CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000040330_02

AMS designation:	CO12M for CO
Manufacturer:	ENVEA 111 Boulevard Robespierre 78304 Poissy Cedex France
Test Laboratory:	TÜV Rheinland Energy GmbH

This is to certify that the AMS has been tested and found to comply with the standards: VDI 4202-1 (2002), VDI 4203-3 (2004), EN 14626 (2012), EN 15267-1 (2009) and EN 15267-2 (2009).

Certification is awarded in respect of the conditions stated in this certificate (this certificate contains 11 pages).
The present certificate replaces certificate 0000040330_01 of 01 April 2019.

TÜVRheinland® CERTIFIED

Suitability Tested
Equivalent to
2008/50/EC
EN 15267
Regular Surveillance

www.tuv.com
ID 0000040330

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

German Federal Environment Agency
Dessau, 01 July 2020

Dr. Marcel Langner
Head of Section II 4.1

This certificate will expire on:
30 June 2025

TÜV Rheinland Energy GmbH
Cologne, 30 June 2020

ppa. Dr. Peter Wilbring

www.umwelt-tuv.eu tre@umwelt-tuv.eu Phone: + 49 221 806-5200	TÜV Rheinland Energy GmbH Am Grauen Stein 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 certificate D-PL-11120-02-00.

Test Report:	936/21206773/B dated 29 February 2008
Initial certification:	01 April 2014
Expiry date:	30 June 2025
Certificate:	Renewal (of previous certificate 0000040330_01 dated 01 April 2019 valid until 30 June 2020)
Publication:	BAnz AT 01.04.2014 B12, chapter VI notification 20

Approved application
The certified AMS is suitable for continuous monitoring of carbon monoxide in ambient air.

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

The AMS is approved for an ambient 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 applicable at the time of testing. As changes in legal provisions are possible, any potential user should ensure, in consultation with the manufacturer, that this AMS is suitable for monitoring the AMS readings relevant to the application.

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

Basis of the certification
This certification is based on:

- Test report no. 936/21206773/B dated 29 February 2008 issued by TÜV Rheinland Immissionsschutz und Energiesysteme GmbH and Addendum 936/21221709/D dated 28 September 2013 issued by 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. 03 September 2008, no. 133, p. 3243, chapter III number 1.1, UBA announcement dated 12 August 2008:

AMS designation:
CO12M for CO

Manufacturer:
Environnement S.A., Poissy Cedex, France
Distribution in Germany:
Ansyco GmbH, Karlsruhe

Field of application:
For the continuous monitoring of carbon monoxide in ambient air

Measuring range during performance testing:
CO 0 to 60 mg/m³
0 to 100 mg/m³

Software version:
V1.26

Test Laboratory:
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Cologne
TÜV Rheinland Group
Report no.: 936/21206773/B dated 29 February 2008

Publication in the German Federal Gazette: BAnz AT 01.04.2014 B12, chapter VI notification 20, UBA announcement dated 27 February 2014:

20 Notification as regards Federal Environment Agency (UBA) notices of 12 August 2008 (BAnz. p. 3243, chapter III number 1.1)

The Model CO12M air quality monitor for CO manufactured by Environnement complies with the requirements of EN 14626 (August 2012 version). Furthermore, the manufacturing process and the quality management for the Model CO12M measuring system for CO meet the requirements of EN 15267.

The test report on performance testing No. 936/21206773/B and the addendum no. 936/21221709/D as an integral part of this report are available online at www.qal1.de.

Statement issued by TÜV Rheinland Energie und Umwelt GmbH
dated 28 September 2013

Publication in the German Federal Gazette: BAnz AT 26.08.2015 B4, chapter V notification 48, UBA announcement dated 22 July 2015:

48 Notification as regards Federal Environment Agency (UBA) notices of 12 August 2008 (BAnz. p. 3243, chapter III number 1.1) and of 27 February 2014 (BAnz AT 01.04.2014 B12, chapter VI 20th notification)

The latest software version of the CO12M measuring system for CO manufactured by Environnement S.A. is:

v1.0.d (calculation process)
v3.6.c (display process)

To extend the means of communication, the measuring system will be equipped with a USB port and a TCP/IP interface.
The Deltaline 26BC-6A-107.101 filter wheel motor replaces the previous Maxon DC Type A-max 22.

