

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000027277_04

AMS designation: APDA-371 with PM_{2.5} pre-separator for suspended particulate matter, PM_{2.5}

Manufacturer: HORIBA Europe GmbH
Hans-Mess-Str. 6
61440 Oberursel/Ts.
Germany

Test Laboratory: TÜV Rheinland Energy GmbH

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

VDI 4202-1 (2002), VDI 4203-3 (2004), EN 14907 (2005), EN 16450 (2017), Guide to the 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 9 pages).

The present certificate replaces certificate 0000027277_03 of 28 July 2015.



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

www.tuv.com
ID 0000027277

Publication in the German Federal Gazette
(BAnz) of 24 March 2020

This certificate will expire on:
23 March 2025

German Federal Environment Agency
Dessau, 04 June 2020

TÜV Rheinland Energy GmbH
Cologne, 03 June 2020


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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 certificate D-PL-11120-02-00.

Test Report:	936/21221789/B dated 19 March 2013 and addendum 936/21246946/B dated 7 September 2019
Initial certification:	02 August 2010
Expiry date:	23 March 2025
Publication:	BAnz AT 24.03.2020 B7, chapter IV notification 50

Approved application

The tested AMS is suitable for continuous ambient air monitoring of suspended particulate matter, PM_{2.5} fraction (stationary operation).

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a field test performed at four different sites.

The AMS is approved for an ambient temperature range of +5 °C to +40 °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. 936/21221789/B dated 19 March 2013 and addendum 936/21246946/B dated 7 September 2019 issued by TÜV Rheinland Energie und Umwelt GmbH and TÜV Rheinland Energy GmbH respectively
- 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 23.07.2013 B4, chapter II number 2.1, UBA announcement dated 3 July 2013:

AMS designation:

APDA-371 with PM_{2.5} pre-separator

Manufacturer: HORIBA Europe GmbH, Oberursel

Field of application:

For continuous ambient air monitoring of suspended particulate matter, PM_{2.5} (stationary operation)

Measuring range during performance testing:

Component	Certification range	Unit
PM _{2.5}	0–1,000	µg/m ³

Software version: Version 3236-07 5.1.1

Restrictions: None

Notes:

1. The measuring system complies with the requirements of the guide to “Demonstration of Equivalence of Ambient Air Monitoring Methods” (January 2010 version) for the component PM_{2.5}.
2. For monitoring PM_{2.5}, the instrument must be fitted with the following options: Sample heater (BX-830), PM₁₀ sampling head (BX-802), PM_{2.5} Sharp Cut Cyclone SCC (BX-807), combined temperature and pressure sensor (BX-596) or an ambient temperature sensor (BX-592).
3. During the performance test, the cycle time was 1 h, i.e. the filter was automatically changed once an hour. Every filter spot was sampled only once.
4. Sampling time in the cycle time is 42min.
5. The measuring system must be operated inside a lockable measurement container.
6. The instrument must be calibrated on-site regularly using a gravimetric PM_{2.5} reference method in accordance with EN 14907.
7. The measuring system may also be operated with the BX-125 pump (optional).
8. Since January 2012, the measuring system has been distributed with a re-engineered rear plate which accommodates additional interfaces such as the optional BX-965 reporting processor.
9. The instrument was first publically announced by the Federal Environment Agency on 12 July 2010 (BAnz. p. 2597, chapter II number 1.1, note 7). Most recently, the Federal Environment Agency made an announcement regarding the instrument on 6 July 2012 (BAnz AT 20.07.2012 B11, chapter IV 2nd notification).
10. The test report on performance testing is available on the internet at www.qal1.de.

Test Laboratory: TÜV Rheinland Energie und Umwelt GmbH, Cologne

Report no.: 936/21221789/B dated 19 March 2013

Publication in the German Federal Gazette: BAnz AT 26.08.2015 B4, chapter V notification 43, UBA announcement dated 22 July 2015:

43 Notification as regards Federal Environment Agency (UBA) notices of 3 July 2013 (BAnz AT 23.07.2013 B4, chapter III number 2.1) and of 25 February 2015 (BAnz AT 02.04.2015 B5, chapter IV 10th notification)

The APDA-371 air quality monitor with PM_{2,5} pre-separator manufactured by HORIBA Europe GmbH may also be operated with the BECKER VT 4.4 vacuum pump.

