

CERTIFICATE

about Product Conformity (QAL1)

Number of Certificate: 0000028754_01

Certified AMS: APMA 370 for CO

Manufacturer: HORIBA, Ltd.
2 Miyanohigashi
Kisshoin Minami-ku
Kyoto 610-8510
Japan

Test Institute: TÜV Rheinland Energie und Umwelt GmbH

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

**VDI 4202-1: 2002, VDI 4203-3: 2004, EN 14626: 2005,
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).

The present certificate replaces Certificate No. 0000028754 of 09 February 2011.



- Complying with 2008/50/EC
- TUV approved
- Annual inspection

Publication in the German Federal Gazette
(BAnz.) of 14 October 2006

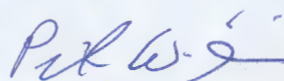
The certificate is valid until:
25 January 2016

Umweltbundesamt
Dessau, 16 March 2012

TÜV Rheinland Energie und Umwelt GmbH
Köln, 15 March 2012



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Am Grauen Stein
51105 Köln

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

Test report:	936/21204643/B of 05 January 2006
First certification:	26 January 2011
Run of validity until:	25 January 2016
Publication	BAnz. 08 April 2006, No. 70, p. 2653, chapter IV, No. 2.1

Approved application

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

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 the temperature range from 0 °C to +40 °C.

Any potential user should ensure in consultation with the manufacturer that this AMS is suitable for the facility on which it will be installed.

Basis of the certification

This certification is based on:

- test report 936/21204643/B dated 05 January 2006 of TÜV Rheinland Immissionsschutz und Energiesysteme GmbH and on the addendum to the test report 936/21204643/B1 of 27 July 2011
- suitability announced by the German Environmental Agency (UBA) as the relevant body
- the ongoing surveillance of the product and the manufacturing process
- publication in the German Federal Gazette (BAnz. 08 April 2006, No. 70, p. 2653, chapter IV, No. 2.1, UBA publication from 21 February 2006)
- publication in the German Federal Gazette (BAnz. 25 August 2009, No. 125, p. 2929, chapter III, notification 1, UBA announcement from 03 August 2009)
- publication in the German Federal Gazette (BAnz. 26 January 2011, No. 14, p. 294, chapter IV, notification 5, UBA announcement from 10 January 2011)
- publication in the German Federal Gazette (BAnz. 02 March 2012, No. 36, p. 920, chapter V, notification 16, UBA announcement from 23 February 2012)

AMS name:

APMA 370

Manufacturer:

HORIBA, Ltd., Kyoto 610 - 8510, Japan

Distributor:

HORIBA Europe GmbH, 42799 Leichlingen

Approval:

For continuous monitoring of CO (stationary operation).

Measuring ranges during the suitability test:

CO 0 – 60 mg/m³

0 – 100 mg/m³

Software version:

Version P1000878001C

Test institute:

TÜV Immissionsschutz und Energiesysteme GmbH, Köln,
TÜV Rheinland Group

Test report:

No. 936/21204643/B of 5 January 2006

1. Notification on the announcement of the Federal Environment Agency of 21 February 2006 (BAnz. p. 2655)

The current software version of the ambient air measuring system APMA 370 of the company Horiba Europe GmbH is:

P1000878001J

As an option, the pump of the type GD-6 EH of the company Horiba can be used alongside the so far used measured gas pump type N 86 KNE of the company KNF.

Statement of TÜV Rheinland Immissionsschutz und Energiesysteme GmbH
of 31 March 2009

5. Notification on the announcement of the Federal Environment Agency of 21 February 2006 (BAnz. p. 2653, chapter IV No. 2.1) and of 3 August 2009 (BAnz. p. 2929, chapter III, 1st notification)

The APMA 370 measuring system by Horiba Ltd., Japan and Horiba Europe GmbH for component CO fulfils the requirements of EN 14626. Moreover, the production and quality management of the APMA 370 measuring system for component CO complies with the requirements of EN 15267.

The report of the suitability test is available on the internet at www.qal1.de.

