CERTIFICATE

of Product Conformity (QAL1)

Certificate No: 0000043529_02

Certified AMS:	LaserGas II for NH_3 and H_2O
Manufacturer:	NEO Monitors AS Prost Stabels vei 22 2019 Skedsmokorset Norway
Test Institute:	TÜV Rheinland Energy & Environment 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 (2023), EN 15267-3 (2007), as well as 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 0000043529_01 dated 26 August 2020.

Suitability Tested
EN 15267
QAL1 Certified
Regular Surveillance

www.tuv.com
ID 0000043529

Publication in the German Federal Gazette (BAnz) of 26 August 2015

German Environment Agency

Dessau, 27 June 2025

This certificate will expire on:
25 August 2030

TÜV Rheinland Energy & Environment GmbH
Cologne, 26 June 2025

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Test report:	936/21228113/A dated 12 March 2015
Initial certification:	26 August 2015
Expiry date:	25 August 2030
Certificate:	Renewal (of previous certificate 0000043529_01 of 26 August 2020 valid until 25 August 2025)
Publication:	BAnz AT 26.08.2015 B4, chapter I No. 2.1

Approved application

The tested AMS is suitable for use at plants according to Directive 2010/75/EC, chapter III (combustion plants / 13th BImSchV:2013), Directive 2010/75/EC, chapter IV (waste incineration plants / 17th BImSchV:2013), Directive 2015/2193/EC (44th BImSchV:2022), TA Luft:2002, 30. BImSchV and 27th BImSchV:2013. 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 month field test at a waste incineration.

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 emission limit values 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.

Note

The legal regulations mentioned correspond to the current state of legislation during certification. Each user should, if necessary, in consultation with the competent authority, ensure that this AMS meets the legal requirements for the intended use. In addition, it cannot be ruled out that legal regulations governing the use of a measuring device for emission monitoring may change during the lifetime of the certificate.

Basis of the certification

This certification is based on:

- Test report 936/21228113/A dated 12 March 2015 of 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 AT 26.08.2015 B4, chapter I No. 2.1, Announcement by UBA dated 22 July 2015:

AMS designation:
LaserGas II for NH_3 and H_2O

Manufacturer:
NEO Monitors AS, Skedsmokorset, Norway

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

Measuring ranges during the performance test:

Component	Certification range	Supplementary measuring ranges		Unit
NH_3	0–10*	0–15*	-	mg/m³
H_2O	0–40*	0–30*	0–50*	Vol.-%

*with reference to a measurement path of 1 m

Software version:
GM 6.1f1-6

Restrictions:
None

Notes:
1. The maintenance interval is six months.
2. The active measurement path for the performance test had a length of 0.513 m during the laboratory test and 1.0 m during the field test.
3. Dry test gases can be used with an unheated measuring cell for monitoring NH_3.
4. The measuring system contains an internal cell for the automatic span point check of NH_3.
5. Supplementary testing (transfer into EN 15267 requirements) to Federal Environment Agency notices of 19 February 2009 (BAnz. p. 899, chapter I number 2.3) and of 17 July 2014 (BAnz AT 05.08.2014 B11, chapter V notification 9).

Test Institute: TÜV Rheinland Energie und Umwelt GmbH, Cologne
Report No.: 936/21228113/A dated 12 March 2015

Publication in the German Federal Gazette: BAnz AT 26.08.2015 B4, Chap. V notification 17, Announcement by UBA dated 22 July 2015:

17 Notification as regards Federal Environment Agency (UBA) notices of 19 February 2009 (BAnz. p. 899, chapter I number 2.3) and of 17 July 2014 (BAnz AT 05.08.2014 B11, chapter IV notification 9)

The LaserGas II measuring system for NH_3 and H_2O manufactured by NEO Monitors AS may alternatively be equipped with a IG17X3000G1i detector manufactured by Laser Components.

Statement by TÜV Rheinland Energie und Umwelt GmbH dated 18 March 2015

Publication in the German Federal Gazette: BAnz AT 17.07.2018 B9, Chap. III notification 14, Announcement by UBA dated 3 July 2018:

14 Notification as regards Federal Environment Agency (UBA) notices of 19 February 2009 (BAnz. p. 899, chapter I number 2.3) and of 22 July 2015 (BAnz AT 26.08.2015 B4, chapter V notification 17)

The latest software version of the LaserGas II measuring system for NH_3 and H_2O manufactured by NEO Monitors AS is:
6.1f1-10

Statement by TÜV Rheinland Energy GmbH dated 21 February 2018

Publication in the German Federal Gazette: BAnz AT 31.07.2020 B10, Chap. II notification 14, Announcement by UBA dated 27 May 2020:

14 Notification as regards Federal Environment Agency (UBA) notices of 22 July 2015 (BAnz AT 26.08.2015 B4, chapter I number 2.1) and of 3 July 2018 (BAnz AT 17.07.2018 B9, chapter III, notification 14)

The latest software version of the LaserGas II measuring system for NH_3 and H_2O manufactured by NEO Monitors AS is:
6.1g-2.

