

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000053805_02

Certified AMS: AC32e for NO, NO₂ and NO_x

Manufacturer: ENVEA
111, Boulevard Robespierre
78304 Poissy Cedex
France

Test Institute: TÜV Rheinland Energy & Environment GmbH

**This is to certify that the AMS has been tested
and found to comply with the standards
VDI 4202-1 (2018), EN 14211 (2012), EN 14211 (2024)
as well as EN 15267-1 (2009) and EN 15267-2 (2023).**

Certification is awarded in respect of the conditions stated in this certificate
(this certificate contains 12 pages).
The present certificate replaces certificate 0000053805_01 dated 2 March 2022.



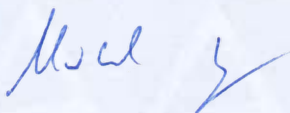
Suitability Tested
Complying with
2008/50/EC
EN 15267
Regular
Surveillance
www.tuv.com
ID 0000053805

Publication in the German Federal Gazette
(BAnz) of 15 March 2017

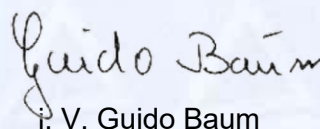
German Environment Agency
Dessau, 23 March 2026

This certificate will expire on:
22 March 2031

TÜV Rheinland
Energy & Environment GmbH
Cologne, 20 March 2026



Dr. Marcel Langner
Head of Section II 4



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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:	936/21233023/A dated 13 October 2016 and Addendum EuL/21264142/B_V1 dated 7 February 2025
Initial certification:	15 March 2017
Expiry date:	30 October 2030
Publication:	BAnz AT 15.03.2017 B6, chapter III No. 1.1 and BAnz AT 31.10.2025 B5, Kap. IV Nr. 35

Approved application

The tested AMS is suitable for continuous immission measurement of NO, NO₂ and NO_x in stationary use.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a three-month field test at a location close to transport links.

The AMS is approved for an ambient temperature range of +0 °C 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 measured values relevant to the application.

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

Basis of the certification

This certification is based on:

- Test report 936/21233023/A dated 13 October 2016 of TÜV Rheinland Energy GmbH and Addendum EuL/21264142/B_V1 dated 7 February 2025 of TÜV Rheinland Energy & Environment 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 15.03.2017 B6, chapter III No. 1.1,
Announcement by UBA dated 22 February 2017:

AMS designation:

AC 32e for NO, NO₂ and NO_x

Manufacturer:

Environnement S.A., Poissy, France

Field of application:

For continuous monitoring of nitrogen oxide in ambient air (stationary operation)

Measuring ranges during the performance test:

Component	Certification range	Unit
NO	0 - 1,200	µg/m ³
NO ₂	0 - 500	µg/m ³

Software version:

Firmware: 1.0.a

Restrictions:

None

Notes:

1. The performance test also includes the Version AC 32e* instrument version without integrated display. In this case, the measured value is displayed via a PC or laptop belonging to the measuring device.
2. The report on the performance test is available online at www.qal1.de.

Test Report:

TÜV Rheinland Energy GmbH, Cologne

Report No.: 936/21233023/A dated 13 October 2016

Publication in the German Federal Gazette: BAnz AT 11.04.2022 B10, chap. VI notification 10,
Announcement by UBA dated 9 March 2022

10 Notification as regards Federal Environment Agency (UBA) notices of 22 February 2017 (BAnz AT 15.03.2017 B6, chapter III number 1.1) and of 31 March 2021 (BAnz AT 03.05.2021 B9, chapter III notification 19)

The current software version for the measuring device AC32e*/AC32e for NO, NO₂ and NO_x from ENVEA is:

v1.1.c

The measuring device can be equipped alternatively with the photomultiplier of the company Hamamatsu of the type R5929.

Within the renewal of the certificate, new evaluations of measurement data were carried out. These are described in test report 936/21233023/C dated 7 January, 2022.

Statement issued by TÜV Rheinland Energy GmbH dated 7 January 2022

Publication in the German Federal Gazette: BAnz AT 20.03.2023 B6, chap. IV notification 64,
Announcement by UBA dated 21 February 2023

64 Notification as regards Federal Environment Agency (UBA) notices of 22 February 2017 (BAnz AT 15.03.2017 B6, chapter III number 1.1) and of 9 March 2022 (BAnz AT 11.04.2022 B10, chapter VI notification 10)

The current software version of the AC32e*/AC32e measuring system for NO, NO₂ and NO_x from ENVEA is:

v1.1.e

Furthermore the software version v1.1.d can be used.

