

CERTIFICATE

of Product Conformity (QAL1)

Certificate number: 0000043106_01

Certified AMS: O3 42e* resp. O3 42e for Ozone

Manufacturer: Environnement S.A.,
111 bd, Robespierre,
78304 Poissy Cedex
France

Test Institute: TÜV Rheinland Energy GmbH

**This is to certify that the AMS has been tested and certified
according to the standards**

**VDI 4202-1 (2010), VDI 4203-3 (2010), EN 14625 (2012),
EN 15267-1 (2009) and EN 15267-2 (2008).**

Certification is awarded in respect of the conditions stated in this certificate
(this certificate contains 10 pages).

The present certificate replaces certificate 0000043106 of 30 April 2015.



Suitability Tested
Complying with
2008/50/EC
EN 15267
Regular
Surveillance

www.tuv.com
ID 0000043106

Publication in the German Federal Gazette
(BAnz.) of 1 August 2016

German Federal Environment Agency
Dessau, 19 August 2016



Dr. Marcel Langner
Head of Section II 4.1

This certificate will expire on:
1 April 2020

TÜV Rheinland Energy GmbH
Cologne, 18 August 2016



ppa. Dr. Peter Wilbring

www.umwelt-tuv.eu
tre@umwelt-tuv.eu
Tel. + 49 221 806-5200

TÜV Rheinland Energy GmbH
Am Grauen Stein
51105 Köln

Test institute accredited to EN ISO/IEC 17025:2005 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

Certificate:
0000043106_01 / 19 August 2016

Test report: 936/21225396/B of 26 February 2016
Initial certification: 2 April 2015
Expiry date: 1 April 2020
Publication: BAnz AT 01.08.2016 B11, chapter III number 1.1

Approved application

The tested AMS is suitable for continuous ambient air monitoring of ozone (stationary operation).

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a three-month field test.

The AMS is approved for the temperature range of 0 °C 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 valid at the time of performance testing. As changes in legal regulations are possible, any potential user should ensure that this AMS is suitable for monitoring the limit value relevant to the application.

Any potential user should ensure, in consultation with the manufacturer, that this AMS is suitable for ambient air applications at which it will be installed.

Basis of the certification

This certification is based on:

- Test report 936/21225396/B of 26 February 2016 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 01.08.2016 B11, chapter III number 1.1,
Announcement by UBA from 14 July 2016:

AMS designation:

O3 42e* resp. O3 42e for Ozone

Manufacturer:

Environnement S.A., Poissy, France

Field of application:

The tested AMS is suitable for continuous ambient air monitoring of ozone
(stationary operation).

Measuring ranges during the performance test:

Component	Certification range	Unit
Ozone	0 - 500	µg/m ³

Software version:

O342e Version: 1.0.4
O342e* Version: 1.0.3

Restrictions:

None

Notes:

1. Measured values are displayed by means of a connected PC or Laptop
2. The performance test includes also the version O3 42e with integrated Display.
3. The report on the performance test is available online at www.qal1.de.
4. Supplementary testing (optimisation of wavelength range of LED as well as pressure compensation) to the announcement of the Federal Environment Agency (UBA) of 25 February 2015 (BAnz AT 02.04.2015 B5, chapter III number 1.1) and of 22 July 2015 (BAnz AT 26.08.2015 B4, chapter IV notification 47).

Test report:

TÜV Rheinland Energie und Umwelt GmbH, Cologne
Report No.: 936/21225396/B of 26 February 2016

Certified product

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

The ambient air monitor O3 42e* is a continuous ozone monitor. The measurement principle is based on ultraviolet absorption. The instrument was developed for the continuous measurement of ozone concentrations in ambient air.

The measurement principle of the O3 42e* is based on UV photometry according to the Beer-Lambert law. The absorption spectrum of ozone has its maximum in the wavelength range of 250 to 270 nanometres. The monochromatic UV-LED light source of the O3 42e* is adjusted to a wavelength of 255 nm and therefore within the maximum absorption range of ozone.