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 23 March 2015

Publication in the German Federal Gazette: BAnz AT 31.07.2017 B12, chapter II notification 32, UBA announcement dated 13 July 2017:

32 Notification as regards Federal Environment Agency (UBA) notices of 3 July 2013 (BAnz AT 23.07.2013 B4, chapter III number 2.1) and of 22 July 2015 (BAnz AT 26.08.2015 B4, chapter V 43^d notification)

The current software version of the APDA-371 air quality monitor with PM_{2,5} pre-separator for suspended particulate matter, PM_{2,5}, manufactured by HORIBA Europe GmbH is:

3236-7 V 5.5.0.

Statement issued by TÜV Rheinland Energy GmbH dated 8 March 2017

Publication in the German Federal Gazette: BAnz AT 24.03.2020 B7, chapter IV notification 50, UBA announcement dated 24 February 2020:

50 Notification as regards Federal Environment Agency (UBA) notices of 3 July 2013 (BAnz AT 23.07.2013 B4, chapter III number 2.1) and of 13 July 2017 (BAnz AT 31.07.2017 B12, chapter II 32nd notification)

The APDA-371 measuring system with PM_{2,5} pre-separator for suspended particulate matter, PM_{2,5} fraction, manufactured by HORIBA Europe GmbH satisfies the requirements defined in standard EN 16450. An addendum as integral part of test report no. 936/21221789/B is available online at www.qal1.de.

The current software version is: 3236-05 3.14.3

Statement issued by TÜV Rheinland Energy GmbH dated 6 December 2019

Certified product

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

With the exception of a modified front design, the APDA-371 measuring system with PM_{2.5} pre-separator exactly corresponds to the BAM-1020 developed and entirely manufactured by Met One Instruments, Inc.

The APDA-371 measuring system with PM_{2.5} pre-separator consists of the PM₁₀-sampling inlet BX-802, PM_{2.5} Sharp Cut Cyclone SCC BX-807, the sampling tube, the sample heater BX-830, the ambient temperature sensor BX-596 or, alternatively, the BX-592 ambient temperature sensor, the BX-127 (or optional BX-125) vacuum pump, the APDA-371 measuring instrument (incl. glass-fibre filter tape), the respective connecting tubes and lines as well as adapters, the roof flange as well as the manual in German.

The measuring system uses beta-attenuation as a measurement principle.

The particle sample passes the PM₁₀-sampling inlet and the PM_{2.5} Sharp Cut Cyclone SCC at a flow rate of 1 m³/h and reaches the APDA-371 analyser via the sampling tube.

During performance testing, the measuring system was operated with the BX-830 sample heater.

Particles arrive at the measuring instrument and will be separated by the glass fibre filter tape.

A measurement cycle (incl. automatic checking of radiometric measurement) proceeds as follows (setting for PM_{2.5}: radiometric measuring time: 8min):

1. At the beginning of each cycle, initial and blank measurements are performed with a clean filter tape I_0 . This takes 8 min.
2. The filter tape is transported forward over a distance of 4 dust spots and pushed under the sampling point. The sample is taken from the filter spot where I_0 was previously determined. For a sampling duration of 42 min. particulate-loaded air is then sucked through that filter spot.
3. At the same time, the spot 4 positions upstream on the filter band is submitted to radiometric measurement I_1 for a duration of 8 minutes. This measurement is performed to check for potential drift effects caused by changes in external parameters such as temperature or relative moisture. The same spot is subjected to a third radiometric measurement I_2 with an inserted reference foil. The same spot of the filter tape is subjected to yet another I_{1x} , eight minutes before the end of the collection time in order to monitor stability of the zero point with the help of I_1 and I_{1x} .
4. Once sampling has been completed, the filter band is reversed back four sampling spots and the sampled filter spot is measured radiometrically (I_3). The calculation of the concentration completes the measurement cycle.
5. The next cycle will start again with step 1.

