

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000040330

Certified AMS: CO12M for CO

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

Test Institute: TÜV Rheinland Energie und Umwelt GmbH

**This is to certify that the AMS has been tested
and found to comply with:**

**VDI 4202-1: 2002, VDI 4203-2: 2004, EN 14626: 2012,
EN 15267-1: 2009, EN 15267-2: 2009**

Certification is awarded in respect of the conditions stated in this certificate
(see also the following pages).



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

www.tuv.com
ID 0000040330

Publication in the German Federal Gazette
(BAnz.) of 03 September 2008

This certificate will expire on:
31 March 2019

German Federal Environment Agency
Dessau, 29 April 2014

TÜV Rheinland Energie und Umwelt GmbH
Cologne, 28 April 2014



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Am Grauen Stein
51105 Cologne

Accreditation according to EN ISO/IEC 17025 and certified according to ISO 9001:2008.

Certificate:
0000040330 / 29 April 2014

Test report: 936/21206773/B of 29 February 2008
Addendum 936/21221709/D of 28 September 2013

Initial certification: 01 April 2014

Date of expiry: 31 March 2019

Publication: BAnz AT 01 April 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-month field test.

The AMS is approved for a temperature range of 0 °C to +30 °C.

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 936/21206773/B of 29 February 2008 of TÜV Rheinland Immissionsschutz und Energiesysteme GmbH and Addendum 936/21221709/D of 28 September 2013 of TÜV Rheinland Energie und Umwelt GmbH
- suitability announced by the German Federal Environment Agency (UBA) as the relevant body
- the on-going surveillance of the product and the manufacturing process
- publication in the German Federal Gazette (BAnz. 03 September 2008, No. 133, p. 3243, chapter III, No. 1.1, UBA publication from 12 August 2008)
- publication in the German Federal Gazette (BAnz AT 01 April 2014 B12, chapter VI, notification 20, UBA publication from 27 February 2014)

AMS designation:

CO12M for CO

Manufacturer:

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

Field of application:

For continuous monitoring of carbon monoxide

Measuring ranges during the performance test:

CO 0 to 60 mg/m³
0 to 100 mg/m³

Software version:

V1.26

Testing institute:

TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Cologne
TÜV Rheinland Group
Report No.: 936/21206773/B of 29 February 2008

20 Notification of announcement by the German Federal Environment Agency dated 12th August 2008 (BAnz. p. 3243, Chapter III Number 1.1)

The measuring system CO12M for CO manufactured by Environnement fulfils the requirements of Standard EN 14626 (December 2012). Furthermore, the manufacturing process and quality management system of the measuring system CO12M for CO fulfill the requirements of EN 15267.

The test report for performance testing with report number 936/21206773/B as well as an addendum as an integral part of to the test report with report number 936/21221709/D can be viewed on the internet at www.qal1.de.

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

Certified product

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

The CO12M analyser measures of 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 complies with the spectrum as 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 interferences caused by gases which have absorption spectrums very similar to those of CO.

The measuring principle conforms with the standard reference method as stipulated by EN 14626.

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 Energie und Umwelt 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 is presented on page 1 of this certificate.

This document as well as the certification mark remains property of TÜV Rheinland Energie und Umwelt GmbH. With revocation of the publication the certificate loses its validity. After the expiration of the certificate and on requests of the TÜV Rheinland Energie und Umwelt GmbH this document shall be returned and the certificate mark must not be employed anymore.

The relevant version of this certificate and the validity is also accessible on the internet: qal1.de.

Certification of CO12M for CO is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

Initial test:

Test report: 936/21206773/B of 29 February 2008
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Cologne

Publication: BAnz. 03 September 2008, No. 133, p. 3243, chapter III, No. 1.1
Announcement by UBA from 12 August 2008

Initial certification according to EN 15267:

Certificate No. 0000040330: 29 April 2014

Expiration date of the certificate: 31 March 2019

Test report: 936/21206773/B of 29 February 2008
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Cologne

Addendum 936/21221709/D of 28 September 2013
TÜV Rheinland Energie und Umwelt GmbH, Cologne

Publication: BAnz AT 01 April 2014 B12, chapter VI, notification 20
Announcement by UBA from 27 February 2014

Notification:

Publication: BAnz AT 01 April 2014 B12, chapter VI, notification 20
Announcement by UBA from 27 February 2014