The O3 42e* analyser uses non-dispersive ultraviolet (UV) absorption technology to measure ozone concentrations. The sample to be analysed is led to the measurement module via a dust filter. The measurement module consists of the following parts:

- LED for monochromatic UV-light with a wavelength of 255 nm, placed under a protective cover, which is fastened with 4 screws. The LED card is directly connected to the card of the reference photodetector.
- two photodetector cards: the reference photodetector card for measuring the energy of the incoming LED light (UV_0) and the photodetector card for measuring UV absorption, which enables detection of signals i and i_0 . Both cards are mounted beneath a protective cover to protect them against interfering light.
- the optical chamber consists of a beam splitter and a convex, flat lens for concentrating the light on the reference photodetector. In the optical chamber, the LED light can be distributed to reference photodetector and measuring chamber.
- a measurement chamber consisting of a glass tube and two mechanical parts at the inlet and outlet where the LED light is absorbed. The optical path length for the sample gas is 400 mm.
- cycle solenoid valve by means of which the sample gas can either cyclically or alternately be changed over to cycle channel i or cycle channel i_0 .
- a flow restrictor which regulates the sample gas flow to 55 litres/hour. The excess flow valve is mounted at the fluid outlet of the measurement chamber.
- ozone filter which can filter out any trace of ozone from the sample gas
- connection for the pressure sensor
- Type PT1000 temperature sensor
- gas inlet

The AMS is available in two versions:

- The version **O3 42e** is fitted with a TFT LCD coloured display with backlight and a touch screen function. Signal output as well as operation can also be carried out via the web browser using an external PC connected via Ethernet.
- The version **O3 42e *** is not fitted with a display. Signal output as well as operation can only be operated via the web browser on an external PC connected via Ethernet.

Apart from that, both versions of the AMS are of identical design.

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 can be applied to the product or used in publicity material 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.

Certification of O3 42e* resp. O3 42e for Ozone 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. 0000043106: 30 April 2015
Expiration date of the certificate: 1 April 2020

Test report: 936/21225396/A of 1 October 2014
TÜV Rheinland Energie und Umwelt GmbH, Cologne

Publication: BAnz AT 02.04.2015 B5, chapter III number 1.1
Announcement by UBA from 25 February 2015

Notifications according to EN 15267

Statement of TÜV Rheinland Energie und Umwelt GmbH, Cologne of 16 March 2015,
Publication: BAnz AT 26.08.2015 B4, chapter IV notification 47,
Announcement by UBA from 22 July 2015
(new software version)

Supplementary testing according to EN 15267

Certificate No. 0000043106_01: 19 August 2016
Expiry date of the certificate: 1 April 2020

Test report: 936/21225396/B of 26 February 2016
TÜV Rheinland Energie und Umwelt GmbH, Cologne,

Publication: BAnz AT 01.08.2016 B11, chapter III number 1.1
Announcement by UBA from 14 July 2016

Expanded uncertainty, System 1

Measuring device:		Environment O3 42e*		Serial-No.: SN 12 / SN 23		1h-alert threshold: 120		nmol/mol	
Measured component:		O ₃							
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	Square of partial uncertainty				
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0.020	U _{r,z}	0.00	0.0000			
2	Repeatability standard deviation at 1h-alert threshold	≤ 3.0 nmol/mol	0.070	U _{r,h}	0.01	0.0001			
3	"lack of fit" at 1h-alert threshold	≤ 4.0% of measured value	0.880	U _{l,h}	0.61	0.3717			
4	Sensitivity coefficient of sample gas pressure at 1h-alert threshold	≤ 2.0 nmol/mol/kPa	0.130	U _{gp}	1.44	2.0656			
5	Sensitivity coefficient of sample gas temperature at 1h-alert threshold	≤ 1.0 nmol/mol/K	0.010	U _{gt}	0.11	0.0122			
6	Sensitivity coefficient of surrounding temperature at 1h-alert threshold	≤ 1.0 nmol/mol/K	0.392	U _{st}	2.92	8.5280			
7	Sensitivity coefficient of electrical voltage at 1h-alert threshold	≤ 0.30 nmol/mol/V	0.010	U _v	0.13	0.0166			
8a	Interferent H ₂ O with 21 mmol/mol	≤ 10 nmol/mol (Zero) ≤ 10 nmol/mol (Span)	0.300 -2.870	U _{H2O}	-2.14	4.5862			
8b	Interferent Toluene with 0.5 µmol/mol	≤ 5.0 nmol/mol (Zero) ≤ 5.0 nmol/mol (Span)	0.870 0.400	U _{Int,pos} or	0.81	0.6533			
8c	Interferent Xylene with 0.5 µmol/mol	≤ 5.0 nmol/mol (Zero) ≤ 5.0 nmol/mol (Span)	1.760 1.000	U _{Int,neg}					
9	Averaging effect	≤ 7.0% of measured value	-4.280	U _{av}	-2.97	8.7928			
18	Difference sample/calibration port	≤ 1.0%	-0.350	U _{ssc}	-0.42	0.1764			
21	Uncertainty of test gas	≤ 3.0%	2.000	U _{cg}	1.20	1.4400			
				Combined standard uncertainty		U _c	5.1617	nmol/mol	
				Expanded uncertainty		U	10.3234	nmol/mol	
				Relative expanded uncertainty		W	8.60	%	
				Maximum allowed expanded uncertainty		W _{req}	15	%	

