

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000038507_03

Certified AMS: AS32M for NO₂

Manufacturer: ENVEA
111, Boulevard Robespierre
78304 Poissy Cedex
France

Test Institute: TÜV Rheinland Energy 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),
Guide for Demonstration of Equivalence of Ambient Air Monitoring Methods (2010),
EN 15267-1 (2009) and EN 15267-2 (2009).**

Certification is awarded in respect of the conditions stated in this certificate
(this certificate contains 12 pages).
The present certificate replaces certificate 0000038507_02 dated 22 July 2018.



Suitability Tested
Complying with
2008/50/EC
EN 15267
Regular
Surveillance
www.tuv.com
ID 0000038507

Publication in the German Federal Gazette
(BAnz) of 01 April 2014

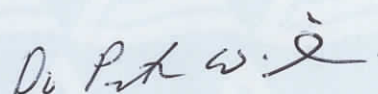
German Environment Agency
Dessau, 14 July 2023

This certificate will expire on:
22 July 2028

TÜV Rheinland Energy GmbH
Cologne, 13 July 2023



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

Test report:	936/21219819/B dated 09 September 2013
Initial certification:	23 July 2013
Expiry date:	22 July 2028
Certificate:	Renewal (of previous certificate 0000038507_02 of 22 July 2018 valid until 22 July 2023)
Publication:	BAnz AT 01.04.2014 B12, chapter IV No. 4.2

Approved application

The certified AMS is suitable for continuous ambient air monitoring of NO₂ (stationary operation).

The suitability of the AMS for these applications was assessed based on a laboratory test and a 3-month field test.

The AMS is approved for an ambient temperature range of +0° to 30°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 936/21219819/B dated 9 September 2013 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 01.04.2014 B12, chapter IV No. 4.2,
Announcement by UBA dated 27 February 2014:

AMS designation:

AS32M for nitrogen dioxide

Manufacturer:

Environnement S.A., Poissy, France

Field of application:

For continuous ambient air monitoring of nitrogen dioxide (stationary operation)

Measuring ranges during the performance test:

Component	Certification range	Unit
Nitrogen dioxide	0 – 500	µg/m ³

Software version:

3.6.a

Restrictions:

None

Notes:

1. The measuring system must be operated inside a lockable measurement container.
2. The test report on performance testing is available on the internet at www.qal1.de.
3. Equivalence with the reference method was demonstrated for the component NO₂ in accordance with the requirements of the "Demonstration of Equivalence of Ambient Air Monitoring Methods".
4. Supplementary testing (demonstration of equivalence with the reference method) as regards Federal Environment Agency (UBA) notice of 03 July 2013 (BAnz AT 23.07.2013, chapter III number 1.1).

Test institute:

TÜV Rheinland Energie und Umwelt GmbH, Cologne
Report No.: 936/21219819/B dated 9 September 2013

Publication in the German Federal Gazette: BAnz AT 26.08.2015 B4, Chap. V notification 49,
Announcement by UBA dated 22 July 2015:

49 Notification as regards Federal Environment Agency (UBA) notice of 27 February 2014 (BAnz AT 01.04.2014 B12, chapter IV number 4.2)

The current software version for the AS32M measuring system for NO₂, manufactured by Environnement S.A., is:

v1.05 (calculation process)
v3.6.h (display process)

In increase leak tightness, the diameter of the orifice was increased from 0.35 mm to 0.36 mm.

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 14 March 2015

Publication in the German Federal Gazette: BAnz AT 26.03.2019 B7, Chap. IV notification 19, Announcement by UBA dated 27 February 2019:

19 Notification as regards Federal Environment Agency notices of 27 February 2014 (BAnz AT 01.04.2014 B12, chapter IV number 4.2) and of 22 July 2015 (BAnz AT 26.08.2015 B4, chapter V notification 49)

The AS32M measuring system for NO₂ manufactured by Environnement S.A. now comes with a colour touch screen display for system control and display of measurement data and instrument parameters.