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 16 March 2015

Publication in the German Federal Gazette: BAnz AT 26.03.2019 B7, chapter IV notification 25, UBA announcement dated 27 February 2019:

25 Notification as regards Federal Environment Agency (UBA) notices of 12 August 2008 (BAnz. p. 3243, chapter III number 1.1) and of 22 July 2015 (BAnz AT 26.08.2015 B4, chapter V 48th notification)

The latest software version of the CO12M measuring system for CO manufactured by Environnement S.A. is:
v1.0.d (calculation process)
v3.6.f (display process)

Statement issued by TÜV Rheinland Energy GmbH dated 27 September 2018

Publication in the German Federal Gazette: BAnz AT 24.03.2020 B7, chapter IV notification 30, UBA announcement dated 24 February 2020:

30 Notification as regards Federal Environment Agency (UBA) notices of 12 August 2008 (BAnz. p. 3243, chapter III number 1.1) and of 27 February 2019 (BAnz AT 26.03.2019 B7, chapter IV 25th notification)

Environnement S.A., Poissy, France have changed their company name to ENVEA.

The latest software version of the CO12M measuring system for CO manufactured by ENVEA is:
v1.0.d (calculation process)
v3.8.a (display process)

Statement issued by TÜV Rheinland Energy GmbH dated 1 October 2019

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

The CO12M analyser measures carbon monoxide (CO) in ambient air. The measuring principle is based on infra-red absorption according to the Beer-Lambert law. The absorption spectrum of carbon monoxide has a maximum wavelength of 4.67 µm, which corresponds to the spectrum selected by the optical filter.

Due to the fact that the absorption spectrum is not continuous, the optical filter is connected to a gas filter correlation wheel which enables highly selective measurement of the gas to be analysed by eliminating interferents caused by gases with similar absorption spectrums to those of CO.

This measuring principle corresponds to the standard reference method as described in EN 14626.

General remarks
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 manufacturing process for 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 document as well as the certification mark remains property of TÜV Rheinland Energy GmbH. Upon revocation of the publication the certificate loses its validity. After the expiration of the certificate and on request of TÜV Rheinland Energy GmbH this document shall be returned and the certificate mark must no longer be used.

The relevant version of this certificate and its expiration date are also accessible on the internet at **qal1.de**.

Document history

Certification of the CO12M measuring system is based on the documents listed below and the regular, continuous surveillance of the manufacturer's quality management system:

Basic testing

Test Report: 936/21206773/B dated 29 February 2008
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH
Publication: BAnz. 03 September 2008, no. 133, p. 3243, chapter III number 1.1
UBA announcement dated 12 August 2008

Initial certification according to EN 15267

Certificate no. 0000040330: 29 April 2014
Expiry date of the certificate: 31 March 2019
Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 28 September 2013
Test Report: 936/21221709/D dated 28 September 2013
Publication: BAnz AT 01.04.2014 B12, chapter VI notification 20
UBA announcement dated 27 February 2014

Notifications in accordance with EN 15267

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 16 March 2015
Publication: BAnz AT 26.08.2015 B4, chapter V notification 48
UBA announcement dated 22 July 2015
(Design and software changes)

Renewal of the certificate

Certificate no. 0000040330_01: 01 April 2019
Expiry date of the certificate: 30 June 2020

Notifications in accordance with EN 15267

Statement issued by TÜV Rheinland Energy GmbH dated 27 September 2018
Publication: BAnz AT 26.03.2019 B7, chapter IV notification 25
UBA announcement dated 27 February 2019
(software updates)

Statement issued by TÜV Rheinland Energy GmbH dated 1 October 2019
Publication: BAnz AT 24.03.2020 B7, chapter IV notification 30
UBA announcement dated 24 February 2020
(New company name, software changes)

Renewal of the certificate

Certificate no. 0000040330_02: 01 July 2020
Expiry date of the certificate: 30 June 2025