Statement of TÜV Rheinland Energie und Umwelt GmbH of 6 October 2010

- 16 Notification on the announcement of the Federal Environment Agency of 21 February 2006 (BAnz. p. 2653, chapter IV No. 2.1) and of 10 January 2011 (BAnz. p. 294, chapter IV, 5th notification)

There is an addendum to the test report 936/21204643/B for the APMA 370 measuring system by Horiba Ltd., Japan and Horiba Europe GmbH for the component CO. The addendum has the report number 936/21204643/B1 and is an integral part of the test report 936/21204643/B after its publication and is also published on www.qal1.de.

Statement of TÜV Rheinland Energie und Umwelt GmbH of 3 November 2011

Certified Product

The certificate is valid for automatic measuring systems that comply with the following description:

The CO-Analyser operates based on the principle of non-dispersal infrared absorption. This measurement principle complies with the reference measuring method described in section 5.2 of Standard EN 14626. The attenuation of infrared light is measured after passing through the test cuvette. According to Lambert-Beer law, attenuation is a measure of the concentration of CO within the cuvette.

The APMA-370 measuring system uses the modulation effect of infrared absorption within the test gas itself if zero and test gas are led to the measuring cell at specific flow rates. The switch is made via a solenoid valve which is clocked at a frequency of 1 Hz. As long as the concentration of the measured component within the cell does not change, the output of the detector is practically zero. Thus, no zero drift occurs.

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.

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 validity 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 Address: **qal1.de**.

Certification of APMA 370 for CO is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

First suitability test:

Test report: 936/21204643/B of 05 January 2006
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Köln

Publication: BAnz. 08 April 2006, No. 70, p. 253, chapter IV, No. 2.1
Announcement by UBA from 21 February 2006

Notifications:

Publication: BAnz. 25 August 2009, No. 125, p. 2929, chapter III, notification 1
Announcement by UBA from 03 August 2009

Publication: BAnz. 26 January 2011, No. 14, p. 294, chapter IV, notification 5
Announcement by UBA from 10 January 2011

Publication: BAnz. 02 March 2012, No. 36, p. 920, chapter V, notification 16
Announcement by UBA from 23 February 2012

Publication: Addendum to test report 936/21204643/B1 from 27 July 2011

Initial certification according to EN 15267:

Certificate No. 0000028754: 09 February 2011

Validity of the certificate until: 25 January 2016

Test report: 936/21204643/B dated 05 January 2006
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Köln

Publication: BAnz. 26 January 2011, No. 14, p. 294, chapter IV, notification 5
Announcement by UBA from 10 January 2011

Expanded uncertainty based on the results of the laboratory testing of Device 1 (the test report only contains the combined assessment of both devices in one table).

Measuring system:	Horiba APMA 370		Serial number	SN 10031	
Component	CO		Level of the hourly limit value	8.62	$\mu\text{mol/mol}$
No	Standard uncertainty due to	Performance criterion	Result	Value of partial uncertainty	Value of partial uncertainty squared
1	Repeatability standard deviation at zero	$\leq 1.0 \mu\text{mol/mol}$	0.035	$u_{r,z}$ 0.00	0.0000
2	Repeatability standard deviation at concentration c_x (at a level of the hourly limit value)	$\leq 3.0 \mu\text{mol/mol}$	0.064	$u_{r,lv}$ 0.01	0.0001
3	Lack of fit at the hourly limit value	4.0% of the measured value			
4	Variation in sample gas pressure at the hourly limit value	$\leq 0.7 \mu\text{mol/mol/kPa}$	2.000	$u_{p,lv}$ 0.10	0.0099
5	Variation in sample gas temperature at the hourly limit value	$\leq 0.3 \mu\text{mol/mol/K}$	0.006	u_{tp} 0.02	0.0002
6	Variation in surrounding temperature at the hourly limit value	$\leq 0.3 \mu\text{mol/mol/K}$	0.001	u_{st} 0.00	0.0000
7	Variation in electrical voltage at the hourly limit value	$\leq 0.3 \mu\text{mol/mol/V}$	0.077	u_{sv} 0.20	0.0395
8a	Presence of water vapour with concentration 21 mmol/mol	$\leq 1.0 \mu\text{mol/mol}$	0.025	u_{H_2O} 0.02	0.0003
8b	Presence of CO2 with concentration 500 $\mu\text{mol/mol}$	$\leq 0.5 \mu\text{mol/mol}$	-0.034	$u_{\text{lim, pos}}$	
8c	Presence of NO with concentration 1 $\mu\text{mol/mol}$	$\leq 0.5 \mu\text{mol/mol}$	-0.111	0.10	0.0109
8d	Presence of N2O with concentration 50 mmol/mol	$\leq 0.5 \mu\text{mol/mol}$	-0.036	$u_{\text{lim, neg}}$	
9	Averaging error	7.0% of the measured value	1.250	u_{av} 0.06	0.0039
18	Difference sample / calibration port	$\leq 1.0\%$	0.000	u_{dsc} 0.00	0.0000
23	Uncertainty calibration gas	$\leq 3.0\%$	2.000	ucg 0.09	0.0074
		Combined standard uncertainty		u_c	0.2739
		Expanded uncertainty		U_c	0.5478
		Relative expanded uncertainty		$U_{c,rel}$	6.35
		Maximum expanded uncertainty		$U_{\text{req,rel}}$	15
					%