The radiometric determination of mass is calibrated in the factory and is checked hourly during operation as part of internal quality assurance at the zero point (clean filter spot) and at the span point (built-in reference foil). Measured values at zero and span points are easily derived from the data generated. These can then be compared to stability criteria (drift) or target values for span (factory settings).

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 gal1.de.

Document history

Certification of the APDA-371 with PM_{2.5} pre-separator is based on the documents listed below and the regular, continuous surveillance of the manufacturer's quality management system:

Initial certification according to EN 15267

Certificate no. 0000027277: 02 August 2010
Expiry date of the certificate: 01 August 2015

Test Report: 936/21209919/A dated 26 March 2010
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Cologne
Publication: BAnz. 28 July 2010, no. 111, p. 2597, chapter II number 1.1, 7th notification
UBA announcement dated 12 July 2010

Certificate based on a notification

Certificate no. 0000027277_01: 20 August 2012
Expiry date of the certificate: 01 August 2015

1st notification of changes to the certificate in accordance with EN 15267:
Statement issued by TÜV Rheinland Energie und Umwelt GmbH, Cologne dated 22 March 2012

Publication: BAnz AT 20.07.2012 B11, chapter IV notification 2
UBA announcement dated 06 July 2012
(Software update, new back plate, optional pump, requirements of "Demonstration of Equivalence of Ambient Air Monitoring Methods", requirements for AMS leak tightness)

Supplementary testing according to EN 15267

Certificate no. 0000027277_02: 20 August 2013
Expiry date of the certificate: 01 August 2015

Test Report: 936/21221789/B dated 19 March 2013
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Publication: BAnz AT 23.07.2013 B4, chapter III number 2.1
UBA announcement dated 03 July 2013

Notification in accordance with EN 15267

Statement issued by TÜV Rheinland Energy GmbH dated 20 September 2014
Publication: BAnz AT 02.04.2015 B5, chapter IV notification 10
UBA announcement dated 25 February 2015
(Discontinuation and replacement of pressure sensor)

Renewal of the certificate:

Certificate no. 0000027277_03: 28 July 2015
Expiry date of the certificate: 01 August 2020

Notifications

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 23 March 2015
Publication: BAnz AT 26.08.2015 B4, chapter V notification 43
UBA announcement dated 22 July 2015
(Design changes)

Statement issued by TÜV Rheinland Energy GmbH dated 8 March 2017
Publication: BAnz AT 31.07.2017 B12, chapter II notification 32
UBA announcement dated 13 July 2017
(software updates)

Certificate based on a notification

Certificate no. 0000027277_04: 04 June 2020
Expiry date of the certificate: 23 March 2025

Test report no. 936/21221789/B dated 19 March 2013 and addendum 936/21246946/B dated 7 September 2019
TÜV Rheinland Energy GmbH, Cologne
Publication: BAnz AT 24.03.2020 B7, chapter IV notification 50
UBA announcement dated 24 February 2020

Comparison candidate with reference according to Guide Demonstration of Equivalence Of Ambient Air Monitoring Methods, 2010			
Candidate	APDA-371	SN	SN 17010 & SN 17011
Status of measured values	Offset corrected	Limit value	30 $\mu\text{g}/\text{m}^3$
		Allowed uncertainty	25 %
All comparisons			
Uncertainty between Reference	0.33	$\mu\text{g}/\text{m}^3$	
Uncertainty between Candidates	1.38	$\mu\text{g}/\text{m}^3$	
SN 17010 & SN 17011			
Number of data pairs	248		
Slope b	1.000	not significant	
Uncertainty of b	0.012		
Ordinate intercept a	0.000	not significant	
Uncertainty of a	0.204		
Expanded meas. uncertainty W_{CM}	11.57	%	
All comparisons, $\geq 18 \mu\text{g}/\text{m}^3$			
Uncertainty between Reference	0.30	$\mu\text{g}/\text{m}^3$	
Uncertainty between Candidates	1.57	$\mu\text{g}/\text{m}^3$	
SN 17010 & SN 17011			
Number of data pairs	74		
Slope b	1.031		
Uncertainty of b	0.033		
Ordinate intercept a	-0.832		
Uncertainty of a	0.919		
Expanded meas. uncertainty W_{CM}	14.93	%	
All comparisons, $< 18 \mu\text{g}/\text{m}^3$			
Uncertainty between Reference	0.34	$\mu\text{g}/\text{m}^3$	
Uncertainty between Candidates	1.05	$\mu\text{g}/\text{m}^3$	
SN 17010 & SN 17011			
Number of data pairs	174		
Slope b	0.971		
Uncertainty of b	0.025		
Ordinate intercept a	0.302		
Uncertainty of a	0.267		
Expanded meas. uncertainty W_{CM}	10.52	%	