The measuring system can alternatively be equipped with a revised high-voltage transformer for the ozone generator.

Statement issued by TÜV Rheinland Energy GmbH dated 4 January 2023

Publication in the German Federal Gazette: BAnz AT 19.05.2025 B3, chap. IV notification 89,
Announcement by UBA dated 2 April 2025

89 Notification as regards Federal Environment Agency (UBA) notices of 22 February 2017 (BAnz AT 15.03.2017 B6, chapter III number 1.1) and of 21 February 2023 (BAnz AT 20.03.2023 B6, chapter IV notification 64)

The current software version of the AC32e*/Ac32e measuring system for NO, NO₂ and NO_x from ENVEA is:

v1.2.c

Furthermore the software version v1.2.a and v1.2.b can be used.

The measuring system can be equipped with a revised voltage of ARM20-Boards.

Statement issued by TÜV Rheinland Energy & Environment GmbH dated 4 October 2024

The basis for this certificate is the publication of the following announcement:

Publication in the German Federal Gazette: BAnz AT 31.10.2025 B5, chap. IV notification 35,
Announcement by UBA dated 27 August 2025

35 Notification as regards Federal Environment Agency (UBA) notices of 22 February 2017 (BAnz AT 15.03.2017 B6, chapter III number 1.1) and of 2 April 2025 (BAnz AT 19.05.2025 B3, chapter IV, notification 89)

The current software version for the AC32e*/AC32e measuring system for NO, NO₂ and NO_x from ENVEA is as follows:

v1.3.a

From software version v1.3.a, the measuring system fulfils the requirements of EN 14211 (version 2024).

An addendum to the test report with the report number EuL/21264142/B_V1 can be viewed on the internet at www.qal1.de.

Statement issued by TÜV Rheinland Energy & Environment GmbH dated 20 May 2025

Certified product

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

The AC32e air quality monitoring system is a continuous nitrogen analyser. The measuring principle relies on the chemiluminescence method.

The main switch of the measuring system and a TFT-LCD colour display with background lighting and touch screen is located at the front of the instrument. This touch screen ensures operation of the AC32e NO_x analyser. The AC32e* version is identical to the AC32e measuring system (apart from its front design), but it does not have a display. The AC32e* measuring system is only operated via an external PC connected via Ethernet.

Fluid inputs and outputs as well as electrical connections are located on the rear side of the AMS.

The instrument is operated with an external vacuum pump.

In the analyser, sample gas flows to a solenoid valve unit via an inlet filter. At this point, the relevant inlet can be selected (sample, zero gas, test gas). The dryer between the dust filter and the solenoid valves allows the removal of all interferences from moisture.

The sample is sucked directly into the reaction chamber for the NO cycle and via the NO₂ → NO converter oven for the NO_x cycle.

The ozoniser generates the necessary ozone for measurements from ambient air. Dust is removed from the air sucked in before the latter is transported through a drier. At the outlet of the ozone generator, the ozone passes through cleaning before it reaches the reaction chamber inside the measuring module. The ozoniser chip ensures the energy supply of the ozone generator.

Furthermore, the dryer provides purge air for the conversion of the photomultiplier tube after flow through of the purge dryer filter.

The vacuum distributor connected to the external pump connects all internal elements which require sub-atmospheric pressure.

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 request of 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 are also accessible on the internet at gal1.de.

History of documents

Certification of AC32e 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. 0000053805_00: 25 April 2017
Expiry date of the certificate: 14 March 2022
Test report: 936/21233023/A dated 13 October 2016
TÜV Rheinland Energy GmbH
Publication: BAnz AT 15.03.2017 B6, chapter III number 1.1
UBA announcement dated 22 February 2017

Notifications

Statement issued by TÜV Rheinland Energy GmbH dated 27 September 2018
Publication: BAnz AT 26.03.2019 B7, chapter IV notification 20
UBA announcement dated 27 February 2019
(Software changes)

Statement issued by TÜV Rheinland Energy GmbH dated 1 October 2019
Publication: BAnz AT 24.03.2020 B7, chapter IV notification 24
UBA announcement dated 24 February 2020
(Software changes and new producer name formerly Environnement S.A.)

