity (interference)	u_i 0.000 mg/m³	0.000 (mg/m³)²
Influence of sample pressure	u_p 0.116 mg/m³	0.013 (mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm} 0.121 mg/m³	0.015 (mg/m³)²
Excursion of measurement beam	u_{mb} -0.146 mg/m³	0.021 (mg/m³)²

* The bigger value of: "Repeatability standard deviation at span" or
"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_c)

$$u_c = \sqrt{\sum (u_{max,j})^2} \quad 0.38 \text{ mg/m}^3$$

Total expanded uncertainty

$$U = u_c \cdot k = u_c \cdot 1.96 \quad 0.74 \text{ mg/m}^3$$

Relative total expanded uncertainty

U in % of the ELV 10 mg/m³ **7.4**

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 TÜV Rheinland
Date of report	2010-10-06

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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.85 Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	1.66 Vol.-%

Relative total expanded uncertainty

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

Requirement of EN 15267-3

U in % of the range 40 Vol.-%	4.2
U in % of the range 40 Vol.-%	10,0
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.