



# PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

**AR602Z/Hg**

Manufactured by:

**Opsis AB**  
P.O. Box 244  
S-244 02 Furulund  
Sweden

Has been assessed by Sira Certification Service  
and for the conditions stated on this certificate complies with:

**MCERTS Performance Standards for Continuous Emissions Monitoring  
Systems, Version 3.4 dated July 2012,  
EN15267-3:2007,  
& QAL 1 as defined in EN 14181: 2004**

Certification Ranges :

Hg 0 to 45  $\mu\text{g}/\text{m}^3$   
0 to 100  $\mu\text{g}/\text{m}^3$

Project No.: 16A27931/ 70130912  
Certificate No: Sira MC120201/01  
Initial Certification: 25 September 2012  
This Certificate issued: 27 November 2017  
Renewal Date: 24 September 2022

R Cooper I Eng MInst MC  
Technical Director

MCERTS is operated on behalf of the Environment Agency by

## Sira Certification Service

Unit 6, Hawarden Industrial park  
Hawarden, Deeside, CH5 3US  
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## Approved Site Application

*Any potential user should ensure, in consultation with the manufacturer, that the monitoring system is suitable for the intended application. For general guidance on monitoring techniques refer to the Environment Agency Monitoring Technical Guidance Notes available at [www.mcerts.net](http://www.mcerts.net)*

On the basis of the assessment and the ranges required for compliance with EU Directives this instrument is considered suitable for use on waste incineration and large coal-fired combustion plant applications. This CEM has been proven suitable for its measuring task (parameter and composition of the flue gas) by use of the QAL 1 procedure specified in EN14181, for LCPD and WID applications for the ranges specified. The lowest certified range for each determinand shall not be more than 1.5X the daily average emission limit value (ELV) for WID applications, and not more than 2.5X the ELV for LCPD and other types of application.

The field test was conducted on a municipal waste incinerator from 6 May 2011 to 23 August 2011.

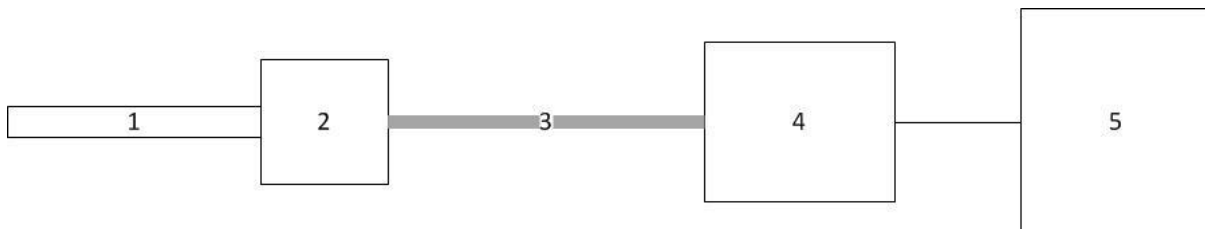
## Basis of Certification

This certification is based on the following Test Report(s) and on Sira's assessment and ongoing surveillance of the product and the manufacturing process:

TÜV Rheinland Report Number 936/21215492/A dated 10 October 2011

## Product Certified

The AR602Z/Hg measuring system consists of the following parts:



1. Sample Probe	2. Heated Filter	3. Heated Sample Line	4. Gas Conditioning	5. Analyser
Model: Opsis HF100	Model: Opsis HF100	Model: Opsis HL100 10m	Model: Opsis HC100	Model: AR602 UV analyser

This certificate applies to all instruments fitted with software version 7.21 (serial number 1498 onwards).

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## Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: 5°C to 40°C  
 Instrument IP rating: IP20: Analyser\*, must be placed in a protected area  
 IP54: Duct mounted parts (transmitter & receiver unit)

\*Must be installed in an environment which protects it from dust and splash water (closed measuring rack)

Results expressed are for range 0 to 45 µg/m<sup>3</sup> unless otherwise stated.