Expanded uncertainty from the results obtained in the laboratory tests for analyser 1

Measuring device:	Environnement CO12M	Serial-No.:	Gerät 1	
Measured component:	CO	8h-limit value:	8.62	µmol/mol

No.	Performance characteristic		Performance criterion	Result	Partial uncertainty		Square of partial uncertainty	
1	Repeatability standard deviation at zero		≤ 0.3 µmol/mol	0.000	$u_{r,z}$	0.00	0.0000	
2	Repeatability standard deviation at 8h-limit value		≤ 0.4 µmol/mol	0.200	u_r	0.03	0.0010	
3	"lack of fit" at 8h-limit value		≤ 4.0% of measured value	1.100	u_l	0.05	0.0030	
4	Sensitivity coefficient of sample gas pressure at 8h-limit value		≤ 0.7 µmol/mol/kPa	0.010	u_{gp}	0.02	0.0005	
5	Sensitivity coefficient of sample gas temperature at 8h-limit value		≤ 0.3 µmol/mol/K	0.015	u_{gt}	0.03	0.0010	
6	Sensitivity coefficient of surrounding temperature at 8h-limit value		≤ 0.3 µmol/mol/K	0.050	u_{st}	0.11	0.0114	
7	Sensitivity coefficient of electrical voltage at 8h-limit value		≤ 0.3 µmol/mol/V	0.000	u_V	0.00	0.0000	
8a	Interferent H_2O with 21 mmol/mol		≤ 1.0 µmol/mol (Zero)	0.060	u_{H2O}	0.04	0.0017	
			≤ 1.0 µmol/mol (Span)	-0.040				
8b	Interferent CO_2 with 500 µmol/mol		≤ 0.5 µmol/mol (Zero)	-0.090	$u_{int,pos}$	0.15	0.0229	
			≤ 0.5 µmol/mol (Span)	-0.100				
8c	Interferent NO with 1 µmol/mol		≤ 0.5 µmol/mol (Zero)	0.020	or			
			≤ 0.5 µmol/mol (Span)	0.130				
8d	Interferent N_2O with 50 nmol/mol		≤ 0.5 µmol/mol (Zero)	0.060	$u_{int,neg}$			
			≤ 0.5 µmol/mol (Span)	0.140				
9	Averaging effect		≤ 7.0% of measured value	-3.900	u_{av}	-0.19	0.0377	
18	Difference sample/calibration port		≤ 1.0%	-0.120	$u_{\Delta sc}$	-0.01	0.0001	
21	Uncertainty of test gas		≤ 3.0%	2.000	u_{cg}	0.09	0.0074	

Combined standard uncertainty	u_c	0.2944 µmol/mol
Expanded uncertainty	U	0.5889 µmol/mol
Relative expanded uncertainty	W	6.83 %
Maximum allowed expanded uncertainty	W_{req}	15 %

Expanded uncertainty from the results obtained in the laboratory tests for analyser 2

