

CERTIFICATE

about Product Conformity (QAL1)

Number of Certificate: 0000027201

Certified AMS: OPSIS SM 200 with PM₁₀-pre-separator

Manufacturer: OPSIS AB
Box 244
244 02 Furulund
Sweden

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 12341: 1998,
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).



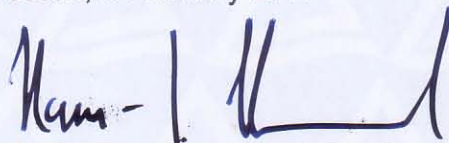
- Certified equivalent EN method
- TUV approved
- Annual inspection

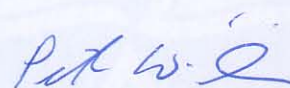
Publication in the German Federal Gazette
(BAnz.) of 29 October 2005

The certificate is valid until: 25 January 2016

Umweltbundesamt
Dessau, 9 February 2011

TÜV Rheinland Energie und Umwelt GmbH
Köln, 7 February 2011


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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:	936/21201592/A of 5 July 2005
First certification:	26 January 2011
Run of validity until:	25 January 2016
Publication:	BAnz. 29 October 2005, No. 206, p. 15702, Chapter IV No. 1.1

Approved application

The AMS is approved for permanent monitoring of suspended particulate matter PM₁₀ in ambient air(stationary operation). The suitability of the product for this application was assessed on the basis of a laboratory test and a field test at five different test sites respectively time periods. The AMS is approved for the temperature range from +5 °C to +40 °C.

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

Basis of the certification

This certification is based on the test reports 936/801013/A of 29 January 2003 and 936/21201592/A of 5 July 2005 of TÜV Immissionsschutz und Energiesysteme GmbH, on the relevant body (Federal Environment Agency of Germany) assessment and ongoing surveillance of the product and the manufacturing process and the publication in the German Federal Gazette (BAnz. 29 October 2005, No. 206, p. 15702, Chapter IV No. 1.1, UBA publication from 25 July 2005 and BAnz. 26 January 2011, No. 14, p. 296, Chapter IV Notification 4: Announcement by UBA from 10 January 2011):

AMS name:

OPSIS SM 200 with PM₁₀ pre-separator

Manufacturer:

OPSIS AB, Furulund, Sweden

Approval:

For permanent monitoring of suspended particulate matter PM₁₀ in ambient air (stationary operation).

Measuring ranges during the suitability test:

0 – 200 µg/m³

Software:

Version 1.03 (OPSIS SM 200 (New))

Remarks:

1. Supplementary test on the publication of suitability (announcement of 22 April 2003, BAnz. p. 10742)
2. The two versions of the AMS are safely distinguished by the serial number:
SN < 1000 = OPSIS SM 200, old version TÜV-Report-No.: 936/801013A

SN > 1000 = OPSIS SM 200, new version TÜV-Report-No.: 936/21201592/A
3. The AMS is also distributed under the name Aeris AB, Box 244, 244 02 Furulund, Sweden.
4. The AMS shall be operated in a lockable measuring cabinet.
5. The linearity check of the radiometric measurement requires different reference foils of the instrument manufacturer.
6. The sampling tube shall be purged with ambient air up to the analyser (option C).
7. The measuring equipment has to be calibrated with the gravimetric PM₁₀ reference procedure by EN 12341

Testing Institute:

TÜV Immissionsschutz und Energiesysteme GmbH, Köln
TÜV Rheinland Group

Test report:

No.: 936/21201592/A of 5 July 2005

4. Notification on the announcement of the Federal Environment Agency of 25 July 2005 (BAnz. p. 15702, chapter IV No. 1.1) and of 3 August 2009 (BAnz. p. 2929, chapter III, Notification 13)

The OPSIS SM 200 measuring system by OPSIS AB for component PM₁₀ fulfils the requirements of EN 12341. Moreover, the production and quality management of the OPSIS SM 200 measuring system for component PM₁₀ 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

Certified product

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

The ambient air measuring system OPSIS SM 200 is based on the measuring principle of beta-attenuation.

The PM AMS OPSIS SM 200 allows the sampling of suspended particulate matter on membrane filters with the option of further performance of qualitative and quantitative investigations of the sample afterwards. Furthermore the mass of particles, separated on the membrane filter during sampling, is determined by means of Beta-absorption in the device and the concentration of suspended particulate matter in $\mu\text{g}/\text{m}^3$ is calculated with the flow rate.

The AMS comprises the sampling inlet, the sampling tube, the pump unit, the sampling- and measurement unit as well as the filter containers for the storage of clean and sampled filters. The filter container has capacity for 40 filters.