Comparison candidate with reference according to Guide Demonstration of Equivalence Of Ambient Air Monitoring Methods, 2010				
Candidate	APDA-371	SN	SN 17010 & SN 17011	
Status of measured values	Offset corrected	Limit value	30	µg/m³
		Allowed uncertainty	25	%
Teddington, Summer				
Uncertainty between Reference	0.33	µg/m³		
Uncertainty between Candidates	1.13	µg/m³		
	SN 17010		SN 17011	
Number of data pairs	78		78	
Slope b	0.994		1.016	
Uncertainty of b	0.030		0.025	
Ordinate intercept a	1.058		0.254	
Uncertainty of a	0.372		0.308	
Expanded meas. uncertainty W _{CM}	14.46	%	11.85	%
Cologne, Winter				
Uncertainty between Reference	0.39	µg/m³		
Uncertainty between Candidates	1.76	µg/m³		
	SN 17010		SN 17011	
Number of data pairs	75		75	
Slope b	0.980		1.061	
Uncertainty of b	0.024		0.019	
Ordinate intercept a	0.196		-0.334	
Uncertainty of a	0.512		0.405	
Expanded meas. uncertainty W _{CM}	12.96	%	14.00	%
Bornheim, Summer				
Uncertainty between Reference	0.30	µg/m³		
Uncertainty between Candidates	1.13	µg/m³		
	SN 17010		SN 17011	
Number of data pairs	53		57	
Slope b	1.052		1.134	
Uncertainty of b	0.036		0.048	
Ordinate intercept a	-1.726		-2.262	
Uncertainty of a	0.527		0.727	
Expanded meas. uncertainty W _{CM}	11.08	%	20.72	%
Teddington, Winter				
Uncertainty between Reference	0.27	µg/m³		
Uncertainty between Candidates	1.01	µg/m³		
	SN 17010		SN 17011	
Number of data pairs	45		43	
Slope b	0.970		0.991	
Uncertainty of b	0.014		0.014	
Ordinate intercept a	-0.946		-0.134	
Uncertainty of a	0.300		0.293	
Expanded meas. uncertainty W _{CM}	14.40	%	7.59	%
All comparisons, ≥18 µg/m³				
Uncertainty between Reference	0.30	µg/m³		
Uncertainty between Candidates	1.57	µg/m³		
	SN 17010		SN 17011	
Number of data pairs	76		75	
Slope b	0.984		1.092	
Uncertainty of b	0.035		0.034	
Ordinate intercept a	-0.180		-1.872	
Uncertainty of a	0.975		0.95	
Expanded meas. uncertainty W _{CM}	16.67	%	16.67	%
All comparisons, <18 µg/m³				
Uncertainty between Reference	0.34	µg/m³		
Uncertainty between Candidates	1.05	µg/m³		
	SN 17010		SN 17011	
Number of data pairs	175		178	
Slope b	0.955		1.021	
Uncertainty of b	0.028		0.026	
Ordinate intercept a	0.373		-0.130	
Uncertainty of a	0.306		0.286	
Expanded meas. uncertainty W _{CM}	13.21	%	11.10	%
All comparisons				
Uncertainty between Reference	0.33	µg/m³		
Uncertainty between Candidates	1.38	µg/m³		
	SN 17010		SN 17011	
Number of data pairs	251		253	
Slope b	0.969	significant	1.041	significant
Uncertainty of b	0.013		0.012	
Ordinate intercept a	0.225	not significant	-0.387	not significant
Uncertainty of a	0.226		0.214	
Expanded meas. uncertainty W _{CM}	13.78	%	13.52	%