

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000028732_02

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 certified
according to the standards**

**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
(This certificate contains 8 pages.)



Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

www.tuv.com
ID 0000028732

Publication in the German Federal Gazette
(BAnz.) of 2 March 2012

This certificate will expire on:
25 January 2021

German Federal Environment Agency
Dessau, 21 January 2016

TÜV Rheinland Energie und Umwelt GmbH
Cologne, 20 January 2016



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51105 Cologne

Test institute accredited to EN ISO/IEC 17025:2005 by DakKS (German Accreditation Body).
This accreditation is limited to the accreditation scope defined in the enclosure to the certificate D-PL-11120-02-00.

Test report:	936/21212540/B of 09 September 2011
Initial certification:	26 January 2011
Certification:	renewal (previous certificate 0000028732_01 of 16 March 2012 valid until 25 January 2016)
Expiry date:	25 January 2021
Publication:	BAnz. 02. March 2012, No. 36, page 920, chapter I, No. 4.6

Approved application

The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13. BImSchV), at waste incineration plants according to Directive 2010/75/EU, chapter IV (17. BImSchV) and other plants requiring official approval. The measured ranges have been selected considering 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.

The notification of suitability of the AMS, performance testing, and the uncertainty calculation have been effected on the basis of the regulations valid at the time of performance testing. As changes in legal regulations are possible, any potential user should ensure that this AMS is suitable for monitoring the limit value relevant to the application.

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/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, number 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 and plants according to 27 BImSchV.

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

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, Cologne
Report No.: 936/21212540/B dated 9 September 2011

Publication in the German Federal Gazette: BAnz AT 20.07.2012 B11, chapter IV, notification 7,
Announcement by UBA from 06 July 2012:

**7 Notification as regards Federal Environmental Agency notice of 2 March 2012
(BAnz. p. 920, chapter I, No. 4.6)**

The current software version for the LaserGas II measuring system for HCl and H₂O manufactured by NEO Monitors AS is:

6.1f1

Statement of TÜV Rheinland Energie und Umwelt GmbH of 20 March 2012

Publication in the German Federal Gazette: BAnz AT 23.07.2013 B4, chapter V. notification 7,
Announcement by UBA from 03 July 2013:

**7 Notification as regards Federal Environmental Agency notices of 23 February 2012
(BAnz. p. 920, chapter I no. 4.6) and of 6 July 2012 (BAnz AT 20.07.2012 B11,
chapter IV, 7th notification)**

The LaserGas II measuring system monitoring HCl and H₂O manufactured by NEO Monitors AS may also be placed inside the explosion proof enclosure versions Ex-n or Ex-p.

Statement of TÜV Rheinland Energie und Umwelt GmbH of 27 March 2013

Publication in the German Federal Gazette: BAnz AT 05.08.2014 B11, chapter IV, notification 10,
Announcement by UBA from 17 July 2014:

**10 Notification as regards Federal Environmental Agency notices of 23 February 2012
(BAnz. p. 920, chapter I, no. 4.6) and of 3 July 2013 (BAnz AT 23.07.2013 B4,
chapter V, 7th notification)**

The software for the LaserGas II measuring system for monitoring H₂O and HCl manufactured by NEO monitors AS, Lørenskog, Norway is now designated as GM 6.1f1-6.

Statement of TÜV Rheinland Energie und Umwelt GmbH of 2 April 2014

Publication in the German Federal Gazette: BAnz AT 26.08.2015 B4, chapter V, notification 18,
Announcement by UBA from 22 July 2015:

**18 Notification as regards Federal Environmental Agency notices of 23 February 2012
(BAnz. p. 920, chapter I no. 4.6) and of 17 July 2014 (BAnz AT 05.08.2014 B11, chapter
IV 10th notification)**

The LaserGas II measuring system for H₂O and HCl manufactured by NEO Monitors AS can also be used with a detector of type G12181-020K by Hamamatsu.

Statement of TÜV Rheinland Energie und Umwelt GmbH of 19 March 2015

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 LaserGas II 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 GM6.1 f 1-6

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 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 its expiration is also accessible on the internet: 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, Cologne,
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, Cologne,
Publication: BAnz. 02 March 2012, no. 36, p. 920, chapter I, no. 4.6,
Announcement by UBA from 23 February 2012

Notifications according to EN 15267:

Statement of TÜV Rheinland Energie und Umwelt GmbH, of 20 March 2012,
Publication: BAnz AT 20.07.2012 B11, chapter IV notification 7,
Announcement by UBA on 06 July 2012, (software changes)

Statement of TÜV Rheinland Energie und Umwelt GmbH, of 27 March 2013,
Publication: BAnz AT 23.07.2013 B4, chapter V notification 7,
Announcement by UBA on 03 July 2013, (explosion protection extension)

Statement of TÜV Rheinland Energie und Umwelt GmbH, of 2 April 2014,
Publication: BAnz AT 05.08.2014 B11, chapter V notification 10,
Announcement by UBA on 17 July 2014, (software changes)

Statement of TÜV Rheinland Energie und Umwelt GmbH, of 19 March 2015,
Publication: BAnz AT 26.08.2015 B4, chapter V notification 18 (hardware option)
Announcement by UBA on 22 July 2015

Renewal of the certificate:

Certificate No.: 0000028732_02: 21 January 2016
Validity of the certificate: 25 January 2021

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)	$u_c = \sqrt{\sum (u_{max,i})^2}$	0.39 mg/m ³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.77 mg/m ³

Relative total expanded uncertainty

Requirement of 2000/76/EC and 2001/80/EC	U in % of the ELV 10 mg/m³	7.7
Requirement of EN 15267-3	U in % of the ELV 10 mg/m³	40.0
	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

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

Measured component

	H ₂ O
Certification range	0 - 40 Vol.-%

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.
A level of 10% was applied.