Statement issued by TÜV Rheinland Energy GmbH dated 9 September 2020
Publication: BAnz AT 03.05.2021 B9, chapter III notification 19
UBA announcement dated 31 March 2021
(Soft- and hardware changes)

Renewal of certificates

Certificate No. 0000053805_01: 2 March 2022
Expiry date of the certificate: 14 March 2027

Notifications

Statement issued by TÜV Rheinland Energy GmbH dated 7 January 2022
Test report: 936/21233023/C dated 7 January 2022
Publication: BAnz AT 11.04.2022 B10, chapter VI notification 10
UBA announcement dated 9 March 2022
(Software and hardware changes)

Statement issued by TÜV Rheinland Energy GmbH dated 4 January 2023
Publication: BAnz AT 20.03.2023 B6, chapter IV notification 64
UBA announcement dated 21 February 2023
(Software and hardware changes)

Statement issued by TÜV Rheinland Energy & Environment GmbH dated 4 October 2024
Publication: BAnz AT 19.05.2025 B3, chapter IV notification 89
UBA announcement dated 2 April 2025
(Software and hardware changes)

Certificate based on a notification

Certificate No. 0000053805_02: 23 March 2026
Expiry date of the certificate: 22 March 2031
Statement issued by TÜV Rheinland Energy & Environment GmbH dated 20 May 2025
Addendum: EuL/21264142/B_V1 dated 7 February 2025
Publication: BAnz AT 31.10.2025 B5, chapter IV notification 35
UBA announcement dated 27 August 2025

Expanded uncertainty laboratory (EN 14211:2012), system 1

Measuring device:		AC 32e		Serial-No.:		SN 5	
Measured component:		NO		1h-limit value:		104,6 nmol/mol	
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty		Square of partial uncertainty	
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0,050	$u_{r,z}$	0,01	0,0000	
2	Repeatability standard deviation at 1h-limit value	≤ 3.0 nmol/mol	0,940	$u_{r,h}$	0,02	0,0005	
3	"lack of fit" at 1h-limit value	$\leq 4.0\%$ of measured value	0,790	$u_{f,h}$	0,48	0,2276	
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤ 8.0 nmol/mol/kPa	0,740	u_{sp}	1,86	3,4672	
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤ 3.0 nmol/mol/K	0,190	u_{gt}	0,48	0,2286	
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤ 3.0 nmol/mol/K	0,947	u_{st}	2,38	5,6783	
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤ 0.30 nmol/mol/V	0,020	u_v	0,06	0,0034	
8a	Interferent H ₂ O with 21 mmol/mol	≤ 10 nmol/mol (Zero)	-0,220	u_{t20}	0,47	0,2178	
		≤ 10 nmol/mol (Span)	3,870				
8b	Interferent CO ₂ with 500 µmol/mol	≤ 5.0 nmol/mol (Zero)	0,290	$u_{int,pos}$	0,38	0,1456	
		≤ 5.0 nmol/mol (Span)	-0,470				
		≤ 5.0 nmol/mol (Zero)	0,120				
8c	Interferent NH ₃ mit 200 nmol/mol	≤ 5.0 nmol/mol (Span)	2,070	$u_{int,neg}$			
		≤ 5.0 nmol/mol (Span)	2,070				
9	Averaging effect	$\leq 7.0\%$ of measured value	-2,330	u_{av}	-1,41	1,9799	
18	Difference sample/calibration port	$\leq 1.0\%$	0,240	u_{ssc}	0,25	0,0630	
21	Converter efficiency	≥ 98	99,40	u_{ec}	0,63	0,3939	
23	Uncertainty of test gas	$\leq 3.0\%$	2,000	u_{cg}	1,05	1,0941	
Combined standard uncertainty				u_c		3,6743	nmol/mol
Expanded uncertainty				U		7,3486	nmol/mol
Relative expanded uncertainty				W		7,03	%
Maximum allowed expanded uncertainty				W_{req}		15	%

