# CERTIFICATE

## of Product Conformity (QAL1)

### Certificate No.: 0000040333_02

| | |
|---|---|
| **Certified AMS:** | AR602Z/NHg for NO, $NO_2$, $SO_2$, $NH_3$ and Hg as well as AR602Z/N for NO, $NO_2$, $SO_2$ and $NH_3$ |
| **Manufacturer:** | Opsis AB<br>Skytteskogsvägen 16<br>244 02 Furulund<br>Sweden |
| **Test Institute:** | TÜV Rheinland Energie und Umwelt GmbH |

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

**EN 15267-1: 2009, EN 15267-2: 2009, EN 15267-3: 2007
and EN 14181: 2004**

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

The present certificate replaces Certificate No. 0000040333_01 of 9 September 2014

**TÜVRheinland® CERTIFIED**

Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

www.tuv.com
ID 0000040333

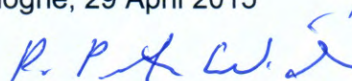Publication in the German Federal Gazette
(BAnz.) of 2 April 2015

This certificate will expire on:
31 March 2019

German Federal Environment Agency
Dessau, 30 April 2015

TÜV Rheinland Energie und Umwelt GmbH
Cologne, 29 April 2015

i. A. Dr. Marcel Langner

ppa. Dr. Peter Wilbring

| | |
|---|---|
| **www.umwelt-tuv.de / www.eco-tuv.com**<br>teu@umwelt-tuv.de<br>Tel. +49 221 806-5200 | TÜV Rheinland Energie und Umwelt GmbH<br>Am Grauen Stein<br>51105 Cologne |

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

10/221 2.08

| | |
|---|---|
| **Test report:** | 936/21222333/C of 8 September 2014 |
| **Initial certification:** | 1 April 2014 |
| **Expiry date:** | 31 March 2019 |
| **Publication:** | BAnz AT 2 April 2015 B5, chapter I number 3.2 and chapter IV notification 36 |

### Approved application

The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III, at waste incineration plants according to Directive 2010/75/EU, chapter IV and other plants requiring official approval. The tested ranges have been chosen with respect to the wide application range of the AMS.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a 12-month field test at a municipal waste incinerator.

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 valid at the time of performance testing. As changes in legal regulations are possible, any potential user should ensure that this AMS is suitable for monitoring the limit values relevant to the application.

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

### Basis of the certification

This certification is based on:

- test report 936/21222333/C of 8 September 2014 of TÜV Rheinland Energie und Umwelt GmbH
- 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 2 April 2015 B5, chapter I number 3.2 and chapter IV notification 36
  UBA announcement of 25 February 2015

**AMS designation:**

AR602Z/NHg for NO, $NO_2$, $SO_2$, $NH_3$ and Hg as well as AR602Z/N for NO, $NO_2$, $SO_2$ and $NH_3$

**Manufacturer:**

OPSIS AB, Furulund, Sweden

**Field of application:**

For measurements at plants requiring official approval (e.g. Directive 2010/75/EU on industrial emissions, chapters III and IV)

**Measuring ranges during the performance test:**

| Components | Certification range | Supplementary range | Unit |
|---|---|---|---|
| NO | 0 - 150* | 0 - 500* | mg/m³ |
| $NO_2$ | 0 - 20* | 0 - 500* | mg/m³ |
| $SO_2$ | 0 - 75* | 0 - 500* | mg/m³ |
| $NH_3$ | 0 - 10* | 0 - 50* | mg/m³ |
| Hg | 0 - 45 | 0 - 100 | µg/m³ |

* at a measurement path length of 1.0 meter

**Software version:**

7.21

**Restrictions:**

1. During performance testing, the requirement of EN 15267-3 with regard to response time was not met for the component Hg.

2. During performance testing, the requirement of EN 15267-3 with regard to the IP Code of the housing was not met.

**Notes:**

1. The maintenance interval is three months for the AR602Z/NHg measuring system and six months for the AR602Z/N measuring system.