Expanded uncertainty, System 2

Measuring device:		Serial-No.:		SN 14 / SN 24		
Measured component:		1h-alert threshold:		120		
Environment O3 42e*		O ₃		nmol/mol		
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	Square of partial uncertainty	
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0.020	u _{r,z}	0.0000	
2	Repeatability standard deviation at 1h-alert threshold	≤ 3.0 nmol/mol	0.090	u _{r,lv}	0.0002	
3	"lack of fit" at 1h-alert threshold	≤ 4.0% of measured value	2.370	u _{lv}	2.6961	
4	Sensitivity coefficient of sample gas pressure at 1h-alert threshold	≤ 2.0 nmol/mol/kPa	0.030	u _{gp}	0.1124	
5	Sensitivity coefficient of sample gas temperature at 1h-alert threshold	≤ 1.0 nmol/mol/K	0.020	u _{gt}	0.0489	
6	Sensitivity coefficient of surrounding temperature at 1h-alert threshold	≤ 1.0 nmol/mol/K	0.231	u _{st}	2.9614	
7	Sensitivity coefficient of electrical voltage at 1h-alert threshold	≤ 0.30 nmol/mol/V	0.020	u _v	0.0665	
8a	Interferent H ₂ O with 21 mmol/mol	≤ 10 nmol/mol (Zero) ≤ 10 nmol/mol (Span)	0.530 -2.700	u _{H2O}	4.0590	
8b	Interferent Toluene with 0.5 µmol/mol	≤ 5.0 nmol/mol (Zero)	0.930	u _{int,pos}	0.5633	
8c	Interferent Xylene with 0.5 µmol/mol	≤ 5.0 nmol/mol (Span)	0.400	or		
		≤ 5.0 nmol/mol (Zero)	1.100	u _{int,neg}		
9	Averaging effect	≤ 5.0 nmol/mol (Span)	0.900			
18	Difference sample/calibration port	≤ 7.0% of measured value	-4.770	u _{av}	10.9214	
21	Uncertainty of test gas	≤ 1.0%	-0.360	u _{psc}	0.1866	
		≤ 3.0%	2.000	u _{cg}	1.4400	
		Combined standard uncertainty	u _c	4.8017	nmol/mol	
Expanded uncertainty				U	9.6033	nmol/mol
Relative expanded uncertainty				W	8.00	%
Maximum allowed expanded uncertainty				W _{req}	15	%

Combined standard uncertainty, System 1

Measuring device:		Serial-No.:		SN 12 / SN 23	
Measured component:		1h-alert threshold:		120	
Environment O3 42e*		O ₃		nmol/mol	
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	Square of partial uncertainty
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0.020	u _{r,z}	0.0000
2	Repeatability standard deviation at 1h-alert threshold	≤ 3.0 nmol/mol	0.070	u _{r,h}	not considered, as u _{r,h} = 0,01 < u _{r,f}
3	"lack of fit" at 1h-alert threshold	≤ 4.0% of measured value	0.880	u _{l,h}	0.3717
4	Sensitivity coefficient of sample gas pressure at 1h-alert threshold	≤ 2.0 nmol/mol/kPa	0.130	u _{pp}	2.0656
5	Sensitivity coefficient of sample gas temperature at 1h-alert threshold	≤ 1.0 nmol/mol/K	0.010	u _{gt}	0.0122
6	Sensitivity coefficient of surrounding temperature at 1h-alert threshold	≤ 1.0 nmol/mol/K	0.392	u _{gt}	8.5280
7	Sensitivity coefficient of electrical voltage at 1h-alert threshold	≤ 0.30 nmol/mol/V	0.010	u _y	0.0166
8a	Interferent H ₂ O with 21 nmol/mol	≤ 10 nmol/mol (Zero)	0.300	u _{H2O}	4.5862
		≤ 10 nmol/mol (Span)	-2.870		
8b	Interferent Toluene with 0.5 µmol/mol	≤ 5.0 nmol/mol (Zero)	0.870	u _{tol,pos}	
		≤ 5.0 nmol/mol (Span)	0.400	or	0.6533
8c	Interferent Xylene with 0.5 µmol/mol	≤ 5.0 nmol/mol (Zero)	1.760	u _{int,neg}	
		≤ 5.0 nmol/mol (Span)	1.000		
9	Averaging effect	≤ 7.0% of measured value	-4.280	u _{av}	8.7928
10	Reproducibility standard deviation under field conditions	≤ 5.0% of average over 3 months	2.590	u _{r,f}	9.6697
11	Long term drift at zero level	≤ 5.0 nmol/mol	0.590	u _{d,l,z}	0.1160
12	Long term drift at span level	≤ 5.0% of max. of certification range	1.190	u _{d,l,h}	0.6797
18	Difference sample/calibration port	≤ 1.0%	-0.350	u _{asc}	0.1764
21	Uncertainty of test gas	≤ 3.0%	2.000	u _{cg}	1.4400
				u _c	6.0908
				U	12.1817
				W	10.15
				W _{req}	15