Statement by TÜV Rheinland Energy GmbH dated 10 March 2020

Publication in the German Federal Gazette: BAnz AT 02.08.2023 B7, Chap. III notification 14, Announcement by UBA dated 5 July 2023:

14 Notification as regards Federal Environment Agency (UBA) notices of 22 July 2015 (BAnz AT 26.08.2015 B4, chapter I number 2.1) and of 27 May 2020 (BAnz AT 31.07.2020 B10, chapter II notification 14)

The LaserGas II measuring system for NH_3 and H_2O from NEO Monitors AS will be equipped with modified microprocessor boards in the future. The new boards have the internal designation
Main-Board G2.1
AUX-Board B0.1
Receiver board B2.0

Statement by TÜV Rheinland Energy GmbH dated 7 February 2023

Publication in the German Federal Gazette: BAnz AT 31.10.2024 B9, Chap. IV notification 28, Announcement by UBA dated 31 August 2024:

28 Notification as regards Federal Environment Agency (UBA) notices of 22 July 2015 (BAnz AT 26.08.2015 B4, chapter I number 2.1) and of 5 July 2023 (BAnz AT 02.08.2023 B7, chapter III notification 14)

The current software version for the LaserGas II measuring system for NH_3 and H_2O from the company NEO Monitors AS is:
6.1g-3

Statement by TÜV Rheinland Energy GmbH dated 28 February 2024

Certified product

This certificate 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 tested system comprises the following parts:

- Transmitter with purge gas device and evaluation system
- Receiver unit with gas purging device
- Data cable of 5 m length for connecting the sender and receiver unit
- Voltage supply
- Heated measuring path

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 Energy & Environment 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 certification mark may be applied to the product or used in advertising materials for the certified product.

This document as well as the certification mark remains property of TÜV Rheinland Energy & Environment GmbH. With revocation of the publication the certificate loses its validity. After the expiration of the certificate and on requests of the TÜV Rheinland Energy & Environment 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**.

History of documents
Certification of LaserGas II NH_3 is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

Basic test
Test report: 936/21205655/A dated 9 November 2007
TÜV Immissionsschutz und Energiesysteme GmbH
Publication: BAnz. 07 March 2008, No. 38, p. 901, chapter I number 2.2
UBA announcement dated 14 February 2008
(The measuring system may also be placed inside the explosion proof enclosure versions Ex-n or Ex-p.)

Supplementary testing
Test report: 936/21205655/B dated 28 February 2008
TÜV Immissionsschutz und Energiesysteme GmbH
Publication: BAnz. 03 September 2008, No. 133, p. 3243, chapter I number 2.2
UBA announcement dated 12 August 2008

Supplementary testing
Test report: 936/21205655/C dated 1 October 2008
TÜV Immissionsschutz und Energiesysteme GmbH
Publication: BAnz. 11 March 2009, No. 38, p. 899, chapter I number 2.3
UBA announcement dated 19 February 2009

Notifications
Statement by TÜV Immissionsschutz und Energiesysteme GmbH dated 30 March 2009
Publication: BAnz. 25 August 2009, No. 125, p. 2929, chapter III notification 13
UBA announcement dated 3 August 2009
(Software changes)

Statement by TÜV Immissionsschutz und Energiesysteme GmbH dated 30 April 2009
Publication: BAnz. 12 February 2010, No. 24, p. 553, chapter IV notification 14
UBA announcement dated 25 January 2010

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 20 March 2012
Publication: BAnz AT 20.07.2012 B11, chapter IV notification 8
UBA announcement dated 6 July 2012
(Software changes)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 27 March 2013
Publication: BAnz AT 23.07.2013 B4, chapter V notification 8
UBA announcement dated 3 July 2013

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 2 April 2014
Publication: BAnz AT 05.08.2014 B11, chapter V notification 9
UBA announcement dated 17 July 2014
(Software changes)

Initial certification according to EN 15267
Certificate No. 0000043529_00: 30 September 2015
Expiry date of the certificate: 25 August 2020
Test report: 936/21228113/A dated 12 March 2015
TÜV Rheinland Energie und Umwelt GmbH
Publication: BAnz AT 26.08.2015 B4, chapter I number 2.1
UBA announcement dated 22 July 2015

Notifications
Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 18 March 2015
Publication: BAnz AT 26.08.2015 B4, chapter V notification 17
UBA announcement dated 22 July 2015
(Hardware changes)

Statement issued by TÜV Rheinland Energy GmbH dated 21 February 2018
Publication: BAnz AT 17.07.2018 B9, chapter III notification 14
UBA announcement dated 3 July 2018
(Software changes)