Expanded uncertainty laboratory (EN 14211:2012), system 2

Measuring device:		AC 32e		Serial-No.:		SN 6	
Measured component:		NO		1h-limit value:		104,6 nmol/mol	
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty		Square of partial uncertainty	
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0,040	$u_{r,z}$	0,00	0,0000	
2	Repeatability standard deviation at 1h-limit value	≤ 3.0 nmol/mol	0,910	$u_{r,h}$	0,02	0,0005	
3	"lack of fit" at 1h-limit value	$\leq 4.0\%$ of measured value	1,000	$u_{f,h}$	0,60	0,3647	
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤ 8.0 nmol/mol/kPa	0,970	u_{sp}	2,44	5,9575	
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤ 3.0 nmol/mol/K	0,130	u_{gt}	0,33	0,1070	
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤ 3.0 nmol/mol/K	1,667	u_{st}	4,19	17,5951	
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤ 0.30 nmol/mol/V	0,030	u_v	0,09	0,0078	
8a	Interferent H ₂ O with 21 mmol/mol	≤ 10 nmol/mol (Zero)	0,040	u_{t20}	0,42	0,1804	
		≤ 10 nmol/mol (Span)	2,600				
8b	Interferent CO ₂ with 500 µmol/mol	≤ 5.0 nmol/mol (Zero)	0,180	$u_{int,pos}$	0,53	0,2797	
		≤ 5.0 nmol/mol (Span)	0,030				
		≤ 5.0 nmol/mol (Zero)	0,290				
8c	Interferent NH ₃ mit 200 nmol/mol	≤ 5.0 nmol/mol (Span)	2,570	$u_{int,neg}$			
		≤ 5.0 nmol/mol (Span)	2,570				
9	Averaging effect	$\leq 7.0\%$ of measured value	3,930	u_{av}	2,37	5,6328	
18	Difference sample/calibration port	$\leq 1.0\%$	-0,280	u_{ssc}	-0,29	0,0858	
21	Converter efficiency	≥ 98	99,20	u_{ec}	0,84	0,7002	
23	Uncertainty of test gas	$\leq 3.0\%$	2,000	u_{cg}	1,05	1,0941	
Combined standard uncertainty				u_c		5,6574	nmol/mol
Expanded uncertainty				U		11,3148	nmol/mol
Relative expanded uncertainty				W		10,82	%
Maximum allowed expanded uncertainty				W_{req}		15	%

Combined uncertainty, laboratory and field (EN 14211:2024), system 1

Measuring device:		AC 32e	Serial-No.:		SN 5
Measured component:		NO	1h-limit value:		104,6 nmol/mol

No.	Performance characteristic	Performance criterion	Result	Partial uncertainty		Square of partial uncertainty
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0,050	$u_{r,z}$	0,01	0,0000
2	Repeatability standard deviation at 1h-limit value	≤ 3.0 nmol/mol	0,940	$u_{r,h}$	not considered, as $\sqrt{2} \cdot u_{r,h} = 0,03 < u_{r,f}$	-
3	"lack of fit" at 1h-limit value	≤ 4.0% of measured value	0,790	$u_{l,h}$	0,48	0,2276
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤ 8.0 nmol/mol/kPa	0,740	u_{sp}	1,86	3,4672
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤ 3.0 nmol/mol/K	0,190	u_{st}	0,48	0,2286
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤ 3.0 nmol/mol/K	0,947	u_{st}	2,38	5,6783
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤ 0.30 nmol/mol/V	0,020	u_v	0,06	0,0034
8a	Interferent H ₂ O with 21 nmol/mol	≤ 10 nmol/mol (Zero)	-0,220	u_{DO}	0,47	0,2178
		≤ 10 nmol/mol (Span)	3,870			
8b	Interferent CO ₂ with 500 µmol/mol	≤ 5.0 nmol/mol (Zero)	0,290	$u_{rel, pos}$	0,38	0,1456
		≤ 5.0 nmol/mol (Span)	-0,470			
8c	Interferent NH ₃ mit 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	0,120	$u_{rel, neg}$	0,38	0,1456
		≤ 5.0 nmol/mol (Span)	2,070			
9	Averaging effect	≤ 7.0% of measured value	-2,330	u_{av}	-1,41	1,9799
10	Reproducibility standard deviation under field conditions	≤ 5.0% of average over 3 months	1,570	u_{f}	1,64	2,6969
11	Long term drift at zero level	≤ 5.0 nmol/mol	1,580	$u_{d,z}$	0,91	0,8321
12	Long term drift at span level	≤ 5.0% of max. of certification range	2,430	$u_{d,h}$	1,47	2,1535
18	Difference sample/calibration port	≤ 1.0%	0,240	u_{sc}	0,25	0,0630
21	Converter efficiency	≥ 98	99,400	u_{ec}	0,63	0,3939
23	Uncertainty of test gas	≤ 3.0%	2,000	u_{tg}	1,05	1,0941
Combined standard uncertainty				u_c		4,3797 nmol/mol
Expanded uncertainty				U		8,7595 nmol/mol
Relative expanded uncertainty				W		8,37 %
Maximum allowed expanded uncertainty				W_{reg}		15 %