Expanded uncertainty based on the results of the laboratory and field testing of Device 1 (the test report only contains the combined assessment of both devices in one table).

Measuring system:	Horiba APMA 370							Serial number	SN 10031		
Component	CO							Level of the hourly limit value	8.62		$\mu\text{mol/mol}$
No	Standard uncertainty due to	Performance criterion	Result	Value of partial uncertainty	Value of partial uncertainty squared						
1	Repeatability standard deviation at zero	$\leq 1.0 \mu\text{mol/mol}$	0.036	$u_{r,z}$	0.0000						
2	Repeatability standard deviation at concentration c_t (at a level of the hourly limit value)	$\leq 3.0 \mu\text{mol/mol}$	0.064	$u_{r,lv}$	0.0001						
3	Lack of fit (at the hourly limit value)	$\leq 4.0\%$ of the measured value	2.000	$u_{l,lv}$	0.0099						
4	Variation in sample gas pressure at the hourly limit value	$\leq 0.7 \mu\text{mol/mol/kPa}$	0.006	u_{gp}	0.0002						
5	Variation in sample gas temperature at the hourly limit value	$\leq 0.3 \mu\text{mol/mol/K}$	0.001	u_{gt}	0.0000						
6	Variation in surrounding temperature at the hourly limit value	$\leq 0.3 \mu\text{mol/mol/K}$	0.077	u_{st}	0.0395						
7	Variation in electrical voltage at the hourly limit value	$\leq 0.3 \mu\text{mol/mol/V}$	0.006	u_v	0.0027						
8a	Presence of water vapour with concentration 21 mmol/mol	$\leq 1.0 \mu\text{mol/mol}$	0.025	u_{H_2O}	0.0003						
8b	Presence of CO2 with concentration 500 $\mu\text{mol/mol}$	$\leq 0.5 \mu\text{mol/mol}$	-0.034	$u_{H_2O, pos}$							
8c	Presence of NO with concentration 1 $\mu\text{mol/mol}$	$\leq 0.5 \mu\text{mol/mol}$	-0.111	oder	0.0109						
8d	Presence of N2O with concentration 50 mmol/mol	$\leq 0.5 \mu\text{mol/mol}$	-0.036	$u_{H_2O, neg}$							
9	Averaging error	$\leq 7.0\%$ of the measured value	1.250	u_{av}	0.0039						
10	Reproducibility under field conditions	$\leq 5.0\%$ of the average of a three month period	0.060	$u_{r,f}$		not considered, because $u_{r,f} = 0 <$					
11	Long term drift at zero	$\leq 0.5 \mu\text{mol/mol}$	-0.172	$u_{l,z}$	0.0099						
12	Long term drift at the hourly alert threshold	$\leq 5.0\%$ of Max. of cert. range	-1.750	$u_{l,lv}$	0.0076						
18	Difference sample / calibration port	$\leq 1.0\%$	0.000	$u_{b,sc}$	0.0000						
23	Uncertainty calibration gas	$\leq 3.0\%$	2.000	u_{cg}	0.0074						
Combined standard uncertainty				u_c	0.3041	$\mu\text{mol/mol}$					
Expanded uncertainty				U_c	0.6081	$\mu\text{mol/mol}$					
Relative expanded uncertainty				$U_{c,rel}$	7.05	%					
Maximum expanded uncertainty				$U_{req,rel}$	15	%					