Calculation of overall uncertainty lab test (Device 1)

| Measuring device: | | Environment CO12M | | Serial-No.: | | Gerät 1 | |
|---------------------|----------------------------------------------------------------------|------------------------------------------------|------------------|--------------------------------------|-------------------------------|-----------------|--|
| Measured component: | | CO | | 8h-limit value: | | 8.62 | |
| 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 ₂ O with 21 mmol/mol | ≤ 1.0 µmol/mol (Zero) ≤ 1.0 µmol/mol (Span) | 0.060 -0.040 | u_{H_2O} 0.04 | 0.0017 | | |
| 8b | Interferent CO ₂ with 500 µmol/mol | ≤ 0.5 µmol/mol (Zero) ≤ 0.5 µmol/mol (Span) | -0.090 -0.100 | $u_{int,pos}$ | 0.0229 | | |
| 8c | Interferent NO with 1 µmol/mol | ≤ 0.5 µmol/mol (Zero) ≤ 0.5 µmol/mol (Span) | 0.020 0.130 | or | | | |
| 8d | Interferent N ₂ O with 50 nmol/mol | ≤ 0.5 µmol/mol (Zero) ≤ 0.5 µmol/mol (Span) | 0.060 0.140 | $u_{int,neg}$ | | | |
| 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_{Asc} -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 % | |

Calculation of overall uncertainty lab test (Device 2)

| Measuring device: | | Environment CO12M | | Serial-No.: | | Gerät 2 | |
|--------------------------------------|----------------------------------------------------------------------|------------------------------------------------|-----------------|----------------------|-------------------------------|------------------|--------|
| Measured component: | | CO | | 8h-limit value: | | 8.62 | |
| No. | Performance characteristic | Performance criterion | Result | Partial uncertainty | Square of partial uncertainty | µmol/mol | |
| 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 _f | 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 ₂ O with 21 mmol/mol | ≤ 1.0 µmol/mol (Zero) ≤ 1.0 µmol/mol (Span) | 0.030 -0.070 | u _{H2O} | 0.02 | 0.0004 | |
| 8b | Interferent CO ₂ with 500 µmol/mol | ≤ 0.5 µmol/mol (Zero) ≤ 0.5 µmol/mol (Span) | 0.100 -0.140 | u _{int,pos} | 0.07 | 0.0056 | |
| 8c | Interferent NO with 1 µmol/mol | ≤ 0.5 µmol/mol (Zero) ≤ 0.5 µmol/mol (Span) | -0.060 0.100 | or | | | |
| 8d | Interferent N ₂ O with 50 nmol/mol | ≤ 0.5 µmol/mol (Zero) | -0.040 | u _{int,neg} | | | |
| 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 _{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 |
| Expanded uncertainty | | | | | | U | 0.3027 |
| Relative expanded uncertainty | | | | | | W | 3.51 |
| Maximum allowed expanded uncertainty | | | | | | W _{req} | 15 |

Calculation of overall uncertainty lab and field test (Device 1)