Combined uncertainty, laboratory and field (EN 14211:2024), system 2

Measuring device:		AC 32e	Serial-No.:		SN 6
Measured component:		NO	1h-limit value:		104,6 nmol/mol

No.	Performance characteristic	Performance criterion	Result	Partial uncertainty		Square of partial uncertainty
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0,040	$u_{r,z}$	0,00	0,0000
2	Repeatability standard deviation at 1h-limit value	≤ 3.0 nmol/mol	0,910	$u_{r,h}$	not considered, as $\sqrt{2} \cdot u_{r,h} = 0,03 < u_{r,f}$	-
3	"lack of fit" at 1h-limit value	≤ 4.0% of measured value	1,000	$u_{l,h}$	0,60	0,3647
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤ 8.0 nmol/mol/kPa	0,970	u_{sp}	2,44	5,9575
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤ 3.0 nmol/mol/K	0,130	u_{st}	0,33	0,1070
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤ 3.0 nmol/mol/K	1,667	u_{st}	4,19	17,5951
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤ 0.30 nmol/mol/V	0,030	u_v	0,09	0,0078
8a	Interferent H ₂ O with 21 nmol/mol	≤ 10 nmol/mol (Zero)	0,040	u_{DO}	0,42	0,1804
		≤ 10 nmol/mol (Span)	2,600			
8b	Interferent CO ₂ with 500 µmol/mol	≤ 5.0 nmol/mol (Zero)	0,180	$u_{rel, pos}$	0,53	0,2797
		≤ 5.0 nmol/mol (Span)	0,030			
8c	Interferent NH ₃ mit 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	0,290	$u_{rel, neg}$	0,53	0,2797
		≤ 5.0 nmol/mol (Span)	2,570			
9	Averaging effect	≤ 7.0% of measured value	3,930	u_{av}	2,37	5,6328
10	Reproducibility standard deviation under field conditions	≤ 5.0% of average over 3 months	1,570	u_{f}	1,64	2,6969
11	Long term drift at zero level	≤ 5.0 nmol/mol	2,140	$u_{d,z}$	1,24	1,5285
12	Long term drift at span level	≤ 5.0% of max. of certification range	0,870	$u_{d,h}$	0,53	0,2760
18	Difference sample/calibration port	≤ 1.0%	-0,280	u_{sc}	-0,29	0,0858
21	Converter efficiency	≥ 98	99,200	u_{ec}	0,84	0,7002
23	Uncertainty of test gas	≤ 3.0%	2,000	u_{tg}	1,05	1,0941
Combined standard uncertainty				u_c		6,0419 nmol/mol
Expanded uncertainty				U		12,0838 nmol/mol
Relative expanded uncertainty				W		11,55 %
Maximum allowed expanded uncertainty				W_{reg}		15 %