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time						
Hg					140s	<200s
Hg (0 to 100mg/m <sup>3</sup> )					140s	<200s
Repeatability standard deviation at zero point						
Hg	0.40					<2.0%
Repeatability standard deviation at reference point						
Hg	0.40					<2.0%
Lack-of-fit						
Hg			1.56			<2.0%
Hg (0 to 100mg/m <sup>3</sup> )			-1.40			<2.0%
Influence of ambient temperature zero point						
Hg	-0.40					<5.0%
Influence of ambient temperature reference point						
Hg		0.70				<5.0%
Influence of sample gas flow for extractive CEMS						
Hg	-0.20					<2.0%
Influence of voltage variations 320 to 420V						
All gases		-0.90				<2.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Cross-sensitivity at zero with interferents: O <sub>2</sub> , H <sub>2</sub> O, CO, CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, NO, NO <sub>2</sub> , NH <sub>3</sub> , SO <sub>2</sub> , HCl Hg			-1.55		Note 2	<4.0%
Cross-sensitivity at reference with interferents: O <sub>2</sub> , H <sub>2</sub> O, CO, CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, NO, NO <sub>2</sub> , NH <sub>3</sub> , SO <sub>2</sub> , HCl Hg				2.67	Note 2	<4.0%
Measurement uncertainty Hg					Guidance - at least 25% below max permissible uncertainty 9.3%	
Calibration function (field) Hg					>0.9891	>0.90
Response time (field) Hg					288 Note 1 Note 3	<200s
Lack of fit (field) Hg			1.89			<2.0%
Maintenance interval					4 weeks Note 4	>8 days

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Zero and Span drift requirement	<p>In order to determine zero and span drift, zero and sample gas have to be admitted with the help of an external test gas generator at regular intervals (at least once per maintenance interval). The measuring system does not have a mechanism to compensate for zero and span drift.</p> <p>The received light level is analysed and displayed for each measurement. If the light level falls below a specified level (e.g. due to contamination), a status signal is set.</p>					<p>Clause 6.13 &amp; 10.13</p> <p>Manufacturer shall provide a description of the technique to determine and compensate for zero and span drift.</p>
Change in zero point over maintenance interval Hg				1.7		<3.0%
Change in reference point over maintenance interval Hg				-2.5		<3.0%
Availability					98.4%	>95%
Reproducibility Hg			1.6			<3.3%

Note 1: The response time reported in the fieldtest does not meet the requirement for EN15267-3. However, this extended time was caused by a significant lag time caused by the volume of the test rig.

Note 2: In order to compensate for cross-sensitivity, the SO<sub>2</sub> content has to be determined in the measuring cell.

Note 3: During the laboratory and field test a heated test gas line of 10m length was used.

Note 4: The AR602Z/Hg has a maintenance interval of four weeks. The work detailed below has to be carried out at regular intervals, depending on local conditions:

Monthly maintenance activities:

- Visual inspection of the entire AMS,
- Checking of target temperatures of the probe, heated line, converter and measuring cell,
- Checking of the measured light level,
- Checking of the zero point by admitting wet synthetic air to the test gas connection of the probe,
- Checking of the reference point by admitting Hg sample gas obtained from an evaporated HgCl<sub>2</sub> solution to the test gas connection of the probe. Checking of the reference point requires a test gas generator (e.g. Type HovaCal) as well as a suitable HgCl<sub>2</sub>-solution.

Biannual maintenance activities:

Replacement of the xenon lamps

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The test lab suggest to schedule several days for necessary adjustment and maintenance works in order to avoid outing times, which exceed the limits stipulated in the 13th and 17th BImSchV.

## Description

The measurement of mercury atoms is made with UV DOAS. Mercury molecules such as  $\text{HgCl}_2$  are converted into atomic mercury in a catalytic converter. The system is hot wet extractive system using a probe, filter, converter, measurement cell and ejector pump where all components are heated. The AR602 UV DOAS analyzer used in the mercury system can measure other components such as  $\text{SO}_2$ ,  $\text{NO}_x$  and  $\text{NH}_3$ .

## General Notes

1. This certificate is based upon the equipment tested. The Manufacturer is responsible for ensuring that on-going production complies with the standard(s) and performance criteria defined in this Certificate. 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 system shall be subject to regular surveillance according to 'Regulations Applicable to the Holders of Sira Certificates'. The design of the product certified is defined in the Sira Design Schedule for certificate No. Sira MC 120201/01
2. If certified product is found not to comply, Sira Certification Service should be notified immediately at the address shown on this certificate.
3. The Certification Marks that can be applied to the product or used in publicity material are defined in 'Regulations Applicable to the Holders of Sira Certificates'.
4. This document remains the property of Sira and shall be returned when requested by the company.

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