Measuring device: Environnement CO12M — Serial-No.: Gerät 2

Measured component: CO — 8h-limit value: 8.62 µmol/mol

No.	Performance characteristic	Performance criterion	Result	Partial uncertainty		Square of partial uncertainty	
1	Repeatability standard deviation at zero	≤ 0.3 µmol/mol	0.200	$u_{r,z}$	0.04	0.0014	
2	Repeatability standard deviation at 8h-limit value	≤ 0.4 µmol/mol	0.100	u_r	0.02	0.0003	
3	"lack of fit" at 8h-limit value	≤ 4.0% of measured value	0.600	u_l	0.03	0.0009	
4	Sensitivity coefficient of sample gas pressure at 8h-limit value	≤ 0.7 µmol/mol/kPa	0.010	u_{gp}	0.02	0.0005	
5	Sensitivity coefficient of sample gas temperature at 8h-limit value	≤ 0.3 µmol/mol/K	0.010	u_{gt}	0.02	0.0005	
6	Sensitivity coefficient of surrounding temperature at 8h-limit value	≤ 0.3 µmol/mol/K	0.020	u_{st}	0.04	0.0018	
7	Sensitivity coefficient of electrical voltage at 8h-limit value	≤ 0.3 µmol/mol/V	0.000	u_V	0.00	0.0000	
8a	Interferent H_20 with 21 mmol/mol	≤ 1.0 µmol/mol (Zero)	0.030	u_{H2O}	0.02	0.0004	
		≤ 1.0 µmol/mol (Span)	-0.070				
8b	Interferent CO_2 with 500 µmol/mol	≤ 0.5 µmol/mol (Zero)	0.100	$u_{int,pos}$			
		≤ 0.5 µmol/mol (Span)	-0.140				
8c	Interferent NO with 1 µmol/mol	≤ 0.5 µmol/mol (Zero)	-0.060	or	0.07	0.0056	
		≤ 0.5 µmol/mol (Span)	0.100				
8d	Interferent N_2O with 50 nmol/mol	≤ 0.5 µmol/mol (Zero)	-0.040	$u_{int,neg}$			
		≤ 0.5 µmol/mol (Span)	0.040				
9	Averaging effect	≤ 7.0% of measured value	-1.300	u_{av}	-0.06	0.0042	
18	Difference sample/calibration port	≤ 1.0%	-0.050	$u_{\Delta sc}$	0.00	0.0000	
21	Uncertainty of test gas	≤ 3.0%	2.000	u_{cg}	0.09	0.0074	

Combined standard uncertainty	u_c	0.1514	µmol/mol
Expanded uncertainty	U	0.3027	µmol/mol
Relative expanded uncertainty	W	3.51	%
Maximum allowed expanded uncertainty	W_{req}	15	%

Expanded uncertainty from the results obtained in the laboratory and field tests for analyser 1

Measuring device: Environnement CO12M — Serial-No.: — Gerät 1

Measured component: CO — 8h-limit value: 8.62 µmol/mol

No.	Performance characteristic		Performance criterion	Result	Partial uncertainty		Square of partial uncertainty	
1	Repeatability standard deviation at zero	≤	0.3 µmol/mol	0.000	$u_{r,z}$	0.00	0.0000	
2	Repeatability standard deviation at 8h-limit value	≤	0.4 µmol/mol	0.200	u_r	not considered, as ur = 0.03 < ur,f	-	
3	"lack of fit" at 8h-limit value	≤	4.0% of measured value	1.100	u_l	0.05	0.0030	
4	Sensitivity coefficient of sample gas pressure at 8h-limit value	≤	0.7 µmol/mol/kPa	0.010	u_{gp}	0.02	0.0005	
5	Sensitivity coefficient of sample gas temperature at 8h-limit value	≤	0.3 µmol/mol/K	0.015	u_{gt}	0.03	0.0010	
6	Sensitivity coefficient of surrounding temperature at 8h-limit value	≤	0.3 µmol/mol/K	0.050	u_{st}	0.11	0.0114	
7	Sensitivity coefficient of electrical voltage at 8h-limit value	≤	0.3 µmol/mol/V	0.000	u_V	0.00	0.0000	
8a	Interferent H_2O with 21 mmol/mol	≤	1.0 µmol/mol (Zero)	-0.040	u_{H2O}	0.04	0.0017	
		≤	1.0 µmol/mol (Span)	0.060				
8b	Interferent CO_2 with 500 µmol/mol	≤	0.5 µmol/mol (Zero)	-0.090	$u_{int,pos}$	0.15	0.0229	
		≤	0.5 µmol/mol (Span)	-0.100				
8c	Interferent NO with 1 µmol/mol	≤	0.5 µmol/mol (Zero)	0.020	or			
		≤	0.5 µmol/mol (Span)	0.130				
8d	Interferent N_2O with 50 nmol/mol	≤	0.5 µmol/mol (Zero)	0.060	$u_{int,neg}$			
		≤	0.5 µmol/mol (Span)	0.140				
9	Averaging effect	≤	7.0% of measured value	-3.900	u_{av}	-0.19	0.0377	
10	Reproducibility standard deviation under field conditions	≤	5.0% of average over 3 months	3.270	$u_{r,f}$	0.28	0.0795	
11	Long term drift at zero level	≤	0.5 µmol/mol	0.220	$u_{d,l,z}$	0.13	0.0161	
12	Long term drift at span level	≤	5.0% of max. of certification range	0.940	$u_{d,l,8h}$	0.05	0.0022	
18	Difference sample/calibration port	≤	1.0%	-0.120	$u_{\Delta sc}$	-0.01	0.0001	
21	Uncertainty of test gas	≤	3.0%	2.000	u_{cg}	0.09	0.0074	