Expanded uncertainty laboratory (EN 14211:2024), system 1

Measuring device:		AC32e	Serial-No.:		SN 5 / 2434	
Measured component:		NO	1h-limit value:		104,6 nmol/mol	
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	Square of partial uncertainty	
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0,050	$u_{r,z}$	0,01	
2	Repeatability standard deviation at 1h-limit value	≤ 3.0 nmol/mol	0,940	$u_{r,th}$	0,02	
3	"lack of fit" at 1h-limit value	≤ 4.0% of measured value	1,340	$u_{l,th}$	0,81	
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤ 8.0 nmol/mol/kPa	0,290	u_{sp}	0,49	
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤ 3.0 nmol/mol/K	0,003	u_{gt}	0,01	
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤ 3.0 nmol/mol/K	0,369	u_{st}	1,08	
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤ 0.30 nmol/mol/V	0,020	u_v	0,06	
8a	Interferent H ₂ O with 21 nmol/mol	≤ 10 nmol/mol (Zero)	-0,220	u_{H_2O}	0,47	
		≤ 10 nmol/mol (Span)	3,870			
8b	Interferent CO ₂ with 500 µmol/mol	≤ 5.0 nmol/mol (Zero)	0,290	$u_{int,pos}$	0,38	
		≤ 5.0 nmol/mol (Span)	-0,470			
8c	Interferent NH ₃ with 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	0,120	or	0,15	
		≤ 5.0 nmol/mol (Span)	2,070			
9	Averaging effect	≤ 7.0% of measured value	-2,330	u_{av}	-1,41	
18	Difference sample/calibration port	≤ 1.0%	0,240	u_{asc}	0,25	
21	Converter efficiency	≥ 98	99,40	u_{ec}	0,63	
23	Uncertainty of test gas	≤ 3.0%	2,000	u_{cg}	1,05	
Combined standard uncertainty				u_c	2,44	nmol/mol
Expanded uncertainty				U	4,88	nmol/mol
Relative expanded uncertainty				W	4,67	%
Maximum allowed expanded uncertainty				W_{req}	15	%

Expanded uncertainty laboratory (EN 14211:2024), system 2

Measuring device:		AC32e	Serial-No.:		SN 6 / 2441	
Measured component:		NO	1h-limit value:		104,6 nmol/mol	
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	Square of partial uncertainty	
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0,040	$u_{r,z}$	0,00	
2	Repeatability standard deviation at 1h-limit value	≤ 3.0 nmol/mol	0,910	$u_{r,th}$	0,02	
3	"lack of fit" at 1h-limit value	≤ 4.0% of measured value	1,370	$u_{l,th}$	0,83	
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤ 8.0 nmol/mol/kPa	0,300	u_{sp}	0,50	
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤ 3.0 nmol/mol/K	0,002	u_{gt}	0,01	
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤ 3.0 nmol/mol/K	0,339	u_{st}	1,00	
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤ 0.30 nmol/mol/V	0,030	u_v	0,09	
8a	Interferent H ₂ O with 21 nmol/mol	≤ 10 nmol/mol (Zero)	0,040	u_{H_2O}	0,42	
		≤ 10 nmol/mol (Span)	2,600			
8b	Interferent CO ₂ with 500 µmol/mol	≤ 5.0 nmol/mol (Zero)	0,180	$u_{int,pos}$	0,53	
		≤ 5.0 nmol/mol (Span)	0,030			
8c	Interferent NH ₃ with 200 nmol/mol	≤ 5.0 nmol/mol (Zero)	0,290	or	0,28	
		≤ 5.0 nmol/mol (Span)	2,570			
9	Averaging effect	≤ 7.0% of measured value	3,930	u_{av}	2,37	
18	Difference sample/calibration port	≤ 1.0%	-0,280	u_{asc}	-0,29	
21	Converter efficiency	≥ 98	99,20	u_{ec}	0,84	
23	Uncertainty of test gas	≤ 3.0%	2,000	u_{cg}	1,05	
Combined standard uncertainty				u_c	3,15	nmol/mol
Expanded uncertainty				U	6,30	nmol/mol
Relative expanded uncertainty				W	6,02	%
Maximum allowed expanded uncertainty				W_{req}	15	%

Combined uncertainty, laboratory and field (EN 14211:2024), system 1

Measuring device:		AC32e	Serial-No.:		SN 5 / 2434
Measured component:		NO	1h-limit value:		104,6 nmol/mol

