

PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

AR500 Open Path Monitor with ER120

Manufactured by:

Opsis AB

PO Box 244

5-244 02 Furulund

Sweden

has been assessed by CSA Group
and for the conditions stated on this certificate complies with:

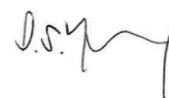
**MCERTS performance standards for ambient monitoring equipment,
Updated 9 September 2025
and**

**Open Path Ambient Air Quality Monitoring Systems using Differential Optical Absorption
Spectrometry
(DOAS) and FTIR Spectroscopy Version 3, August 2017**

Certification ranges:

NO ₂	400 µg/m ³
SO ₂	700 µg/m ³
O ₃	360 µg/m ³

Project No.: 80297529
Certificate No: CSA MC 160295/02
Initial Certification: 14 June 2016
This Certificate issued: 11 June 2026
Renewal Date: 13 June 2031



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The MCERTS certificate consists of this document in its entirety.

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Approved Site Application

Any potential user should make sure, in consultation with the manufacturer, that the monitoring system is suitable for the intended application. For further information on stack emissions monitoring refer to the Environment Agency's guidance available at www.mcerts.net

On the basis of these tests this certificate is valid when the instrument is used for urban air quality monitoring and similar applications.

Basis of Certification

This certification is based on the following test report(s) and on CSA Group's assessment and ongoing surveillance of the product and the manufacturing process:

TÜV Rhineland Cologne report: 936/21211350/B dated 7th October 2011

The testing for the Opsis AB AR500 Open Path Monitor with ER120 was conducted in line with EN 14211, EN 14212 and EN 14625. The analyser is not based on an EN standard method and therefore the procedure described in Figure 2 of the MCERTS Performance Standards for Continuous Ambient Air Quality Monitoring Systems (which refers to the EC guide Demonstration of Equivalence of Ambient Air Monitoring Methods) has been applied.

Product Certified

The AR500 measuring system consists of the following parts:

- AR500 analyser
- Combined Emitter – Receiver Unit ER120

This certificate applies to all instruments fitted with software version 7.21 (serial number 1329 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
 Sender/receiver unit IP65

Note: If the instrument is supplied with an enclosure, then the ambient temperature shall be monitored inside the enclosure to ensure that it stays within the above ambient temperature range.

Results are expressed as error % of the measured value, unless otherwise stated.

Test	Results expressed as % of the measured value				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time						
NO ₂					120s	<180s
SO ₂					120s	<180s
O ₃					120s	<180s
Repeatability standard deviation at zero point						
NO ₂					<0.1 nmol/mol	<1.0 nmol/mol
SO ₂					<0.1 nmol/mol	<1.0 nmol/mol
O ₃					<0.2 nmol/mol	<1.0 nmol/mol
Repeatability standard deviation at reference point						
NO ₂					<2.0 nmol/mol	<3.0 nmol/mol
SO ₂					<0.1 nmol/mol	<3.0 nmol/mol
O ₃					<0.6nmol/mol	<3.0 nmol/mol
Residual lack-of-fit at zero						
NO ₂					<-3.79 nmol/mol	<5.0 nmol/mol
SO ₂					<-0.64 nmol/mol	<5.0 nmol/mol
O ₃					<-0.41 nmol/mol	<5.0 nmol/mol
Lack-of-fit						
NO ₂		0.8				<4% of measured value
SO ₂			1.6			<4% of measured value
O ₃	0.4					<4% of measured value