2. The measurement path length was 1 m during the lab test and 2 m during the field test.

3. The components NO, $NO_2$, $SO_2$ and $NH_3$ are determined in-situ. The component Hg can also be measured by using the external measurement cell EX060H module (the measurement path length being 2 m) and the MX004 multiplexer module. In this set-up, the measuring system is named AR602Z/NHg. If the component Hg is not included (AR602Z/N), the light path shall remain unchanged.

4. In order to perform regular span point checks for the component Hg, a test gas generator (e. g. HovaCal) must be available.

5. In order to compensate for cross-sensitivity as regards component Hg, the $SO_2$ content (displayed as XXX) in the heated measuring cell has to be determined.

6. During the laboratory and field tests, the length of the heated test gas line for the component Hg was 10 m.

7. If the component Hg is included in the measurements (AR602Z/NHg), the filters within the sampling probe shall be checked and, if necessary, replaced after revision or malfunctions occurring during waste gas scrubbing.

8. Supplementary testing (extension of the maintenance interval) as regards Federal Environmental Agency notices of 17 July 2014 (BAnz AT 5 August 2014 B11, chapter I number 4.2).

**Test report:**
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Report no.: 936/21222333/C of 8 September 2014

| | |
|---|---|
| **36** | **Notification as regards Federal Environment Agency notices of 17 July 2014 (BAnz AT 05 August 2014 B11, chapter I number 4.2)** |

The step motor for the automatic grid finding of Type RDM 543/100A of manufacturer BERGER LAHR in the measuring system AR602Z/N for NO, $NO_2$, $SO_2$ and $NH_3$ as well as AR602Z/NHg for NO, $NO_2$, $SO_2$, $NH_3$ and Hg of the company Opsis AB was discontinued and therefore replaced by the step motor for the automatic grid finding of Type RDM 545/100A of manufacturer BERGER LAHR.

Statement of TÜV Rheinland Energie und Umwelt GmbH of 20 September 2014

## Certified product

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

The AMS AR602Z/NHg for NO, $NO_2$, $SO_2$, $NH_3$ and Hg, as well as its variant the AR602Z/N for NO, $NO_2$, $SO_2$ and $NH_3$ is an in-situ measuring system, which operates according to the principle of DOAS measurement.

The tested measuring system consists of a light source, a receiver, a fibre optic cable and an analyser. With the Differential Optical Absorption Spectroscopy (DOAS), the measuring components are determined in the analyser by way of the characteristic absorption of radiation in the UV range by gaseous components.

The measuring path consists of a light path between a light emitter and a light receiver. The light source in the emitter is a high-pressure xenon lamp.

The light beam generated by the emitter is directed towards the receiver. On its path through the medium, the intensity of the light beam is affected by scattering and absorption by molecules and particles.

The light collected by the receiver is led to the analyser via a fibre optic cable. This cable merely serves as a means to enable installing the analyser at a location where it is protected against dust, excessive moisture, variations in temperature etc.

The measuring system consists of:

- Analyser (AR602Z/N)
- Emitter unit (EM062)
- Receiver unit (RE062)
- Fibre optic cable (OF60 R3)
- Manual

The module for measuring mercury also comprises:

- Sample gas probe SP2000 (manufacturer M&C) in Opsis yellow
- Heated sample gas pipe with interior diameter of 6 mm (length 10 m)
- Heated sample gas cell with an active measuring path length of 2.0 m, including emitter/receiver unit, converter, suction jet pump, flow monitoring, power pack and temperature control (EX060)
- Multiplexer (MX004)

**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 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 its expiration is also accessible on the internet: **qal1.de**.

