

# CERTIFICATE

## about Product Conformity (QAL1)

Number of Certificate: 0000028753

**Certified AMS:** OPSIS SM 200 for PM<sub>2.5</sub>

**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 14907: 2005,  
Guide to Demonstration of Equivalence of Ambient Air Monitoring Methods: 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).



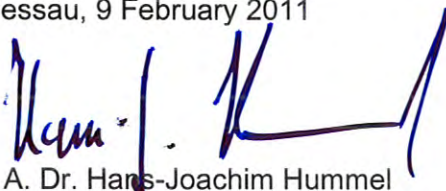
- Certified equivalent EN method
- Complying with 2008/50/EC
- TUV approved
- Annual inspection

Publication in the German Federal Gazette  
(BAnz.) of 25 August 2009

The certificate is valid until: 25 January 2016

Umweltbundesamt  
Dessau, 9 February 2011

TÜV Rheinland Energie und Umwelt GmbH  
Köln, 7 February 2011

  
i. A. Dr. Hans-Joachim Hummel

  
ppa. Dr. Peter Wilbring

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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:** 936/21205849/A of 26 March 2009  
**First certification:** 26 January 2011  
**Run of validity until:** 25 January 2016  
**Publication** BAnz. 25 August 2009, No. 125, page 2933, Chapter II No. 1.1

#### **Approved application**

The certified AMS is approved for permanent monitoring of suspended particulate matter PM<sub>2.5</sub> 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 four 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 report 936/21205849/A of 26 March 2009 of TÜV Rheinland Immissionsschutz und Energiesysteme GmbH and 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. 25 August 2009, No. 125, p. 2933, Chapter II No. 1.1, UBA publication of 3 August 2009 and BAnz. 26. January 2011, No. 14, p. 296, Chapter IV notification 3: Announcement by UBA from 10 January 2011):

**AMS name:**

OPSIS SM 200 for PM<sub>2.5</sub>

**Manufacturer:**

OPSIS AB, Furulund, Sweden

**Approval:**

For permanent monitoring of suspended particulate matter PM<sub>2.5</sub> in ambient air (stationary operation).

**Measuring range during the suitability test:**

PM<sub>2.5</sub>: 0 – 200 µg/m<sup>3</sup>

**Software version:**

Version 1.04.10

**Remarks:**

1. The requirements according to guide "Demonstration of Equivalence of Ambient Air Monitoring Methods" are fulfilled for the measured component PM<sub>2.5</sub>.
2. The AMS is also distributed by the company Aeris AB, Box 244, 244 02 Furulund, Sweden.
3. The linearity check of the radiometric measurement requires different reference foils of the instrument manufacturer.
4. The sampling tube has to be purged with ambient air up to the analyser.
5. The measuring system is to be calibrated on site in regular intervals with the gravimetric PM<sub>2.5</sub> reference method according to EN 14907.

**Test report:**

TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Köln  
Report-No.: 936/21205849/A of 26 March 2009

3. Notification on the announcement of the Federal Environment Agency of 3 August 2009 (BAnz. p 2929, Chapter II No. 1.1)

The OPSIS SM 200 measuring system by OPSIS AB for component PM<sub>2.5</sub> fulfils the requirements of EN 14907. Moreover, the production and quality management of the OPSIS SM 200 measuring system for component PM<sub>2.5</sub> complies with the requirements of EN 15267 and of the Guideline „Demonstration of Equivalence of Ambient Air Monitoring Methods“, version of November 2005.

The report of the suitability test is available on the internet at [www.qal1.de](http://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 sampled volume.

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  $\text{PM}_{2.5}$ -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  $38.33 \text{ l}/\text{min} = 2.3 \text{ m}^3/\text{h}$ . As an alternate, the use of TSP,  $\text{PM}_{10}$  and  $\text{PM}_{1}$ -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 (temperature stabilizer TS 200). 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 PM<sub>2.5</sub> pre-separator for suspended particulate matter PM<sub>2.5</sub> 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: 936/21205849/A of 26 March 2009

TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Köln

Publication: BAnz. 25 August 2009, No. 125, p. 2933, Chapter II No. 1.1:

Announcement by UBA from 3 August 2009

**Initial certification according to EN 15267:**

Certificate No. 0000028753: 9 February 2011

Validity of the certificate until: 25 January 2016

Test report: 936/21205849/A of 26 March 2009,

TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Köln,

Publication: BAnz. 26. January 2011, No. 14, p. 296, Chapter IV Notification 3:

Announcement by UBA from 10 January 2011.

## Results of the equivalence test for the demonstration of equivalence according to the EC-Guide of November 2005

Type-approval test from 936/21205849/A of 2009-03-26

Candidate 1 vs. Candidate 2

Candidates	Test site	No. of values	Uncertainty $u_{bs}$
SN			$\mu\text{g}/\text{m}^3$
1236 / 1237	Köln, Frankfurter Str.	90	1.019
1236 / 1237	Köln, Parking lot	69	0.965
1236 / 1237	Furulund (Summer)	56	1.007
1236 / 1237	Furulund (Winter)	76	0.768
1236 / 1237	All test sites	291	0.944
Classification via reference values			
1236 / 1237	Values $\geq 50\%$ ALV 1 ( $\geq 12.5 \mu\text{g}/\text{m}^3$ )	79	1.114
1236 / 1237	Values $\geq 50\%$ ALV 2 ( $\geq 10 \mu\text{g}/\text{m}^3$ )	99	1.061
1236 / 1237	Values $< 50\%$ ALV 1 ( $< 12.5 \mu\text{g}/\text{m}^3$ )	93	0.834
1236 / 1237	Values $< 50\%$ ALV 2 ( $< 10 \mu\text{g}/\text{m}^3$ )	73	0.837

Candidate vs. Reference

<b>PM2.5</b>	<b>Limit value ALV</b>	<b>Slope b</b>	<b>Intercept a</b>	<b><math>u_{c,s}</math> at limit value</b>	<b><math>w_{CM}</math></b>	<b><math>W_{CM}</math></b>	<b><math>W_{CM} \leq</math> <math>W_{dgo}</math></b>
<b>Test site</b>	$\mu\text{g}/\text{m}^3$	$(\mu\text{g}/\text{m}^3)/(\mu\text{g}/\text{m}^3)$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	%	%	$(W_{dgo} =$ 25 %)
Köln, Frankfurter Str.	25	0.99	0.47	1.62	6.46	12.92	yes
	20	0.99	0.47	1.62	8.11	16.23	yes
Köln, Parking lot	25	1.01	1.49	2.38	9.52	19.04	yes
	20	1.01	1.49	2.34	11.72	23.45	yes
Furulund (Summer)	25	1.00	2.06	2.50	9.98	19.97	yes
	20	1.00	2.06	2.49	12.47	24.94	yes
Furulund (Winter)	25	1.09	0.46	2.93	11.74	23.48	yes
	20	1.09	0.46	2.49	12.44	24.88	yes
Alle test sites	25	1.00	1.41	2.06	8.23	16.45	yes
	20	1.00	1.41	2.07	10.35	20.70	yes
Values $\geq$ 50 % ALV 1 ( $\geq 12.5 \mu\text{g}/\text{m}^3$ )	25	0.99	1.54	2.16	8.65	17.29	yes
Values $\geq$ 50 % ALV 2 ( $\geq 10 \mu\text{g}/\text{m}^3$ )	20	1.00	1.25	2.09	10.47	20.95	yes