The current software version of the AS32M measuring system for NO₂ is:
v1.05 (calculation process)
v4.0.d (Display Process)

Statement issued by TÜV Rheinland Energy GmbH dated 9 January 2019

Publication in the German Federal Gazette: BAnz AT 24.03.2020 B7, Chap. IV notification 28, Announcement by UBA dated 24 February 2020:

28 Notification as regards Federal Environment Agency (UBA) notices of 27 February 2014 (BAnz AT 01.04.2014 B12, chapter IV number 4.2) and of 27 February 2019 (BAnz AT 26.03.2019 B7, chapter IV notification 19)

Environnement S.A., Poissy, France have changed their company name to ENVEA. The AS32M measuring system for NO₂ manufactured by ENVEA remains otherwise unchanged.

Statement issued by TÜV Rheinland Energy GmbH dated 1 October 2019

Publication in the German Federal Gazette: BAnz AT 03.05.2021 B9, Chap. III
notification 15, Announcement by UBA dated 31 March 2021:

**15 Notification as regards Federal Environment Agency (UBA) notices
of 27 February 2014 (BAnz AT 01.04.2014 B12, chapter IV number 4.2) and
of 24 February 2020 (BAnz AT 24.03.2020 B7, chapter IV notification 28)**

The latest software versions of the measuring system AS32M for NO₂
manufactured by the company ENVEA are:

- v1.05 (Calculation Process)
- v4.0.e (Display Process).

Statement issued by TÜV Rheinland Energy GmbH dated 8 September 2020

Publication in the German Federal Gazette: BAnz AT 20.03.2023 B6, Chap. IV
notification 66, Announcement by UBA dated 21 February 2023:

**66 Notification as regards Federal Environment Agency (UBA) notices
of 27 February 2014 (BAnz AT 01.04.2014 B12, chapter IV number 4.2) and
of 31 March 2021 (BAnz AT 03.05.2021 B9, chapter III notification 15)**

The current software versions of the AS32M measuring system for NO₂ from the
company ENVEA are:

- v1.05 (Calculation Process)
- v4.0.f (Display Process)

Statement issued by TÜV Rheinland Energy GmbH dated 9 September 2022

Certified product

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

The AS32M air quality monitor is a continuous nitrogen dioxide analyser. The measuring principle is based on direct UV absorption. The instrument was designed for continuous ambient air monitoring of nitrogen dioxide. The measuring principle of the AS32M is based on the CAPS technique (Cavity Attenuated Phase Shift Spectroscopy).

The sampling is performed by a pump mounted at the end of the fluid circuit through a Teflon tube connected to the rear panel of the analyser. An assembly of two 3-way solenoid valves enables the selection one of the three inlets of the analyser: "sample", "zero air" or "span gas". Protection against dust is ensured by a Teflon filter (PTFE) connected to the "sample" inlet.

A PERMA-PURE dryer is used to dry the sample gas. The dryer is made of two concentric tubes, the internal tube is made of a special water-permeable polymer. The molecules are transferred, through this tube, from the side where the water content is the highest to the side where it is the lowest. To ensure a lower partial pressure of water on the outside of the polymer tube, the tube periphery is placed under vacuum condition and rinsed by a portion of the flow rate leaving the tube.

After drying, the sampled gas passes through a dust filter (made of microfibers of borosilicate glass bound in PTFE) which holds 99.5% of the particles that have an aerodynamic diameter higher than 10 nm. This enables to avoid the optical interference generated by the light scattering induced by the particles whose diameter is higher than the emission wavelength (450 nm).

From here, the sampled gas is led into the optical cavity. The optical cavity is a stainless steel hollow cylinder, closed at each end by a semi-transparent mirror of high reflectivity. The luminous source placed upstream of the M1 inlet mirror of the cavity is an LED which emits light at 450 nm. A convergent lens placed between the LED and the M1 mirror focuses the beam of light. A phototube placed behind the M2 outlet mirror of the cavity detects the photons transmitted by this mirror. Between the M2 mirror and the detector, a convergent lens focuses the beam on the detector and a band-pass interference filter centred around 450 ± 10 nm enables to select the photons that have a wavelength between 440 and 460 nm.

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: gal1.de.