Certification of AR602Z/NHg for NO, $NO_2$, $SO_2$, $NH_3$ and Hg as well as AR602Z/N for NO, $NO_2$, $SO_2$ and $NH_3$ is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

**Initial certification according to EN 15267**

Certificate no. 0000040333:          29 April 2014

Expiry date of the certificate:          31 March 2019

Test report: 936/21222333/A of 10 October 2013
TÜV Rheinland Energie und Umwelt GmbH, Cologne

Publication: BAnz AT 1 April 2014 B12, chapter I, no. 3.2
UBA announcement of 27 February 2014

**Supplementary testing according to EN 15267**

Certificate no. 0000040333_01:          9 September 2014

Expiry date  of the certificate:          31 March 2019

Test report: 936/21222333/B of 17 February 2014
TÜV Rheinland Energie und Umwelt GmbH, Cologne

Publication: BAnz AT 5 August 2014 B11, chapter I, no. 4.2
UBA announcement of 17 July 2014

**Supplementary testing according to EN 15267**

Certificate no. 0000040333_02:          30 April 2015

Expiry date  of the certificate:          31 March 2019

Test report: 936/21222333/C of 8 September 2014
TÜV Rheinland Energie und Umwelt GmbH, Cologne

Publication: BAnz AT 2 April 2015 B5, chapter I number 3.2
UBA announcement of 25 February 2015

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**Notification:**

Statement of TÜV Rheinland Energie und Umwelt GmbH of 20 September 2014
Publication: BAnz AT 2 April 2015 B5, chapter IV notification 36 (new stepmotor)
UBA announcement of 25 February 2015

## Calculation of overall uncertainty according to EN 14181 and EN 15267-3

**Measuring system**

| | |
|---|---|
| Manufacturer | Opsis AB |
| AMS designation | AR602Z/NHg |
| Serial number of units under test | 1759 / 1760 |
| Measuring principle | UV-DOAS |

**Test report**     936/21222333/C

| | |
|---|---|
| Test laboratory | TÜV Rheinland |
| Date of report | 2014-09-08 |

**Measured component**     Hg

Certification range     0 - 45 µg/m³

**Evaluation of the cross-sensitivity (CS)**
(system with largest CS)

| | | |
|---|---|---|
| Sum of positive CS at zero point | 0.00 | µg/m³ |
| Sum of negative CS at zero point | -0.50 | µg/m³ |
| Sum of postive CS at span point | 1.00 | µg/m³ |
| Sum of negative CS at span point | -1.10 | µg/m³ |
| Maximum sum of cross-sensitivities | 1.20 | µg/m³ |
| Uncertainty of cross-sensitivity | 0.694 | µg/m³ |

**Calculation of the combined standard uncertainty**

| Tested parameter | | | | | $u^2$ | |
|---|---|---|---|---|---|---|
| Repeatability standard deviation at set point * | $u_r$ | 0.450 | µg/m³ | | 0.203 | (µg/m³)² |
| Lack of fit | $u_{lof}$ | 0.404 | µg/m³ | | 0.163 | (µg/m³)² |
| Zero drift from field test | $u_{d.z}$ | 0.260 | µg/m³ | | 0.068 | (µg/m³)² |
| Span drift from field test | $u_{d.s}$ | -0.546 | µg/m³ | | 0.298 | (µg/m³)² |
| Influence of ambient temperature at span | $u_t$ | 0.153 | µg/m³ | | 0.023 | (µg/m³)² |
| Influence of supply voltage | $u_v$ | 0.208 | µg/m³ | | 0.043 | (µg/m³)² |
| Cross-sensitivity (interference) | $u_i$ | 0.694 | µg/m³ | | 0.481 | (µg/m³)² |
| Influence of sample gas flow | $u_p$ | -0.049 | µg/m³ | | 0.002 | (µg/m³)² |
| Uncertainty of reference material at 70% of certification range | $u_{rm}$ | 0.364 | µg/m³ | | 0.132 | (µg/m³)² |

