PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

G-CEM 4100 Extractive Multigas Analyser

manufactured by:

CODEL International Ltd

Station Building
Station Road
Bakewell
Derbyshire
DE45 1GE
UK

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

MCERTS Performance Standards for Continuous Emission Monitoring Systems, Version 2, Revision 1 (April 2003)

Certification Ranges :

NO	0 to 134 mg/m^3 (0 to 100 ppm)
	0 to 1340 mg/m^3 (0 to 1000 ppm)
NO_2	0 to 82 mg/m^3 (0 to 40 ppm)
CO	0 to 125 mg/m^3 (0 to 100 ppm)
	0 to 1250 mg/m^3 (0 to 1000 ppm)
SO_2	0 to 286 mg/m^3 (0 to 100 ppm)
	0 to 2860 mg/m^3 (0 to 1000 ppm)
H_2O	0 to 30 % vol

Project No:	674/0235 & 674/0317
Certificate No:	Sira MC 070116/02
Initial Certification:	03 October 2007
This Certificate Issued	25 February 2008
Renewal Date:	03 October 2012

Technical Director

MCERTS is operated on behalf of the Environment Agency by

Sira Certification Service
12 Acorn Industrial Park, Crayford Road, Crayford
Dartford, Kent, UK, DA1 4AL
Tel: 01322 520500 Fax: 01322 520501

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Approved Site Application

Any potential user should ensure, in consultation with the manufacturer that the emission monitoring system is suitable for the process on which it will be installed.

For general guidance on stack emission monitoring techniques refer to Environment Agency Technical Guidance Note M2: Monitoring of stack emissions to air. Operators with installations falling under the Large Combustion Plant Directive or Waste Incineration Directive must refer to Technical Guidance Note M20: Quality Assurance of Continuous Emission Monitoring Systems. For guidance on the suitability of CEMS for their installations, M2 and M20 are available on the Environment Agency's website at www.mcerts.net

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:

NPL Report	Ref: E04050085/1 Codel 01 dated 21st December 2005
AEA Report	Ref: AEAT/ENV/R/2050/Issue 1 dated October 2005
TUV Rheinland	Ref: 936/21208236/A dated 18/09/07

Product Certified

The G-CEM 4100 measuring system consists of the following parts:

- Sample probe and heated sample line
- Transceiver unit and detector system housed in air conditioned cabinet
- Gas Control Unit (GCU)
- Central Datapoint Controller (CDC)

MCERTS certified products are identified by an MCERTS label stating the determinands covered by the scope of the certification. This certificate applies to all instruments fitted with software versions Master 507 041 C, Slave 507 020 A onwards.

Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: -20^0C to $+50^0$C

Unless otherwise stated the evaluation was carried out on the certification ranges for NO 0 to 134 mg/m^3, NO_2 0 to 82 mg/m^3, CO 0 to 125 mg/m^3, SO_2 0 to 286 mg/m^3 and H_20 0 to 30%vol.

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<4		
Linearity						
NO		0.6				<2%
CO		1.0				<2%
SO_2		1.0				<2%
NO_2			1.4			<2%
H_2O	0.2					<2%
Cross-sensitivity (H_2O, CO_2, CH_4, N_20)						
NO		1.0				<4%
CO	0.0				See note 1	<4%
SO_2			-2.0			<4%
NO_2	0.0					<4%
H_2O	0.0					<4%
Temperature dependent zero shift						
NO	-0.02					<0.3%/^{o}C
CO	0.00					<0.3%/^{o}C
SO_2	-0.04					<0.3%/^{o}C
NO_2	0.00					<0.3%/^{o}C
H_2O	0.00					<0.3%/^{o}C

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<4		
Temperature dependent upper reference point shift						
NO	-0.04					<0.3%/^{o}C
CO	-0.02					<0.3%/^{o}C
SO_2	0.04					<0.3%/^{o}C
NO_2	0.10					<0.3%/^{o}C
H_2O	0.22					<0.3%/^{o}C
Response time						
NO					159s	<200s
CO					157s	<200s
SO_2					162s	<200s
NO_2					160s	<200s
H_2O					171s	<200s
Detection Limit						
NO			1.1			<2.0%
CO	0.1					<2.0%
SO_2			1.9			<2.0%
NO_2			2.0			<2.0%
H_2O	0.0					<2.0%
Interference of test gas flow on the measurement signal						
CO	0.3					<1.0%
Vibration test (10 to 60Hz (±0.3mm), 60 to 150Hz at 19.6m/s^2)					Note 2	To be reported
Mains voltage (190V to 250V)						
CO	0.0					<2%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<4		
Sample gas pressure (3kPa change)						
CO	0.1					To be reported
Sample gas temperature (130°C & 160°C)						
NO, CO	0.2					To be reported
SO_2, H_2O	0.1					
NO_2	0.3					
Analysis function (field) Note 3						
NO					97.6%	>95%
CO					97.2%	>95%
NO_2					95.1%	>95%
H_2O					97.4%	>95%
Availability Note 3					97.2%	>95%
Zero and span drift per week during field trial Note 3						
NO	0.22					<2%/week (zero)
CO	0.17					<4%/week (span)
NO_2	0.55					
H_2O	-				Not performed	
Maintenance Interval Note 3					>12 weeks	To be reported

Note 1: Cross sensitivity to interference substances was only performed on zero measurements.
Note 2: Test not applicable as extractive analyser.
Note 3: Field test : Model 4100 was assessed on the basis of a three month field trial mounted on a gas turbine power station. The certification ranges were:

NO 0-134mg/m^3
CO 0-125mg/m^3
NO_2 0-205mg/m^3
H_20 0-25%vol

Span drift results indicated are for upper reference point. Zero drift was negligible

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Description:

The G-CEM 4100 system is a hot extractive analyser using infrared absorption spectroscopy to measure up to seven gases. The process gases are drawn through a coarse filtered probe located in the stack and transported to the measurement chamber via a short heated sample line without further conditioning.

The transceiver unit containing the infrared source and detector system is located in a separate cabinet and is totally isolated from the flue gas. The analyser is installed inside an air conditioned cabinet. Integral measurement of flue gas temperature and pressure allows full data normalisation to standard values. The output data can be presented in ppm (by volume), mg/m^3 (measured) and mg/Nm^3 (normalised). Zero and span protocol gas can be injected either automatically or manually on demand for calibration and /or auditing the analyser.

Other components of the G-CEM4100 analyser are:

- Gas Control Unit (GCU) that controls the input of zero and calibration gas into the analyser. It contains the necessary compressed air filtration and drying equipment to ensure high quality air supply for the zero calibration and probe purge function. An I/O CEM unit housed within the GCU controls the zero and span calibration functions.

- Central Datapoint Controller (CDC) that accepts data from 1 to 16 SCUs and processes the data for onward transmission to a remote PC or SCADA system.

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 070098/01.

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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