No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	Square of partial uncertainty
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0,050	$u_{r,z}$	0,01
2	Repeatability standard deviation at 1h-limit value	≤ 3.0 nmol/mol	0,940	$u_{r,h}$	not considered, as $\sqrt{2} \cdot u_{r,h} = 0,03 < u_{r,f}$
3	"lack of fit" at 1h-limit value	≤ 4.0% of measured value	1,340	$u_{l,h}$	0,81
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤ 8.0 nmol/mol/kPa	0,290	u_{sp}	0,49
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤ 3.0 nmol/mol/K	0,003	u_{gt}	0,01
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤ 3.0 nmol/mol/K	0,369	u_{st}	1,08
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤ 0.30 nmol/mol/V	0,020	u_v	0,06
8a	Interferent H ₂ O with 21 mmol/mol	≤ 10 nmol/mol (Zero) ≤ 10 nmol/mol (Span)	-0,220 3,870	$u_{int,20}$	0,47
8b	Interferent CO ₂ with 500 µmol/mol	≤ 5.0 nmol/mol (Zero) ≤ 5.0 nmol/mol (Span)	0,290 -0,470	$u_{int,pos}$ or	0,38
8c	Interferent NH ₃ with 200 nmol/mol	≤ 5.0 nmol/mol (Zero) ≤ 5.0 nmol/mol (Span)	0,120 2,070	$u_{int,neg}$	0,15
9	Averaging effect	≤ 7.0% of measured value	-2,330	u_{av}	-1,41
10	Reproducibility standard deviation under field conditions	≤ 5.0% of average over 3 months	0,480	$u_{r,f}$	0,50
11	Long term drift at zero level	≤ 5.0 nmol/mol	1,580	$u_{d,l,z}$	0,91
12	Long term drift at span level	≤ 5.0% of max. of certification range	2,430	$u_{d,l,h}$	1,47
18	Difference sample/calibration port	≤ 1.0%	0,240	u_{sac}	0,25
21	Converter efficiency	≥ 98	99,400	u_{EC}	0,63
23	Uncertainty of test gas	≤ 3.0%	2,000	u_{cg}	1,05

Combined standard uncertainty	u_c	3,03	nmol/mol
Expanded uncertainty	U	6,07	nmol/mol
Relative expanded uncertainty	W	5,80	%
Maximum allowed expanded uncertainty	W_{req}	15	%

Combined uncertainty, laboratory and field (EN 14211:2024), system 2

Measuring device:		AC32e	Serial-No.:		SN 6 / 2441
Measured component:		NO	1h-limit value:		104,6 nmol/mol

No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	Square of partial uncertainty
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0,040	$u_{r,z}$	0,00
2	Repeatability standard deviation at 1h-limit value	≤ 3.0 nmol/mol	0,910	$u_{r,h}$	not considered, as $\sqrt{2} \cdot u_{r,h} = 0,03 < u_{r,f}$
3	"lack of fit" at 1h-limit value	≤ 4.0% of measured value	1,370	$u_{l,h}$	0,83
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤ 8.0 nmol/mol/kPa	0,300	u_{sp}	0,50
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤ 3.0 nmol/mol/K	0,002	u_{gt}	0,01
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤ 3.0 nmol/mol/K	0,339	u_{st}	1,00
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤ 0.30 nmol/mol/V	0,030	u_v	0,09
8a	Interferent H ₂ O with 21 mmol/mol	≤ 10 nmol/mol (Zero) ≤ 10 nmol/mol (Span)	0,040 2,600	$u_{int,20}$	0,42
8b	Interferent CO ₂ with 500 µmol/mol	≤ 5.0 nmol/mol (Zero) ≤ 5.0 nmol/mol (Span)	0,180 0,030	$u_{int,pos}$ or	0,53
8c	Interferent NH ₃ with 200 nmol/mol	≤ 5.0 nmol/mol (Zero) ≤ 5.0 nmol/mol (Span)	0,290 2,570	$u_{int,neg}$	0,28
9	Averaging effect	≤ 7.0% of measured value	3,930	u_{av}	2,37
10	Reproducibility standard deviation under field conditions	≤ 5.0% of average over 3 months	0,480	$u_{r,f}$	0,50
11	Long term drift at zero level	≤ 5.0 nmol/mol	2,140	$u_{d,l,z}$	1,24
12	Long term drift at span level	≤ 5.0% of max. of certification range	0,870	$u_{d,l,h}$	0,53
18	Difference sample/calibration port	≤ 1.0%	-0,280	u_{sac}	-0,29
21	Converter efficiency	≥ 98	99,200	u_{EC}	0,84
23	Uncertainty of test gas	≤ 3.0%	2,000	u_{cg}	1,05

Combined standard uncertainty	u_c	3,46	nmol/mol
Expanded uncertainty	U	6,92	nmol/mol
Relative expanded uncertainty	W	6,61	%
Maximum allowed expanded uncertainty	W_{req}	15	%