\* The larger value is used :
   "Repeatability standard deviation at span" or
   "Standard deviation from paired measurements under field conditions"

| | | | |
|---|---|---|---|
| Combined standard uncertainty ($u_C$) | $u_c = \sqrt{\sum \left(u_{max,j}\right)^2}$ | 1.19 | µg/m³ |
| Total expanded uncertainty | $U = u_c * k = u_c * 1.96$ | 2.33 | µg/m³ |

| | | |
|---|---|---|
| **Relative total expanded uncertainty** | **U in % of the ELV 30 µg/m³** | **7.8** |
| **Requirement of 2010/75/EU** | **U in % of the ELV 30 µg/m³** | **40.0** |
| Requirement of EN 15267-3 | U in % of the ELV 30 µg/m³ | 30.0 |

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## Calculation of overall uncertainty according to EN 14181 and EN 15267-3

**Measuring system**

| | |
|---|---|
| Manufacturer | OPSIS AB |
| AMS designation | AR602Z/N |
| Serial number of units under test | 1759 / 1760 |
| Measuring principle | UV-DOAS |

**Test report** 936/21222333/C

| | |
|---|---|
| Test laboratory | TÜV Rheinland |
| Date of report | 2014-09-08 |

**Measured component** $NH_3$

Certification range 0 - 10 mg/m³

**Evaluation of the cross-sensitivity (CS)**
(system with largest CS)

| | | |
|---|---|---|
| Sum of positive CS at zero point | 0.18 | mg/m³ |
| Sum of negative CS at zero point | -0.10 | mg/m³ |
| Sum of postive CS at span point | 0.23 | mg/m³ |
| Sum of negative CS at span point | -0.10 | mg/m³ |
| Maximum sum of cross-sensitivities | 0.23 | mg/m³ |
| Uncertainty of cross-sensitivity | 0.133 | mg/m³ |

**Calculation of the combined standard uncertainty**

| Tested parameter | | | | $u^2$ | |
|---|---|---|---|---|---|
| Repeatability standard deviation at set point * | $u_r$ | 0.090 | mg/m³ | 0.008 | (mg/m³)² |
| Lack of fit | $u_{lof}$ | 0.040 | mg/m³ | 0.002 | (mg/m³)² |
| Zero drift from field test | $u_{d.z}$ | 0.069 | mg/m³ | 0.005 | (mg/m³)² |
| Span drift from field test | $u_{d.s}$ | 0.110 | mg/m³ | 0.012 | (mg/m³)² |
| Influence of ambient temperature at span | $u_t$ | 0.058 | mg/m³ | 0.003 | (mg/m³)² |
| Influence of supply voltage | $u_v$ | 0.071 | mg/m³ | 0.005 | (mg/m³)² |
| Cross-sensitivity (interference) | $u_i$ | 0.133 | mg/m³ | 0.018 | (mg/m³)² |
| Influence of sample gas pressure | $u_p$ | 0.088 | mg/m³ | 0.008 | (mg/m³)² |
| Uncertainty of reference material at 70% of certification range | $u_{rm}$ | 0.081 | mg/m³ | 0.007 | (mg/m³)² |
| Excursion of measurement beam | $u_{mb}$ | 0.115 | mg/m³ | 0.013 | (mg/m³)² |

\* The larger value is used :
"Repeatability standard deviation at span" or
"Standard deviation from paired measurements under field conditions"

| | | | |
|---|---|---|---|
| Combined standard uncertainty ($u_C$) | $u_c = \sqrt{\sum \left(u_{max\,j}\right)^2}$ | 0.28 | mg/m³ |
| Total expanded uncertainty | $U = u_c * k = u_c * 1.96$ | 0.55 | mg/m³ |

| | | |
|---|---|---|
| **Relative total expanded uncertainty** | **U in % of the ELV 10 mg/m³** | **5.5** |
| **Requirement of 2010/75/EU** | **U in % of the ELV 10 mg/m³** | **40.0** ** |
| Requirement of EN 15267-3 | U in % of the ELV 10 mg/m³ | 30.0 |

\*\* The EU-directive 2010/75/EU on industrial emissions provides no requirements for this component.
A value of 40 % was used for this.