Combined standard uncertainty, System 2

Measuring device:		Environment O3 42e*		Serial-No.:		SN 14 / SN 24	
Measured component:		O ₃		1h-alert thresh hold:		120	
No.	Performance characteristic	Performance criterion	Result	Partial uncertainty	Square of partial uncertainty	nmol/mol	
1	Repeatability standard deviation at zero	≤ 1.0 nmol/mol	0.020	u _{r,z}	0.00	0.0000	
2	Repeatability standard deviation at 1h-alert threshold	≤ 3.0 nmol/mol	0.090	u _{r,th}	not considered, as u _{r,th} = 0,01 < u _{r,f}	-	
3	"lack of fit" at 1h-alert threshold	≤ 4.0% of measured value	2.370	u _{l,th}	1.64	2.6961	
4	Sensitivity coefficient of sample gas pressure at 1h-alert threshold	≤ 2.0 nmol/mol/kPa	0.030	u _{sp}	0.34	0.1124	
5	Sensitivity coefficient of sample gas temperature at 1h-alert threshold	≤ 1.0 nmol/mol/K	0.020	u _{gt}	0.22	0.0489	
6	Sensitivity coefficient of surrounding temperature at 1h-alert threshold	≤ 1.0 nmol/mol/K	0.231	u _{gt}	1.72	2.9614	
7	Sensitivity coefficient of electrical voltage at 1h-alert threshold	≤ 0.30 nmol/mol/V	0.020	u _v	0.26	0.0665	
8a	Interferent H ₂ O with 21 nmol/mol	≤ 10 nmol/mol (Zero)	0.530	u _{H2O}	-2.01	4.0590	
8b	Interferent Toluene with 0.5 µmol/mol	≤ 10 nmol/mol (Span)	-2.700	u _{int,pos} or u _{int,neg}	0.75	0.5633	
		≤ 5.0 nmol/mol (Zero)	0.930				
		≤ 5.0 nmol/mol (Span)	0.400				
8c	Interferent Xylene with 0.5 µmol/mol	≤ 5.0 nmol/mol (Zero)	1.100	0.900			
		≤ 5.0 nmol/mol (Span)	0.900				
9	Averaging effect	≤ 7.0% of measured value	-4.770	u _{av}	-3.30	10.9214	
10	Reproducibility standard deviation under field conditions	≤ 5.0% of average over 3 months	2.590	u _{r,f}	3.11	9.6597	
11	Long term drift at zero level	≤ 5.0 nmol/mol	0.810	u _{d,l,z}	0.47	0.2187	
12	Long term drift at span level	≤ 5.0% of max. of certification range	1.450	u _{d,l,th}	1.00	1.0092	
18	Difference sample/calibration port	≤ 1.0%	-0.360	u _{ssc}	-0.43	0.1866	
21	Uncertainty of test gas	≤ 3.0%	2.000	u _{cg}	1.20	1.4400	
Combined standard uncertainty				u _c		5.8261	nmol/mol
Expanded uncertainty				U		11.6522	nmol/mol
Relative expanded uncertainty				W		9.71	%
Maximum allowed expanded uncertainty				W _{req}		15	%