

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000081153_00

Certified AMS: nCLD EL² for NO, NO₂ and NO_x

Manufacturer: ECO PHYSICS AG
Bubikonerstrasse 45
8635 Dürnten
Switzerland

Test Institute: 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)
as well as EN 14181 (2014).

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 0000081153

Publication in the German Federal Gazette
(BAnz) of 20 March 2023

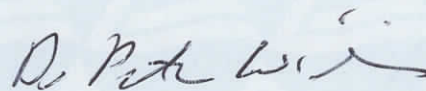
German Environment Agency
Dessau, 25 April 2023

This certificate will expire on:
19 March 2028

TÜV Rheinland Energy GmbH
Cologne, 24 April 2023



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51105 Köln

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 the certificate D-PL-11120-02-00.

Test report:	936/21253991/A dated 05 September 2022
Initial certification:	20 March 2023
Expiry date:	19 March 2028
Publication:	BAnz AT 20.03.2023 B6, chapter I No. 2.1

Approved application

The tested AMS is suitable for use at plants according to Directive 2010/75/EC, chapter III (13th BImSchV:2021), chapter IV (17th BImSchV:2021), Directive 2015/2193/EC (44th BImSchV:2021), 30th BImSchV:2019, TA-Luft:2021 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 four-month field test at a gas- and steamturbine power plant

The AMS is approved for an ambient temperature range of +5° to 40°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 936/21253991/A dated 05 September 2022 of TÜV Rheinland Energy 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 20.03.2023 B6, chapter I No. 2.1,
Announcement by UBA dated 21 February 2023:

AMS designation:

nCLD EL² for NO, NO₂ and NO_x

Manufacturer:

ECO PHYSICS AG, Dürnten, Switzerland

Field of application:

Modular measuring system for plants requiring official approval and plants according to the 27th BImSchV.

Measuring ranges during the performance test:

Component	Certification range	additional ranges		Unit
NO	0 - 50	0 - 200	0 - 500	mg/m ³
NO ₂	0 - 50	0 - 200	0 - 500	mg/m ³
NO _x *	0 - 50	0 - 200	0 - 500	mg/m ³

* NO_x as NO₂

Software version:

1.7.0.0

Restrictions:

The measuring system may only be used in plants where the waste gas moisture does not permanently exceed 30 vol.%.

Notes:

1. The maintenance interval is four weeks.
2. The performance test also includes the version nCLD 822 Mh (without calibration gas valve).
3. The analogue data output is a voltage signal. In the case of long cable runs, the signal must be checked for measured value falsifications.

Test report:

TÜV Rheinland Energy GmbH, Cologne
Report No.: 936/21253991/A dated 5 September 2022

Certified product

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

The emission measuring device nCLD EL² is a continuous nitrogen oxide analyzer. The measuring principle is based on the chemiluminescence method. The device was developed for continuous monitoring of emissions of NO, NO₂ and NO_x in combustion gases.

The nCLD EL² nitrogen oxide analyzer uses the chemiluminescence method to continuously measure NO, NO₂ and NO_x in combustion exhaust gases. The sample gas flows through an orifice plate to the two measurement chambers. For NO by a direct route and for NO_x initially via the NO₂ converter. Ambient air enters the analyzer through an inlet filter and permeation dryer and is passed to the corona discharge ozone generator. From the reaction chamber, the exhaust air flows through the ozone destroyer to the pump and is discharged through the vent.

The determined measurement data are stored in the system and output via the various signal outputs.

The certified measuring system nCLD EL² consists of the following components:

Analyzer Model

CLD EL² or nCLD 822 Mh
NO₂ /NO converter
Ozone generator
Permeation dryer
Switching power supply and main processor board
Detector unit

Probe:

Bühler Technologies GmbH

Type:

GAS 222.20-Cal-twin incl. ceramic filter (length 100 cm),
heated 180 °C

Heated sample gas line

Temperature: 180 °C
Length: 10 m
Diameter (inside): 4 mm
Material: PTFE

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 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 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 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 nCLD EL² 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. 0000081153_00: 25 April 2023
Expiry date of the certificate: 19 March 2028
Test report 936/21253991/A dated 05 September 2022
TÜV Rheinland Energy GmbH, Cologne
Publication: BAnz AT 20.03.2023 B6, chapter I No. 2.1
Announcement by UBA dated 21 February 2023

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

Measuring system

Manufacturer	ECO PHYSICS AG
AMS designation	nCLD EL ²
Serial number of units under test	151/156
Measuring principle	Chemiluminescence

Test report

Test laboratory	936/21253991/A TÜV Rheinland
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Measured component

Certification range	NO 0 - 50 mg/m ³
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Evaluation of the cross-sensitivity (CS)

(system with largest CS)

Sum of positive CS at zero point	0.64 mg/m ³
Sum of negative CS at zero point	0.00 mg/m ³
Sum of positive CS at span point	0.40 mg/m ³
Sum of negative CS at span point	-1.30 mg/m ³
Maximum sum of cross-sensitivities	-1.30 mg/m ³
Uncertainty of cross-sensitivity	u_i -0.751 mg/m ³