Expanded uncertainty based on the results of the laboratory and field testing of Device 2 (the test report only contains the combined assessment of both devices in one table).

Measuring system:	Horiba APMA 370					Serial number	SN 10032		
Component	CO					Level of the hourly limit value	8.62		$\mu\text{mol/mol}$
No	Standard uncertainty due to	Performance criterion	Result	Value of partial uncertainty	Value of partial uncertainty squared	Value of partial uncertainty			
1	Repeatability standard deviation at zero	$\leq 1.0 \mu\text{mol/mol}$	0.028	$u_{r,z}$	0.0000	0.00			
2	Repeatability standard deviation at concentration c_1 (at a level of the hourly limit value)	$\leq 3.0 \mu\text{mol/mol}$	0.070	$u_{r,l,v}$	0.0001	0.01			
3	Lack of fit (at the hourly limit value)	$\leq 4.0\%$ of the measured value	2.300	$u_{l,v}$	0.0131	0.11			
4	Variation in sample gas pressure at the hourly limit value	$\leq 0.7 \mu\text{mol/mol/kPa}$	0.009	u_{gp}	0.0005	0.02			
5	Variation in sample gas temperature at the hourly limit value	$\leq 0.3 \mu\text{mol/mol/K}$	0.004	u_{gt}	0.0001	0.01			
6	Variation in surrounding temperature at the hourly limit value	$\leq 0.3 \mu\text{mol/mol/K}$	0.067	u_{st}	0.0306	0.17			
7	Variation in electrical voltage at the hourly limit value	$\leq 0.3 \mu\text{mol/mol/V}$	0.017	u_v	0.0244	0.16			
8a	Presence of water vapour with concentration 21 mmol/mol	$\leq 1.0 \mu\text{mol/mol}$	0.017	u_{H_2O}	0.0001	0.01			
8b	Presence of CO ₂ with concentration 500 $\mu\text{mol/mol}$	$\leq 0.5 \mu\text{mol/mol}$	-0.013	$u_{\text{lim,pos}}$					
8c	Presence of NO with concentration 1 $\mu\text{mol/mol}$	$\leq 0.5 \mu\text{mol/mol}$	-0.002	oder		0.01			0.0001
8d	Presence of N ₂ O with concentration 50 mmol/mol	$\leq 0.5 \mu\text{mol/mol}$	0.002	$u_{\text{lim,neg}}$					
9	Averaging error	$\leq 7.0\%$ of the measured value	-1.100	u_{av}	0.0030	-0.05			
10	Reproducibility under field conditions	$\leq 5.0\%$ of the average of a three month period	0.060	$u_{r,f}$		not considered, because $u_{r,f} = 0 <$			
11	Long term drift at zero	$\leq 0.5 \mu\text{mol/mol}$	-0.164	$u_{l,z}$	0.0090	-0.09			
12	Long term drift at the hourly alert threshold	$\leq 5.0\%$ of Max. of cert. range	-1.610	$u_{l,l,v}$	0.0064	-0.08			
18	Difference sample / calibration port	$\leq 1.0\%$	0.000	u_{psc}	0.0000	0.00			
23	Uncertainty calibration gas	$\leq 3.0\%$	2.000	0	0.0074	0.09			
		Combined standard uncertainty				u_c			$\mu\text{mol/mol}$
		Expanded uncertainty				U_c			$\mu\text{mol/mol}$
		Relative expanded uncertainty				$U_{c,rel}$			%
		Maximum expanded uncertainty				$U_{exp,rel}$			%