| Measuring device: Environment CO12M | | Serial-No.: Gerät 1 | | µmol/mol | | |
|--------------------------------------|----------------------------------------------------------------------|---------------------------------------|--------|---------------------|-------------------------------------------|----------|
| Measured component: CO | | 8h-limit value: | | 8.62 | | |
| No. | Performance characteristic | Performance criterion | Result | Partial uncertainty | Square of partial uncertainty | |
| 1 | Repeatability standard deviation at zero | ≤ 0.3 µmol/mol | 0.000 | $u_{r,z}$ | 0.0000 | |
| 2 | Repeatability standard deviation at 8h-limit value | ≤ 0.4 µmol/mol | 0.200 | u_r | not considered, as $u_r = 0.03 < u_{r,f}$ | |
| 3 | "lack of fit" at 8h-limit value | ≤ 4.0% of measured value | 1.100 | u_l | 0.0030 | |
| 4 | Sensitivity coefficient of sample gas pressure at 8h-limit value | ≤ 0.7 µmol/mol/kPa | 0.010 | u_{gp} | 0.0005 | |
| 5 | Sensitivity coefficient of sample gas temperature at 8h-limit value | ≤ 0.3 µmol/mol/K | 0.015 | u_{gt} | 0.0010 | |
| 6 | Sensitivity coefficient of surrounding temperature at 8h-limit value | ≤ 0.3 µmol/mol/K | 0.050 | u_{st} | 0.0114 | |
| 7 | Sensitivity coefficient of electrical voltage at 8h-limit value | ≤ 0.3 µmol/mol/V | 0.000 | u_v | 0.0000 | |
| 8a | Interferent H ₂ O with 21 mmol/mol | ≤ 1.0 µmol/mol (Zero) | -0.040 | u_{H_2O} | 0.0017 | |
| 8b | Interferent CO ₂ with 500 µmol/mol | ≤ 1.0 µmol/mol (Span) | 0.060 | $u_{int,pos}$ | | |
| | | ≤ 0.5 µmol/mol (Zero) | -0.090 | | | |
| 8c | Interferent NO with 1 µmol/mol | ≤ 0.5 µmol/mol (Span) | -0.100 | or | 0.0229 | |
| | | ≤ 0.5 µmol/mol (Zero) | 0.020 | | | |
| 8d | Interferent N ₂ O with 50 nmol/mol | ≤ 0.5 µmol/mol (Span) | 0.130 | $u_{int,neg}$ | | |
| | | ≤ 0.5 µmol/mol (Zero) | 0.060 | | | |
| 9 | Averaging effect | ≤ 7.0% of measured value | -3.900 | u_{av} | 0.0377 | |
| 10 | Reproducibility standard deviation under field conditions | ≤ 5.0% of average over 3 months | 3.270 | $u_{r,f}$ | 0.0795 | |
| 11 | Long term drift at zero level | ≤ 0.5 µmol/mol | 0.220 | $u_{l,z}$ | 0.0161 | |
| 12 | Long term drift at span level | ≤ 5.0% of max. of certification range | 0.940 | $u_{l,sh}$ | 0.0022 | |
| 18 | Difference sample/calibration port | ≤ 1.0% | -0.120 | u_{ssc} | 0.0001 | |
| 21 | Uncertainty of test gas | ≤ 3.0% | 2.000 | u_{cg} | 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 | % |

Calculation of overall uncertainty lab and field test (Device 2)

| Measuring device: | | Serial-No.: | | Gerät 2 | | µmol/mol | |
|--------------------------------------|----------------------------------------------------------------------|---------------------------------------|--------|----------------------|----------------------------------------------------------------|----------|----------|
| Measured component: | | 8h-limit value: | | 8.62 | | | |
| 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 u _r = 0.01 < u _{r,f} | - | |
| 3 | "lack of fit" at 8h-limit value | ≤ 4.0% of measured value | 0.600 | u _i | 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 ₂ O 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} | | | |
| | | ≤ 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 | or | 0.07 | 0.0056 | |
| 8d | Interferent N ₂ O 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,z} | 0.22 | 0.0481 | |
| 12 | Long term drift at span level | ≤ 5.0% of max. of certification range | 1.380 | u _{d,sh} | 0.07 | 0.0047 | |
| 18 | Difference sample/calibration port | ≤ 1.0% | -0.050 | u _{asc} | 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 | % |

CONFIRMATION

Notification on changes according to EN 15267 regarding
certificate 0000040330 dated 29 April 2014

Measuring system: CO12M for CO

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

German Federal Environmental Agency (UBA)

Announcement about the uniform practice in
monitoring emissions and ambient air.

22 July 2015

Federal Gazette: BAnz AT 26 August 2015 B4

**V Notifications to the uniform practice for the continuous monitoring of
emission and ambient air:**

- 48** Notification as regards Federal Environment Agency (UBA) notices of 12 August 2008
(Federal Gazette (BAnz.) p. 3243, chapter III number 1.1) and of 27 February 2014
(Federal Gazette (BAnz.) AT 1 April 2014 B12, chapter VI 20th notification)

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

v1.0.d (Calculation process)

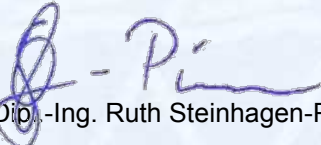
v3.6.c (Display process)

For additional means of communication, the AMS was equipped with a USB and a
TCP/IP interface.

The Maxon DC A-max 22 filter wheel motor was replaced by a brushless filter wheel
motor of the type Deltaline 26BC-6A-107.101.

Statement of TÜV Rheinland Energie und Umwelt GmbH of 16 March 2015

TÜV Rheinland Energie und Umwelt GmbH
Cologne, 04 November 2015


i. A. Dipl.-Ing. Ruth Steinhagen-Pinnow


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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.