Umwelt Bundesamt

TÜVRheinland®
Precisely Right.

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000028732_03

AMS designation:	LaserGas II for HCl and H_2O
Manufacturer:	NEO Monitors AS Prost Stabels Vei 22 2019 Skedsmokorset Norway
Test Laboratory:	TÜV Rheinland Energy GmbH

This is to certify that the AMS has been tested and found to comply with the standards EN 15267-1 (2009), EN 15267-2 (2009), EN 15267-3 (2007) and EN 14181 (2004).

Certification is awarded in respect of the conditions stated in this certificate (this certificate contains 10 pages).
The present certificate replaces certificate 0000028732_02 of 21 January 2016.

TÜVRheinland® CERTIFIED

Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

www.tuv.com
ID 0000028732

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

This certificate will expire on:
25 January 2026

German Federal Environment Agency
Dessau, 25 January 2021

Dr. Marcel Langner
Head of Section II 4.1

TÜV Rheinland Energy GmbH
Cologne, 24 January 2021

ppa. Dr. Peter Wilbring

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

10/221 2.08

Test Report:	936/21212540/B dated 09 September 2011
Initial certification:	26 January 2011
Expiry date:	25 January 2026
Certificate:	Renewal (of previous certificate 0000028732_02 dated 21 January 2016 valid until 25 January 2021)
Publication:	BAnz. 2 March 2012, no. 36, p. 920, chapter I number 4.6

Approved application
The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13th BImSchV), chapter IV (17th BImSchV), 30th BImSchV, 44th BImSchV, plants in compliance with TA Luft and plants according to the 27th BImSchV. The measured ranges have been selected so as to ensure as broad a field of application as possible.

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 applicable at the time of testing. As changes in legal provisions are possible, any potential user should ensure that this AMS is suitable for monitoring the limit values relevant to the application.

Any potential user should ensure, in consultation with the manufacturer, that this AMS is suitable for the intended purpose.

Basis of the certification
This certification is based on:

- Test report no. 936/21212540/B dated 09 September 2011 issued by TÜV Rheinland Energie und Umwelt GmbH
- Suitability announced by the German Federal Environment Agency (UBA) as the relevant body
- The ongoing surveillance of the product and the manufacturing process

Publication in the German Federal Gazette: BAnz. 2 March 2012, no. 36, p. 920, chapter I number 4.6, UBA announcement dated 23 February 2012:

AMS designation:
LaserGas II for HCl and H_2O

Manufacturer:
NEO Monitors AS, Lørenskog, Norway

Field of application:
For plants requiring official approval and for plants according to the 27th BImSchV

Measuring ranges during performance testing:

Component	Certification range	supplementary measuring ranges	Unit
HCl	0–15	0 – 90	mg/m³*
H2O	0 - 40	0–30	vol.-%*

* at 1 m measurement path length

Software version:
GM6.1d5

Restrictions:
None

Notes:
1. The measuring system 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 1.0 m in the field test.
5. Supplementary testing (extension of the maintenance interval) as regards Federal Environment Agency notice of 10 January 2011 (BAnz. p. 294, chapter I number 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, UBA announcement dated 06 July 2012:

7	**Notification as regards Federal Environment Agency notice of 2 March 2012 (BAnz. p. 920, chapter I number 4.6)** The latest software version of the LaserGas II measuring system for HCl and H_2O manufactured by NEO Monitors AS is: 6.1f1 Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 20 March 2012

Publication in the German Federal Gazette: BAnz AT 23.07.2013 B4, chapter V notification 7, UBA announcement dated 03 July 2013:

7	**Notification as regards Federal Environment Agency notices of 23 February 2012 (BAnz. p. 920, chapter I number 4.6) and of 6 July 2012 (BAnz AT 20.07.2012 B11, chapter IV 7th notification)** The LaserGasII measuring system for HCl and H_2O manufactured by NEO Monitors AS may also be used with the explosion-proof housing versions Ex-n and Ex-p. Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 27 March 2013

Publication in the German Federal Gazette: BAnz AT 05.08.2014 B11, chapter V notification 10, UBA announcement dated 17 July 2014:

10	**Notification as regards Federal Environment Agency notices of 23 February 2012 (BAnz. p. 920, chapter I number 4.6) and of 3 July 2013 (BAnz AT 23.07.2013 B4, chapter V 7th notification)** The latest software version of the LaserGas II measuring system for H_2O and HCl manufactured by NEO Monitors AS Lørenskog, Norway, now is GM 6.1f1-6. Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 2 April 2014

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

18	**Notification as regards Federal Environment Agency (UBA) notices of 23 February 2012 (BAnz. p. 920, chapter I number 4.6) and of 17 July 2014 (BAnz AT 05.08.2014 B11, chapter IV 10th notification)** The LaserGas II for H_2O and HCl manufactured by NEO Monitors AS may alternatively be operated with a G12181-020K detector manufactured by Hamamatsu. Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 19 March 2015