Renewal of certificates
Certificate No. 0000043529_01: 26 August 2020
Expiry date of the certificate: 25 August 2025

Notifications
Statement issued by TÜV Rheinland Energy GmbH dated 10 March 2020
Publication: BAnz AT 31.07.2020 B10, chapter II notification 14
UBA announcement dated 27 May 2020
(Software changes)

Statement issued by TÜV Rheinland Energy GmbH dated 7 February 2023
Publication: BAnz AT 02.08.2023 B7, chapter III notification 14
UBA announcement dated 5 July 2023
(Hardware changes)

Statement by TÜV Rheinland Energy & Environment GmbH dated 28 February 2024
Publication: BAnz AT 31.10.2024 B9, chapter IV notification 28
UBA announcement dated 31 August 2024
(Software changes)

Renewal of certificates
Certificate No. 0000043529_02: 27 June 2025
Expiry date of the certificate: 25 August 2030

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

Measuring system					
Manufacturer		NEO Monitors AS			
AMS designation		LaserGas II			
Serial number of units under test		3187 / 32510 / 3188 / 32574			
Measuring principle		Laser Spektroscopy			
Test report		936/21228113/A			
Test laboratory		TÜV Rheinland			
Date of report		2015-03-12			
Measured component		NH_3			
Certification range		0 - 10	mg/m³		
Evaluation of the cross-sensitivity (CS)					
(system with largest CS)					
Sum of positive CS at zero point		0.18	mg/m³		
Sum of negative CS at zero point		-0.08	mg/m³		
Sum of postive CS at span point		0.00	mg/m³		
Sum of negative CS at span point		-0.16	mg/m³		
Maximum sum of cross-sensitivities		0.18	mg/m³		
Uncertainty of cross-sensitivity	u_i	0.104	mg/m³		
Calculation of the combined standard uncertainty					
Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.142	mg/m³	0.020	(mg/m³)²
Lack of fit	u_{lof}	-0.098	mg/m³	0.010	(mg/m³)²
Zero drift from field test	$u_{d,z}$	0.028	mg/m³	0.001	(mg/m³)²
Span drift from field test	$u_{d,s}$	-0.075	mg/m³	0.006	(mg/m³)²
Influence of ambient temperature at span	u_t	0.115	mg/m³	0.013	(mg/m³)²
Influence of supply voltage	u_v	0.015	mg/m³	0.000	(mg/m³)²
Cross-sensitivity (interference)	u_i	0.104	mg/m³	0.011	(mg/m³)²
Influence of sample gas pressure	u_p	0.057	mg/m³	0.003	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.081	mg/m³	0.007	(mg/m³)²
Excursion of measurement beam	u_{mb}	0.069	mg/m³	0.005	(mg/m³)²

* The larger value is used :
"Repeatability standard deviation at set point" or
"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.27	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.54	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 10 mg/m³**	**5.4**
Requirement of 2010/75/EU	**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 AS	
AMS designation		LaserGas II	
Serial number of units under test		3187 / 32510 / 3188 / 32574	
Measuring principle		Laser Spektroscopy	
Test report		936/21228113/A	
Test laboratory		TÜV Rheinland	
Date of report		2015-03-12	
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 span point		0.57	Vol.-%
Sum of negative CS at span point		-0.75	Vol.-%
Maximum sum of cross-sensitivities		-0.75	Vol.-%
Uncertainty of cross-sensitivity	u_i	-0.434	Vol.-%

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.390	Vol.-%	0.152	(Vol.-%)²
Lack of fit	u_{lof}	-0.323	Vol.-%	0.104	(Vol.-%)²
Zero drift from field test	u_{dz}	0.023	Vol.-%	0.001	(Vol.-%)²
Span drift from field test	u_{ds}	-0.092	Vol.-%	0.008	(Vol.-%)²
Influence of ambient temperature at span	u_t	0.173	Vol.-%	0.030	(Vol.-%)²
Influence of supply voltage	u_v	0.029	Vol.-%	0.001	(Vol.-%)²
Cross-sensitivity (interference)	u_i	-0.434	Vol.-%	0.188	(Vol.-%)²
Influence of sample gas pressure	u_p	0.255	Vol.-%	0.065	(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}	0.150	Vol.-%	0.023	(Vol.-%)²

* The larger value is used :
"Repeatability standard deviation at set point" or
"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.82	Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	1.61	Vol.-%

Relative total expanded uncertainty	**U in % of the range 40 Vol.-%**	**4.0**
Requirement of 2010/75/EU	**U in % of the range 40 Vol.-%**	**10.0** **
Requirement of EN 15267-3	U in % of the range 40 Vol.-%	7.5

** The EU-directive 2010/75/EU on industrial emissions provides no requirements for this component..
A value of 10 % was chosen.