

PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

Serinus 30 CO Analyser

manufactured by:

Ecotech Pty Ltd

1492 Ferntree Gully Road
Knoxfield, Victoria, 3180
Australia

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

**MCERTS Performance Standards for Continuous Ambient Air Quality
Monitoring Systems, Version 6, dated December 2008,**

Certification Ranges :

CO 0 to 100 ppm

Project No: 674/0362
Certificate No: Sira MC100166/03
Initial Certification: 25 February 2010
This Certificate Issued: 06 June 2012
Renewal Date: 24 February 2015

Technical Director

MCERTS is operated on behalf of the Environment Agency by

Sira Certification Service

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Registered Office: Rake Lane, Eccleston, Chester, UK CH4 9JN*

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

All tests have been conducted in accordance with BS EN 14626. On the basis of these tests this certificate is valid when the instrument is used for urban air quality monitoring and similar applications.

The field trial was conducted on an urban background site for 3 months.

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:

Sira ^(Note 1) Report 674/0362 dated 17th February 2010

Ecotech ^(Note 2) Report MCERTS Application Serinus 30 Carbon Monoxide Analyser dated 29th January 2010

Note 1: UKAS accredited for product certification (0011) to EN 45011:1998 for MCERTS Performance Standards for Continuous Ambient Air Quality Monitoring Systems, Version 6, dated December 2008

Note 2: NATA accredited test laboratory to ISO/IEC 17025:2005 for type approval tests according to EN 14626:2005

Product Certified

The Serinus 30 CO analyser measuring system consists of the following parts:

- Infrared source
- Gas filter wheel
- Measurement cell
- IR detector

This certificate applies to all instruments fitted with software version 1.23.0000 (serial number 08-0760 onwards).

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Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: 0°C to +30°C

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.

Test	Results expressed as % of measured value				Other results	MCERTS specification Note: $\mu\text{mol/mol} = \text{ppm}$
	<0.5	<1	<2	<5		
Repeatability at zero					0.032 $\mu\text{mol/mol}$	<1 $\mu\text{mol/mol}$
Repeatability at hourly limit value					0.011 $\mu\text{mol/mol}$	<3 $\mu\text{mol/mol}$
Residual lack of fit at zero					0.084 $\mu\text{mol/mol}$	<0.2 $\mu\text{mol/mol}$
Lack of fit (largest residual from the linear regression line)		0.81				<4%
Sensitivity coefficient to sample gas pressure					0.087 $\mu\text{mol/mol}$	<0.7 $\mu\text{mol/mol/kPa}$
Sensitivity coefficient to sample gas temperature					0.019 $\mu\text{mol/mol}$	<0.3 $\mu\text{mol/mol/K}$
Sensitivity coefficient to surrounding air temperature					0.043 $\mu\text{mol/mol}$	<0.3 $\mu\text{mol/mol/K}$
Sensitivity coefficient to electrical supply voltage					-0.001 $\mu\text{mol/mol}$	<0.3 $\mu\text{mol/mol/V}$
Interference by H ₂ O (at concentration of 19 nmol/mol)					-0.126 $\mu\text{mol/mol}$	<1.0 $\mu\text{mol/mol}$
Interference by NO (concentration of 1.0 $\mu\text{mol/mol}$)					-0.140 $\mu\text{mol/mol}$	<0.5 $\mu\text{mol/mol}$
Interference by CO ₂ (at concentration of 500 $\mu\text{mol/mol}$)					-0.008 $\mu\text{mol/mol}$	<0.5 $\mu\text{mol/mol}$
Interference by N ₂ O (at concentration of 50 $\mu\text{mol/mol}$)					-0.173 $\mu\text{mol/mol}$	<0.5 $\mu\text{mol/mol}$

Test	Results expressed as % of measured value	Other results	MCERTS specification
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	<0.5	<1	<2	<5		Note: $\mu\text{mol/mol} = \text{ppm}$
Averaging effect			1.79			<7%
Short term zero drift (over 12h)					-0.095 $\mu\text{mol/mol}$	<0.10 $\mu\text{mol/mol}$
Short term span drift (over 12h)					-0.018 $\mu\text{mol/mol}$	<0.60 $\mu\text{mol/mol}$
Response time (rise)					67.3s	180 s
Response time (fall)					63.5s	180 s
Difference between rise and fall time					4.8s	<10s
Reproducibility under field conditions				4.14		<5% averaged over three month period
Long term zero drift (over 3months)					-0.320 $\mu\text{mol/mol}$	<0.5 $\mu\text{mol/mol}$
Long term span drift (over 3 months)		0.84				<5% of the max of certification range
Period of unattended operation					3 months	3 months not less than 2 weeks
Availability (data capture)					98.96%	>90%
Total expanded uncertainty					11.81%	<15%

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Description:

The measurement of carbon monoxide in the Serinus 30 is based on non-dispersive infrared spectrometry; CO absorbs infrared radiation (IR) at a wavelength near 4.7 μ m. Specifically the method involves determining the difference in infrared energy absorption passed by the optical system between a gas sample containing the compound of interest and a reference path. The difference in infrared energy absorbed is proportional to the concentration of CO.

Light produced by an infrared source passes through the 'chopper wheel' (a gas filter alternating between CO and N₂) and into the cell. Inside the cell, the IR light is passed up and down, reflecting off mirrors, to achieve the sensitivity required, and then is focused out of the cell onto the detector. Flowing through the analyzer cell, the sample gas stream is irradiated by this infrared light. The differing intensity of light focused onto the detector from each chopper wheel window gives the CO sample concentration. The chopper wheel (correlation wheel) contains three compartments, one containing CO which acts as a reference, the second one containing N₂ which allows the measurement of CO, and the last one contains a mask to measure cell background levels.

The analyzer software automatically corrects for gas temperature and pressure changes and is referenced to 0°C, 20°C or 25°C at 1 atmosphere. The analyser can store 8 years of one minute data of up to twelve analyser parameters.

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 MC100166/02.
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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