For sampling inlet, a PM₁₀-sampling inlet, acting as a pre-separator for the suspended particulate matter sampled from ambient air, is used. The devices are operated with a constant, regulated volume flow of 16.67 l/min = 1.0 m³/h. As an alternate, the use of TSP, PM_{2.5} and PM₁₀-sampling inlets is also possible.

The sampling tube connects the sampling inlet with the sampling- and measurement unit. To avoid condensation effects in the inner part of the tube when feeding the tube through the cabinet roof as well as to avoid losses of volatile components of the particulates by temperature fluctuations on the way to the sampling- and measurement unit, a feed through the roof, purged with ambient air, is installed around the sampling tube (option C). This secures, that the sampled air in the tube keeps its initial temperature up to the filter.

The pump unit is connected to the sampling- and measurement unit by two hoses (inlet & outlet). The sampling- and measurement unit controls the pump and contains the mechanical system for the filter movements in the device, large parts of the pneumatic system, the measuring part and all necessary electronic parts and micro-processors for the control of the measuring device.

The operation of the device is done via a foil keypad at the front panel of the device. All required parameters, e.g. sampling time, sampled volume etc are set here. Furthermore several functions for QA/QC can be activated.

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 certified product is found no longer to comply with the applicable European Standard, TÜV Rheinland Energie und Umwelt GmbH should be notified at the address shown on page 1.

The certification mark that 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 the 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 seen at the Internet Address: qal1.de.

Certification of OPSIS SM 200 with pre-seperator for PM₁₀ 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: 936/801013/A of 29 January 2003
TÜV Immissionsschutz und Energiesysteme GmbH, Köln

Publication: BAnz. 15 May 2003, No. 90, p. 10742, Chapter III No. 1.1:
Announcement by UBA from 22 April 2003

1. Supplementary test:

Test report: 936/21201592/A of 5 July 2005
TÜV Immissionsschutz und Energiesysteme GmbH, Köln

Publication: BAnz. 29 October 2005, No. 206, p. 15702, Chapter IV No. 1.1:
Announcement by UBA from 25 July 2005

Notification:

Publication: BAnz. 25 August 2009, No. 125, p. 2935, Chapter III Notification 13:
Announcement by UBA from 3 August 2009

Initial certification according to EN 15267:

Certificate No. 0000027201: 9 February 2011

Validity of the certificate until: 25 January 2016
Test report: 936/21201592/A of 5. July 2005,
TÜV Immissionsschutz und Energiesysteme GmbH, Köln,

Publication: BAnz. 26 January 2011, No. 14, p. 296, Chapter IV Notification 4:
Announcement by UBA from 10 January 2011

Results of the equivalence test for the demonstration of equivalence according to EN 12341:1998

Type-approval test from 936/801013/A of 2003-01-29

Candidate 1 vs. Candidate 2

Candidates	Test site	No. of values	STD s_a	Student-Factor t_f	Confidence interval CI_{95}
SN			$\mu\text{g}/\text{m}^3$		$\mu\text{g}/\text{m}^3$
285 / 288	Parking lot Köln	39	1.96	2.026	3.96
	Wesseling	62	1.46	2.000	2.91
	Mechernich	114	1.28	1.981	2.54
	Brühl	45	1.38	2.017	2.78
	Total	260	1.46	1.969	2.87

Candidate vs. Reference

SN 285	No. of values N	Slope m	Offset b	R ²
Parking lot Köln	17	1.0374	-1.8928	0.978
Wesseling	40	1.0043	2.0421	0.958
Mechernich	66	1.0345	-0.4712	0.950
Brühl	18	1.0062	-1.3519	0.956

SN 288	No. of values N	Slope m	Offset b	R ²
Parking lot Köln	17	1.0829	-2.697	0.986
Wesseling	40	1.0193	1.8582	0.976
Mechernich	66	1.0243	-0.5352	0.951
Brühl	18	0.9209	0.0913	0.962

Candidate	No. of values N	Slope m	Offset b	R ²
SN 285	141	1.0177	0.0478	0.956
SN 288	141	1.0211	-0.1718	0.959

Supplementary testing from 936/21201592/A of 2005-07-05

Candidate 1 vs. Candidate 2

Candidates	Test site	No. of values	STD s_a	Student-Factor t_f	Confidence interval CI_{95}
SN	Furulund		$\mu\text{g}/\text{m}^3$		$\mu\text{g}/\text{m}^3$
1110 / 1112		104	1.14	1.983	2.27
1110 / 276		80	1.65	1.991	3.29
1112 / 276		80	1.41	1.991	2.81

Candidate vs. Reference

Candidate	No. of values N	Slope m	Offset b	R^2
SN 1110	43	1.0946	-1.0318	0.973
SN 1112	43	1.0490	0.3288	0.977
SN 276	34	1.0271	0.5794	0.954