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## Calculation of overall uncertainty according to EN 14181 and EN 15267-3

**Measuring system**

| | |
|---|---|
| Manufacturer | Opsis AB |
| AMS designation | AR602Z/N |
| Serial number of units under test | 1759 / 1760 |
| Measuring principle | UV-DOAS |

**Test report** | 936/21222333/C
| | |
|---|---|
| Test laboratory | TÜV Rheinland |
| Date of report | 2014-09-08 |

**Measured component** | NO
| | |
|---|---|
| Certification range | 0 - 150 mg/m³ |

**Evaluation of the cross-sensitivity (CS)**
(system with largest CS)

| | | |
|---|---|---|
| Sum of positive CS at zero point | 0.00 | mg/m³ |
| Sum of negative CS at zero point | 0.00 | mg/m³ |
| Sum of postive CS at span point | 0.00 | mg/m³ |
| Sum of negative CS at span point | 0.00 | mg/m³ |
| Maximum sum of cross-sensitivities | 0.00 | mg/m³ |
| Uncertainty of cross-sensitivity | 0.000 | mg/m³ |

**Calculation of the combined standard uncertainty**

| Tested parameter | | | | | $u^2$ | |
|---|---|---|---|---|---|---|
| Repeatability standard deviation at set point * | $u_r$ | 0.600 | mg/m³ | | 0.360 | (mg/m³)² |
| Lack of fit | $u_{lof}$ | -0.635 | mg/m³ | | 0.403 | (mg/m³)² |
| Zero drift from field test | $u_{d.z}$ | 0.779 | mg/m³ | | 0.607 | (mg/m³)² |
| Span drift from field test | $u_{d.s}$ | -1.386 | mg/m³ | | 1.921 | (mg/m³)² |
| Influence of ambient temperature at span | $u_t$ | 0.100 | mg/m³ | | 0.010 | (mg/m³)² |
| Influence of supply voltage | $u_v$ | 0.123 | mg/m³ | | 0.015 | (mg/m³)² |
| Cross-sensitivity (interference) | $u_i$ | 0.000 | mg/m³ | | 0.000 | (mg/m³)² |
| Influence of sample gas pressure | $u_p$ | 0.367 | mg/m³ | | 0.135 | (mg/m³)² |
| Uncertainty of reference material at 70% of certification range | $u_{rm}$ | 1.212 | mg/m³ | | 1.470 | (mg/m³)² |
| Excursion of measurement beam | $u_{mb}$ | -0.537 | mg/m³ | | 0.288 | (mg/m³)² |

\* The larger value is used :
   "Repeatability standard deviation at span" or
   "Standard deviation from paired measurements under field conditions"

| | | | |
|---|---|---|---|
| Combined standard uncertainty ($u_C$) | $u_c = \sqrt{\sum \left(u_{max\,j}\right)^2}$ | 2.28 | mg/m³ |
| Total expanded uncertainty | $U = u_c * k = u_c * 1.96$ | 4.47 | mg/m³ |

| | | |
|---|---|---|
| **Relative total expanded uncertainty** | **U in % of the ELV 100 mg/m³** | **4.5** |
| **Requirement of 2010/75/EU** | **U in % of the ELV 100 mg/m³** | **20.0** |
| Requirement of EN 15267-3 | U in % of the ELV 100 mg/m³ | 15.0 |

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## Calculation of overall uncertainty according to EN 14181 and EN 15267-3

**Measuring system**

| | |
|---|---|
| Manufacturer | Opsis AB |
| AMS designation | AR602Z/N |
| Serial number of units under test | 1759 / 1760 |
| Measuring principle | UV-DOAS |

**Test report** 936/21222333/C

| | |
|---|---|
| Test laboratory | TÜV Rheinland |
| Date of report | 2014-09-08 |

**Measured component** $NO_2$

Certification range 0 - 20 mg/m³

**Evaluation of the cross-sensitivity (CS)**
(system with largest CS)

| | | |
|---|---|---|
| Sum of positive CS at zero point | 0.52 | mg/m³ |
| Sum of negative CS at zero point | -0.13 | mg/m³ |
| Sum of postive CS at span point | 0.46 | mg/m³ |
| Sum of negative CS at span point | -0.57 | mg/m³ |
| Maximum sum of cross-sensitivities | -0.57 | mg/m³ |
| Uncertainty of cross-sensitivity | -0.329 | mg/m³ |