History of documents

Certification of AS32M 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. 0000038507_00: 20 August 2013
Expiry date of the certificate: 22 July 2018

Test report: 936/21219819/A dated 11 March 2013
TÜV Rheinland Energie und Umwelt GmbH
Publication: BAnz AT 23.07.2013 B4, chapter III number 1.1
UBA announcement dated 3 July 2013

Supplementary testing according to EN 15267

Certificate No. 0000038507_01: 29 April 2014
Expiry date of the certificate: 22 July 2018

Test report: 936/21219819/B dated 9 September 2013
TÜV Rheinland Energie und Umwelt GmbH
Publication: BAnz AT 01.04.2014 B12, chapter IV number 4.2
UBA announcement dated 27 February 2014

Notifications

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 14 March 2015
Publication: BAnz AT 26.08.2015 B4, chapter V notification 49
UBA announcement dated 22 July 2015
(new Software version, modification of the blind´s diameter)

Renewal of certificate

Certificate No. 0000038507_02: 22 July 2018
Expiry date of the certificate: 22 July 2023

Notifications

Statement issued by TÜV Rheinland Energy GmbH dated 9 January 2019
Publication: BAnz AT 26.03.2019 B7, chapter IV notification 19
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 28
UBA announcement dated 24 February 2020
(Producer formerly Environnement S.A.)

Statement issued by TÜV Rheinland Energy GmbH dated 8 September 2020
Publication: BAnz AT 03.05.2021 B9, chapter III notification 15
UBA announcement dated 31 March 2021
(Software changes)

Statement issued by TÜV Rheinland Energy GmbH dated 9 September 2022
Publication: BAnz AT 20.03.2023 B6, chapter IV notification 66
UBA announcement dated 21 February 2023
(Software changes)

Renewal of certificate

Certificate No. 0000038507_03: 14 July 2023
Expiry date of the certificate: 22 July 2028

Expanded uncertainty laboratory, system 1

Instrument: Environnement AS32M		Serial.-No. SN 1 (001)		µg/m³	
Component: NO2		1h-limit value: 200			
No.	Performance characteristic	Performance criteria	Result	Partial uncertainty	Square of uncertainty
1	Repeatability at zero	≤ 1.92 µg/m³	0.200	U _{r,z}	0.0014
2	Repeatability at concentration ct	≤ 5.76 µg/m³	1.300	U _{r,iv}	0.0574
3	"lack of fit"	≤ 4.0% of measured value	1.100	U _{l,iv}	1.6133
4	Sensitivity coefficient of sample gas pressure	≤ 8.0 µg/m³/kPa	0.137	U _{gp}	0.8958
5	Sensitivity coefficient of sample gas temperature	≤ 5.76 µg/m³/K	0.072	U _{gt}	0.5049
6	Sensitivity coefficient of surrounding temperature	≤ 5.76 µg/m³/K	0.200	U _{st}	3.9184
7	Sensitivity coefficient of electrical voltage	≤ 0.57 µg/m³/V	0.034	U _v	0.4478
8a	Interference of H2O at 21 mmol/mol	≤ 9.6 µg/m³ (zero)	0.200	U _{H2O}	1.0800
		≤ 9.6 µg/m³ (span)	-1.800		
8b	Interference of CO2 at 500 µmol/mol	≤ 9.6 µg/m³ (zero)	0.200	U _{int,pos}	13.2300
		≤ 9.6 µg/m³ (span)	2.200		
8c	Interference of NH3 at 200 nmol/mol	≤ 9.6 µg/m³ (zero)	0.200	U _{int,neg}	
		≤ 9.6 µg/m³ (span)	4.100		
9	Averaging effect	≤ 7.0% of measured value	-0.600	U _{av}	0.4800
18	Difference sample/calibration port	≤ 1%	0.200	U _{sc}	0.1600
21	Converter efficiency	≥ 98	---	U _{EC}	0.0000
23	Uncertainty calibration gas	≤ 3%	2.000	ucg	4.0000
		combined standard uncertainty		u _c	5.1427
		expanded uncertainty		U _c	10.2855
		expanded uncertainty actual		U _{c,rel}	5.14
		expanded uncertainty required		U _{req,rel}	15