Calculation of the combined standard uncertainty

Tested parameter

		u^2
Lack of fit	u_D 0.254 mg/m ³	0.065 (mg/m ³) ²
Zero drift from field test	u_{lof} -0.173 mg/m ³	0.030 (mg/m ³) ²
Span drift from field test	$u_{d,z}$ -0.289 mg/m ³	0.084 (mg/m ³) ²
Influence of ambient temperature at span	$u_{d,s}$ 0.577 mg/m ³	0.333 (mg/m ³) ²
Influence of supply voltage	u_t 0.529 mg/m ³	0.280 (mg/m ³) ²
Cross-sensitivity (interference)	u_v 0.265 mg/m ³	0.070 (mg/m ³) ²
Influence of sample gas flow	u_i -0.751 mg/m ³	0.564 (mg/m ³) ²
Uncertainty of reference material at 70% of certification range	u_p -0.231 mg/m ³	0.053 (mg/m ³) ²
	u_{rm} 0.404 mg/m ³	0.163 (mg/m ³) 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)

$$u_c = \sqrt{\sum (u_{\max, j})^2} \quad 1.28 \text{ mg/m}^3$$

Total expanded uncertainty

$$U = u_c \cdot k = u_c \cdot 1.96 \quad 2.51 \text{ mg/m}^3$$

Relative total expanded uncertainty

U in % of the ELV 33.3 mg/m³ **7.5**

Requirement of 2010/75/EU

U in % of the ELV 33.3 mg/m³ **20.0**

Requirement of EN 15267-3

U in % of the ELV 33.3 mg/m³ **15.0**

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

Measuring system

Manufacturer	ECO PHYSICS AG
AMS designation	nCLD EL ²
Serial number of units under test	151/156
Measuring principle	Chemiluminescence

Test report

Test laboratory	936/21253991/A TÜV Rheinland
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Measured component

Certification range	NO ₂ 0 - 50 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 span point	1,20 mg/m ³
Sum of negative CS at span point	-1,30 mg/m ³
Maximum sum of cross-sensitivities	1,30 mg/m ³
Uncertainty of cross-sensitivity	u_i 0,751 mg/m ³

Calculation of the combined standard uncertainty

Tested parameter

		u^2
Lack of fit	u_r 0,460 mg/m ³	0,212 (mg/m ³) ²
Zero drift from field test	$u_{l,rf}$ -0,231 mg/m ³	0,053 (mg/m ³) ²
Span drift from field test	$u_{d,z}$ -0,404 mg/m ³	0,163 (mg/m ³) ²
Influence of ambient temperature at span	$u_{t,s}$ 0,520 mg/m ³	0,270 (mg/m ³) ²
Influence of supply voltage	u_t 0,451 mg/m ³	0,203 (mg/m ³) ²
Cross-sensitivity (interference)	u_v 0,401 mg/m ³	0,161 (mg/m ³) ²
Influence of sample gas flow	u_i 0,751 mg/m ³	0,564 (mg/m ³) ²
Uncertainty of reference material at 70% of certification range	u_b -0,173 mg/m ³	0,030 (mg/m ³) ²
Converter efficiency for AMS measuring NOx	u_{rm} 0,404 mg/m ³	0,163 (mg/m ³) ²
	$u_{c,a}$ 1,039 mg/m ³	1,080 (mg/m ³) 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)

$$u_c = \sqrt{\sum (u_{max,i})^2} \quad 1,70 \text{ mg/m}^3$$

Total expanded uncertainty

$$U = u_c * k = u_c * 1.96 \quad 3,34 \text{ mg/m}^3$$

Relative total expanded uncertainty

U in % of the ELV 33.3 mg/m³ 10.0

Requirement of 2010/75/EU

U in % of the ELV 33.3 mg/m³ 20.0

Requirement of EN 15267-3

U in % of the ELV 33.3 mg/m³ 15.0

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

Measuring system

Manufacturer	ECO PHYSICS AG
AMS designation	nCLD EL ²
Serial number of units under test	151/156
Measuring principle	Chemiluminescence

Test report

Test laboratory	936/21253991/A TÜV Rheinland
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Measured component

Certification range	NOx 0 - 50 mg/m ³
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Evaluation of the cross-sensitivity (CS)

(system with largest CS)

Sum of positive CS at zero point	0.19 mg/m ³
Sum of negative CS at zero point	0.00 mg/m ³
Sum of positive CS at span point	1.50 mg/m ³
Sum of negative CS at span point	-1.20 mg/m ³
Maximum sum of cross-sensitivities	1.50 mg/m ³
Uncertainty of cross-sensitivity	u_i 0.866 mg/m ³

Calculation of the combined standard uncertainty

Tested parameter

		u^2
Lack of fit	u_D 0.507 mg/m ³	0.257 (mg/m ³) ²
Zero drift from field test	u_{lof} 0.231 mg/m ³	0.053 (mg/m ³) ²
Span drift from field test	$u_{d,z}$ -0.231 mg/m ³	0.053 (mg/m ³) ²
Influence of ambient temperature at span	$u_{d,s}$ 0.318 mg/m ³	0.101 (mg/m ³) ²
Influence of supply voltage	u_t 0.404 mg/m ³	0.163 (mg/m ³) ²
Cross-sensitivity (interference)	u_v 0.387 mg/m ³	0.150 (mg/m ³) ²
Influence of sample gas flow	u_i 0.866 mg/m ³	0.750 (mg/m ³) ²
Uncertainty of reference material at 70% of certification range	u_p -0.173 mg/m ³	0.030 (mg/m ³) ²
Converter efficiency for AMS measuring NOx	u_{rm} 0.404 mg/m ³	0.163 (mg/m ³) ²
	u_{ce} 1.039 mg/m ³	1.080 (mg/m ³) 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)

$$u_c = \sqrt{\sum (u_{max, j})^2} \quad 1.67 \text{ mg/m}^3$$

Total expanded uncertainty

$$U = u_c \cdot k = u_c \cdot 1.96 \quad 3.28 \text{ mg/m}^3$$

Relative total expanded uncertainty

Requirement of 2010/75/EU

Requirement of EN 15267-3

U in % of the ELV 33.3 mg/m³ **9.9**

U in % of the ELV 33.3 mg/m³ **20.0**

U in % of the ELV 33.3 mg/m³ **15.0**