**Calculation of the combined standard uncertainty**

| Tested parameter | | | | | $u^2$ | |
|---|---|---|---|---|---|---|
| Standard deviation from paired measurements under field conditions * | $u_D$ | 0.053 | mg/m³ | | 0.003 | (mg/m³)² |
| Lack of fit | $u_{lof}$ | 0.081 | mg/m³ | | 0.007 | (mg/m³)² |
| Zero drift from field test | $u_{d.z}$ | 0.150 | mg/m³ | | 0.023 | (mg/m³)² |
| Span drift from field test | $u_{d.s}$ | 0.185 | mg/m³ | | 0.034 | (mg/m³)² |
| Influence of ambient temperature at span | $u_t$ | 0.058 | mg/m³ | | 0.003 | (mg/m³)² |
| Influence of supply voltage | $u_v$ | 0.058 | mg/m³ | | 0.003 | (mg/m³)² |
| Cross-sensitivity (interference) | $u_i$ | -0.329 | mg/m³ | | 0.108 | (mg/m³)² |
| Influence of sample gas pressure | $u_p$ | 0.088 | mg/m³ | | 0.008 | (mg/m³)² |
| Uncertainty of reference material at 70% of certification range | $u_{rm}$ | 0.162 | mg/m³ | | 0.026 | (mg/m³)² |
| Excursion of measurement beam | $u_{mb}$ | 0.144 | mg/m³ | | 0.021 | (mg/m³)² |

\* The larger value is used :
"Repeatability standard deviation at span" or
"Standard deviation from paired measurements under field conditions"

| | | | |
|---|---|---|---|
| Combined standard uncertainty ($u_C$) | $u_c = \sqrt{\sum \left(u_{max,j}\right)^2}$ | 0.49 | mg/m³ |
| Total expanded uncertainty | $U = u_c * k = u_c * 1.96$ | 0.95 | mg/m³ |

| | | |
|---|---|---|
| **Relative total expanded uncertainty** | **U in % of the range 20 mg/m³** | **4.8** |
| **Requirement of 2010/75/EU** | **U in % of the range 20 mg/m³** | **20.0** |
| Requirement of EN 15267-3 | U in % of the range 20 mg/m³ | 15.0 |

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## Calculation of overall uncertainty according to EN 14181 and EN 15267-3

**Measuring system**

| | |
|---|---|
| Manufacturer | Opsis AB |
| AMS designation | AR602Z/N |
| Serial number of units under test | 1759 / 1760 |
| Measuring principle | UV-DOAS |

**Test report** 936/21222333/C

| | |
|---|---|
| Test laboratory | TÜV Rheinland |
| Date of report | 2014-09-08 |

**Measured component** $SO_2$

Certification range 0 - 75 mg/m³

**Evaluation of the cross-sensitivity (CS)**
(system with largest CS)

| | | |
|---|---|---|
| Sum of positive CS at zero point | 0.00 | mg/m³ |
| Sum of negative CS at zero point | -0.27 | mg/m³ |
| Sum of postive CS at span point | 0.73 | mg/m³ |
| Sum of negative CS at span point | -1.47 | mg/m³ |
| Maximum sum of cross-sensitivities | -1.47 | mg/m³ |
| Uncertainty of cross-sensitivity | -0.849 | mg/m³ |