Expanded uncertainty laboratory, system 2

Instrument: Environnement AS32M		Serial.-No. SN 2 (002)		1h-limit value: 200		µg/m³	
Component: NO2							
No.	Performance characteristic	Performance criteria	Result	Partial uncertainty	Square of uncertainty		
1	Repeatability at zero	≤ 1.92 µg/m³	0.100	U _{r,z}	0.02	0.0004	
2	Repeatability at concentration ct	≤ 5.76 µg/m³	1.600	U _{r,lv}	0.30	0.0884	
3	"lack of fit"	≤ 4.0% of measured value	1.500	U _{l,lv}	1.73	3.0000	
4	Sensitivity coefficient of sample gas pressure	≤ 8.0 µg/m³/kPa	0.119	U _{gp}	0.82	0.6759	
5	Sensitivity coefficient of sample gas temperature	≤ 5.76 µg/m³/K	0.021	U _{gt}	0.21	0.0430	
6	Sensitivity coefficient of surrounding temperature	≤ 5.76 µg/m³/K	0.170	U _{st}	1.68	2.8310	
7	Sensitivity coefficient of electrical voltage	≤ 0.57 µg/m³/V	0.011	U _v	0.22	0.0471	
8a	Interference of H2O at 21 mmol/mol	≤ 9.6 µg/m³ (zero)	0.000	U _{H2O}	-1.44	2.0833	
8b	Interference of CO2 at 500 µmol/mol	≤ 9.6 µg/m³ (span)	0.000	U _{int,pos}	2.71	7.3633	
		≤ 9.6 µg/m³ (zero)	0.300				
8c	Interference of NH3 at 200 nmol/mol	≤ 9.6 µg/m³ (span)	2.000	U _{int,neg}	3.12	9.7200	
		≤ 9.6 µg/m³ (zero)	0.100				
9	Averaging effect	≤ 7.0% of measured value	2.700	U _{av}	0.08	0.0064	
18	Difference sample/calibration port	≤ 1%	0.040	U _{dsc}	0.00	0.0000	
21	Converter efficiency	≥ 98	---	U _{EC}	2.00	4.0000	
23	Uncertainty calibration gas	≤ 3%	2.000	ucg	2.00	4.0000	
				combined standard uncertainty		U _c	µg/m³
				expanded uncertainty		U _c	µg/m³
				expanded uncertainty actual		U _{c,rel}	%
				expanded uncertainty required		U _{req,rel}	%

Combined uncertainty, laboratory and field, system 1

Instrument: Environnement AS32M		Serial.-No. SN 1 (001)		1h-limit value: 200		µg/m³	
Component: NO2		Performance criteria		Result		Square of uncertainty	
No.	Performance characteristic	Performance criteria	Result	Partial uncertainty	1h-limit value:	Square of uncertainty	µg/m³
1	Repeatability at zero	1.92 µg/m³	0.200	u _{r,z}	0.04	0.0014	
2	Repeatability at concentration ct	5.76 µg/m³	1.300	u _{r,lv}	not considered, because u _{r,lv} = 0.23 < u _{r,f}	-	
3	"lack of fit"	4.0% of measured value	1.100	u _{l,lv}	1.27	1.6133	
4	Sensitivity coefficient of sample gas pressure	8.0 µg/m³/kPa	0.137	u _{gp}	0.95	0.8958	
5	Sensitivity coefficient of sample gas temperature	5.76 µg/m³/K	0.072	u _{gt}	0.71	0.5049	
6	Sensitivity coefficient of surrounding temperature	5.76 µg/m³/K	0.200	u _{st}	1.98	3.9184	
7	Sensitivity coefficient of electrical voltage	0.57 µg/m³/V	0.034	u _v	0.67	0.4478	
8a	Interference of H2O at 21 mmol/mol	9.6 µg/m³ (zero)	0.200	u _{H2O}	-1.04	1.0800	
		9.6 µg/m³ (span)	-1.800				
8b	Interference of CO2 at 500 µmol/mol	9.6 µg/m³ (zero)	0.200	u _{int,pos}			
		9.6 µg/m³ (span)	2.200				
8c	Interference of NH3 at 200 nmol/mol	9.6 µg/m³ (zero)	0.200	u _{int,neg}			
		9.6 µg/m³ (span)	4.100				
9	Averaging effect	7.0% of measured value	-0.600	u _{av}	-0.69	0.4800	
10	Reproducibility under field conditions	5.0% of the average of 3 Mon.	1.770	u _{rf}	3.54	12.5316	
11	Long term drift at zero level	9.36 µg/m³	1.160	u _{d,l,z}	0.67	0.4485	
12	Long term drift at span level	5.0% of certification range	1.810	u _{d,l,lv}	2.09	4.3681	
18	Difference sample/calibration port	1%	0.200	u _{Dsc}	0.40	0.1600	
21	Converter efficiency	98	---	u _{EC}	0.00	0.0000	
23	Uncertainty calibration gas	3%	2.000	u _{CG}	2.00	4.0000	
				combined standard uncertainty		u _c	µg/m³
				expanded uncertainty		U _c	µg/m³
				expanded uncertainty actual		U _{c,rel}	%
				expanded uncertainty required		U _{req,rel}	%