Publication in the German Federal Gazette: BAnz AT 17.07.2018 B9, chapter III notification 13, UBA announcement dated 03 July 2018:

13	**Notification as regards Federal Environment Agency (UBA) notices of 23 February 2012 (BAnz. p. 920, chapter I number 4.6) and of 22 July 2015 (BAnz AT 26.08.2015 B4, chapter V 18th notification)** The latest software version of the LaserGas II measuring system for H_2O and HCl manufactured by NEO Monitors AS is: 6.1f1-10 Statement issued by TÜV Rheinland Energy GmbH dated 21 February 2018

Publication in the German Federal Gazette: BAnz AT 31.07.2020 B10, chapter II notification 13, UBA announcement dated 27 May 2020:

13	**Notification as regards Federal Environment Agency (UBA) notices of 23 February 2012 (BAnz. p. 920, chapter I number 4.6) and of 3 July 2018 (BAnz AT 17.07.2018 B9, chapter III 13th notification)** The latest software version of the LaserGas II measuring system for HCl and H_2O manufactured by NEO Monitors AS is: 6.1g-2. Statement issued by TÜV Rheinland Energy GmbH dated 10 March 2020

Certified product
This certification applies to automated measurement systems conforming 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 LaserGas II measuring system under test consists of the following components.

- 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 measurement path (active measurement path: 0.513 m)
- Instrument software version GM6.1f1-6

General remarks
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 manufacturing process for 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 Energy 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 document as well as the certification mark remains property of TÜV Rheinland Energy GmbH. Upon revocation of the publication the certificate loses its validity. After the expiration of the certificate and on request of TÜV Rheinland Energy GmbH this document shall be returned and the certificate mark must no longer be used.

The relevant version of this certificate and its expiration date are also accessible on the internet at **qal1.de**.

Document history

Certification of the LaserGas II measuring system is based on the documents listed below and the regular, continuous surveillance of the manufacturer's quality management system:

Initial certification according to EN 15267

Certificate no. 0000028732: 09 February 2011
Expiry date of the certificate: 25 January 2016
Test report 936/21212540/A dated 06 October 2010
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Publication: BAnz. 26 January 2011, no. 14, p. 295, chapter I number 3.2
UBA announcement dated 10 January 2011

Supplementary testing according to EN 15267

Certificate no. 0000028732_01: 16 March 2012
Expiry date of the certificate: 25 January 2016
Test report 936/21212540/B dated 09 September 2011
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Publication: BAnz. 2 March 2012, no. 36, p. 920, chapter I number 4.6
UBA announcement dated 23 February 2012

Notifications in accordance with EN 15267

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 20 March 2012
Publication: BAnz AT 20.07.2012 B11, chapter IV notification 7
UBA announcement dated 06 July 2012
(software updates)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 27 March 2013
Publication: BAnz AT 23.07.2013 B4, chapter V notification 7
UBA announcement dated 03 July 2013
(Ex-proof extension)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 2 April 2014
Publication: BAnz AT 05.08.2014 B11, chapter V notification 10
UBA announcement dated 17 July 2014
(software updates)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 19 March 2015
Publication: BAnz AT 26.08.2015 B4, chapter V notification 18
UBA announcement dated 22 July 2015
(new instrument option)

Renewal of the certificate:

Certificate no. 0000028732_02: 21 January 2016
Expiry date of the certificate: 25 January 2021

Notifications in accordance with EN 15267

Statement issued by TÜV Rheinland Energy GmbH dated 21 February 2018
Publication: BAnz AT 17.07.2018 B9, chapter III notification 13
UBA announcement dated 03 July 2018
(software updates)

Statement issued by TÜV Rheinland Energy GmbH dated 10 March 2020
Publication: BAnz AT 31.07.2020 B10, chapter II notification 13
UBA announcement dated 27 May 2020
(software updates)

Renewal of the certificate

Certificate no. 0000028732_03:	25 January 2021
Expiry date of the certificate:	25 January 2026

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	HCl		
Certification range	0 - 15 mg/m³		

Evaluation of the cross sensitivity (CS)		
(system with largest 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 postive 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	0.000	mg/m³

Calculation of the combined standard uncertainty

Tested parameter		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	$u_{d,z}$	0.095	mg/m³	0.009	(mg/m³)²
Span drift from field test	$u_{d,s}$	-0.147	mg/m³	0.022	(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 larger value is used :
"Repeatability standard deviation at span" or
"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_c)	$u_c = \sqrt{\sum (u_{max\,j})^2}$	0.39	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.77	mg/m³

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

Umwelt Bundesamt

Certificate:
0000028732_03 / 25 January 2021

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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_2O	
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 postive 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	**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.
A level of 10% was applied.