Combined standard uncertainty	u_c	0.4283	µmol/mol
Expanded uncertainty	U	0.8566	µmol/mol
Relative expanded uncertainty	W	9.94	%
Maximum allowed expanded uncertainty	W_{req}	15	%

Expanded uncertainty from the results obtained in the laboratory and field tests for analyser 2

Measuring device:	Environnement CO12M			Serial-No.:	Gerät 2		
Measured component:	CO			8h-limit value:	8.62	µmol/mol	

No.	Performance characteristic		Performance criterion	Result	Partial uncertainty		Square of partial uncertainty	
1	Repeatability standard deviation at zero	≤	0.3 µmol/mol	0.200	$u_{r,z}$	0.04	0.0014	
2	Repeatability standard deviation at 8h-limit value	≤	0.4 µmol/mol	0.100	u_r	not considered, as ur = 0.01 < ur,f	-	
3	"lack of fit" at 8h-limit value	≤	4.0% of measured value	0.600	u_l	0.03	0.0009	
4	Sensitivity coefficient of sample gas pressure at 8h-limit value	≤	0.7 µmol/mol/kPa	0.010	u_{gp}	0.02	0.0005	
5	Sensitivity coefficient of sample gas temperature at 8h-limit value	≤	0.3 µmol/mol/K	0.010	u_{gt}	0.02	0.0005	
6	Sensitivity coefficient of surrounding temperature at 8h-limit value	≤	0.3 µmol/mol/K	0.020	u_{st}	0.04	0.0018	
7	Sensitivity coefficient of electrical voltage at 8h-limit value	≤	0.3 µmol/mol/V	0.000	u_V	0.00	0.0000	
8a	Interferent H_2O with 21 mmol/mol	≤	1.0 µmol/mol (Zero)	-0.070	u_{H2O}	0.02	0.0004	
		≤	1.0 µmol/mol (Span)	0.030				
8b	Interferent CO_2 with 500 µmol/mol	≤	0.5 µmol/mol (Zero)	0.100	$u_{int,pos}$	or 0.07	0.0056	
		≤	0.5 µmol/mol (Span)	-0.140				
8c	Interferent NO with 1 µmol/mol	≤	0.5 µmol/mol (Zero)	-0.060				
		≤	0.5 µmol/mol (Span)	0.100				
8d	Interferent N_2O with 50 nmol/mol	≤	0.5 µmol/mol (Zero)	-0.040	$u_{int,neg}$			
		≤	0.5 µmol/mol (Span)	0.040				
9	Averaging effect	≤	7.0% of measured value	-1.300	u_{av}	-0.06	0.0042	
10	Reproducibility standard deviation under field conditions	≤	5.0% of average over 3 months	3.270	$u_{r,f}$	0.28	0.0795	
11	Long term drift at zero level	≤	0.5 µmol/mol	0.380	$u_{d,l,z}$	0.22	0.0481	
12	Long term drift at span level	≤	5.0% of max. of certification range	1.380	$u_{d,l,8h}$	0.07	0.0047	
18	Difference sample/calibration port	≤	1.0%	-0.050	$u_{s,sc}$	0.00	0.0000	
21	Uncertainty of test gas	≤	3.0%	2.000	u_{cg}	0.09	0.0074	
					Combined standard uncertainty	u_c	0.3936	µmol/mol
					Expanded uncertainty	U	0.7873	µmol/mol
					Relative expanded uncertainty	W	9.13	%
					Maximum allowed expanded uncertainty	W_{req}	15	%