Combined uncertainty, laboratory and field, system 2

Instrument: Environnement AS32M		Serial-No. SN 2 (002)		1h-limit value: 200		µg/m³			
Component: NO2		Performance criteria		Result		Partial uncertainty		Square of uncertainty	
1	Repeatability at zero	≤	1.92 µg/m³	0.100	u _{r,z}	0.02	0.0004		
2	Repeatability at concentration ct	≤	5.76 µg/m³	1.600	u _{r,lv}	not considered, because u _{r,lv} = 0.29 < u _{r,f}	-		
3	"lack of fit"	≤	4.0% of measured value	1.500	u _{lv}	1.73	3.0000		
4	Sensitivity coefficient of sample gas pressure	≤	8.0 µg/m³/kPa	0.119	u _{gp}	0.82	0.6759		
5	Sensitivity coefficient of sample gas temperature	≤	5.76 µg/m³/K	0.021	u _{gt}	0.21	0.0430		
6	Sensitivity coefficient of surrounding temperature	≤	5.76 µg/m³/K	0.170	u _{st}	1.68	2.8310		
7	Sensitivity coefficient of electrical voltage	≤	0.57 µg/m³/V	0.011	u _v	0.22	0.0471		
8a	Interference of H2O at 21 mmol/mol	≤	9.6 µg/m³ (zero)	0.200	u _{H2O}	-1.44	2.0833		
		≤	9.6 µg/m³ (span)	-2.500					
8b	Interference of CO2 at 500 µmol/mol	≤	9.6 µg/m³ (zero)	0.300	u _{nit,pos}				
		≤	9.6 µg/m³ (span)	2.000					
8c	Interference of NH3 at 200 nmol/mol	≤	9.6 µg/m³ (zero)	0.100	u _{nit,neg}	2.71	7.3633		
		≤	9.6 µg/m³ (span)	2.700					
9	Averaging effect	≤	7.0% of measured value	2.700	u _{av}	3.12	9.7200		
10	Reproducibility under field conditions	≤	5.0% of the average of 3 Mon.	1.770	u _{r,f}	3.54	12.5316		
11	Long term drift at zero level	≤	9.36 µg/m³	1.170	u _{d,l,z}	0.68	0.4563		
12	Long term drift at span level	≤	5.0% of certification range	1.730	u _{d,i,lv}	2.00	3.9905		
18	Difference sample/calibration port	≤	1%	0.040	u _{d,sc}	0.08	0.0064		
21	Converter efficiency	≥	98	---	u _{ec}	0.00	0.0000		
23	Uncertainty calibration gas	≤	3%	2.000	u _{cg}	2.00	4.0000		
				combined standard uncertainty		u _c	7.6994	µg/m³	
				expanded uncertainty		U _c	15.3988	µg/m³	
				expanded uncertainty actual		U _{c,rel}	7.70	%	
				expanded uncertainty required		U _{req,rel}	15	%	