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Test	Results expressed as % of the measured value				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Short term drift at zero level (12hrs)						
NO ₂					<0.3 nmol/mol over 12 h	<2.0 nmol/mol over 12 h
SO ₂					<0.9 nmol/mol over 12 h	<2.0 nmol/mol over 12 h
O ₃					<-0.2 nmol/mol over 12 h	<2.0 nmol/mol over 12 h
Short term drift at span level (12hrs)						
NO ₂					<0.9 nmol/mol over 12 h	<6.0 nmol/mol over 12 h
SO ₂					<-0.5 nmol/mol over 12 h	<6.0 nmol/mol over 12 h
O ₃					<1.9 nmol/mol over 12 h	<6.0 nmol/mol over 12 h
Sensitivity coefficient to surrounding air temperature at zero.						
NO ₂					0.02 nmol/mol/K	<3.0 nmol/mol/K
SO ₂					-0.02 nmol/mol/K	<1.0 nmol/mol/K
O ₃					0.02 nmol/mol/K	<1.0 nmol/mol/K
Sensitivity coefficient to surrounding air temperature at span.						
NO ₂					0.05 nmol/mol/K	<3.0 nmol/mol/K
SO ₂					-0.06 nmol/mol/K	<1.0 nmol/mol/K
O ₃					0.15 nmol/mol/K	<1.0 nmol/mol/K
Sensitivity coefficient to sample gas temperature.						
NO ₂					-0.03 nmol/mol/K	<3.0 nmol/mol/K
SO ₂					0.02 nmol/mol/K	<1.0 nmol/mol/K
O ₃					0.01 nmol/mol/K	<1.0 nmol/mol/K

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Test	Results expressed as % of the measured value				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Dependence on supply voltage						
NO ₂					<0.07 nmol/mol/V	<0.3 nmol/mol/V
SO ₂					<0.01 nmol/mol/V	<0.3 nmol/mol/V
O ₃					<0.01 nmol/mol/V	<0.3 nmol/mol/V
Single gas interference						
NO ₂						
CO ₂					2.6 nmol/mol	<5.0 nmol/mol
NH ₃					2.3 nmol/mol	<5.0 nmol/mol
O ₃					2.2 nmol/mol	<2.0 nmol/mol
						Note 1
SO ₂						
H ₂ S					0.5 nmol/mol	<5.0 nmol/mol
NH ₃					0.4 nmol/mol	<5.0 nmol/mol
NO					-0.6 nmol/mol	<5.0 nmol/mol
NO ₂					0.4 nmol/mol	<5.0 nmol/mol
m-Xylene					1.4 nmol/mol	<10.0 nmol/mol
O ₃						
m-Xylene					2.6 nmol/mol	<5.0 nmol/mol
toluene					2.2 nmol/mol	<5.0 nmol/mol
Averaging effect						
NO ₂		-0.6				<7%
SO ₂	-0.1					<7%
O ₃		-0.9				<7%
Total expanded uncertainty						
NO ₂					6.52	<15%
SO ₂					6.23	<15%
O ₃					8.01	<15%

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Test	Results expressed as % of the measured value				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Period of unattended operation (Maintenance interval) All gases					4 weeks	>2 weeks
Zero drift (over maintenance interval) NO ₂ SO ₂ O ₃					1.62 nmol/mol -0.92 nmol/mol -1.84 nmol/mol	<5 nmol/mol <5 nmol/mol <5 nmol/mol
Span drift (over maintenance interval) NO ₂ SO ₂ O ₃					0.50 -2.07 2.90	<5% of maximum certification range
Field reproducibility NO ₂ SO ₂ O ₃					4.72 4.83 2.41	<5% of the average over three months period
Availability (data capture) All gases					96.7%	>90%

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Description

The system is an open path ambient air gas measurement system that uses an AR500 (UV) analyser and transmitter and receiver. The AR500 analyser is based upon UV absorption techniques for measuring SO₂, NO₂ and O₃.

The transmitter and receiver units are mounted opposite each other typically 200-800 metres apart. The receiver is connected to the control unit by a fibre optic cable.

The AR500 analyser system can measure other gases but these are not included under the certification, please contact the manufacturer for details.

The ER110 (EM110 emitter and RE110 receiver) can be used on path up to approximately 500 metres and the ER150 (EM150 emitter and RE150 receiver) up to approximately 1000 metres. The difference is the diameter of the two mirror options, the ER110 mirror is 100mm and the ER150 mirror is 150mm. The emitter contains a xenon lamp and a mirror.

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 CSA Group Testing UK Ltd Certificates'.
2. The design of the product certified is held and maintained by TÜV Rheinland for certificate No. CSA MC160295.
3. If a certified product is found not to comply, CSA Group should be notified immediately at the address shown on this certificate.
4. The certification marks that can be applied to the product or used in publicity material are defined in 'Regulations Applicable to the Holders of CSA Group Testing UK Ltd Certificates'.
5. This document remains the property of CSA Group and shall be returned when requested by CSA Group.

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