**Calculation of the combined standard uncertainty**

**Tested parameter** $u^2$

| | | | | | | |
|---|---|---|---|---|---|---|
| Standard deviation from paired measurements under field conditions * | $u_D$ | 0.189 | mg/m³ | 0.036 | (mg/m³)² |
| Lack of fit | $u_{lof}$ | 0.271 | mg/m³ | 0.073 | (mg/m³)² |
| Zero drift from field test | $u_{d.z}$ | 0.520 | mg/m³ | 0.270 | (mg/m³)² |
| Span drift from field test | $u_{d.s}$ | 0.390 | mg/m³ | 0.152 | (mg/m³)² |
| Influence of ambient temperature at span | $u_t$ | 0.208 | mg/m³ | 0.043 | (mg/m³)² |
| Influence of supply voltage | $u_v$ | 0.085 | mg/m³ | 0.007 | (mg/m³)² |
| Cross-sensitivity (interference) | $u_i$ | -0.849 | mg/m³ | 0.720 | (mg/m³)² |
| Influence of sample gas pressure | $u_p$ | 0.184 | mg/m³ | 0.034 | (mg/m³)² |
| Uncertainty of reference material at 70% of certification range | $u_{rm}$ | 0.606 | mg/m³ | 0.368 | (mg/m³)² |
| Excursion of measurement beam | $u_{mb}$ | -0.277 | mg/m³ | 0.077 | (mg/m³)² |

\* The larger value is used :
"Repeatability standard deviation at span" or
"Standard deviation from paired measurements under field conditions"

| | | | |
|---|---|---|---|
| Combined standard uncertainty ($u_C$) | $u_c = \sqrt{\sum \left(u_{max\,j}\right)^2}$ | 1.33 | mg/m³ |
| Total expanded uncertainty | $U = u_c * k = u_c * 1.96$ | 2.62 | mg/m³ |

| | | |
|---|---|---|
| **Relative total expanded uncertainty** | **U in % of the ELV 50 mg/m³** | **5.2** |
| **Requirement of 2010/75/EU** | **U in % of the ELV 50 mg/m³** | **20.0** |
| Requirement of EN 15267-3 | U in % of the ELV 50 mg/m³ | 15.0 |

# CONFIRMATION

Notification on changes according to EN 15267 regarding
certificate 0000040333_02 dated 30 April 2015

| | |
|---|---|
| **Measuring system:** | AR602Z/NHg for NO, $NO_2$, $SO_2$, $NH_3$ and Hg and AR602Z/N for NO, $NO_2$, $SO_2$ and $NH_3$ |
| **Manufacturer:** | Opsis AB<br>Skytteskogsvägen 16<br>244 02 Furulund<br>Sweden |

**German Federal Environmental Agency (UBA)**
**Announcement about the uniform practice in**
**monitoring emissions and ambient air.**
**22 July 2015**
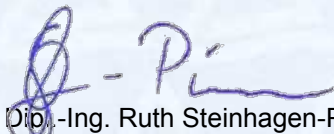**Federal Gazette: BAnz AT 26.08.2015 B4**

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

**15** Notification as regards Federal Environment Agency (UBA) notices of 17 July 2014 (Federal Gazette BAnz AT 05.08.2014 B11, chapter I number 4.2) and of 25 February 2015 (Federal Gazette BAnz AT 02.04.2015 B5, chapter IV 36th notification)

The measuring systems AR602Z/N for $SO_2$, NO, $NO_2$ and $NH_3$ and AR602Z/NHg for $SO_2$, NO, $NO_2$, $NH_3$ and Hg, manufactured by Opsis AB, are also available with the option "ER060/062AUTO with automatic QAL3 testing system" for regular automatic functional checks with the main component NO. The "ER060/062AUTO with automatic QAL3 testing system" option does not serve the purpose of adjusting the AMS, nor does it replace the manual zero and span point checks required during the maintenance interval. It solely gives information of the status of the measuring systems between the external test gas offerings.

Statement of TÜV Rheinland Energie und Umwelt GmbH of 23 March 2015

TÜV Rheinland Energie und Umwelt GmbH
Cologne, 04 November 2015

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

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| **www.umwelt-tuv.de**<br>teu@umwelt-tuv.de<br>Tel. +49 221 806-5200 | TÜV Rheinland Energie und Umwelt GmbH<br>Am Grauen Stein<br>51105 Cologne |

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.