



PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

GEM 2000 Plus Portable Gas Analyser

manufactured by:

Geotechnical Instruments (UK) Ltd

*Sovereign House
Queensway
Leamington Spa
Warwickshire
CV31 3JR*

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

MCERTS Performance Standards for Portable Systems for Emission Monitoring, Version 1 (March 2005)

Certification Ranges :

CH ₄	0 to 60% vol
O ₂	0 to 21% vol
CO ₂	0 to 60% vol
CO	0 to 2000 ppm

Note: During the complete evaluation the instruments were calibrated using CO₂ instead of N₂ gas.

Project No: 674/0210B
Certificate No: Sira MC 080127/03
Initial Certification: 14 July 2008
This Certificate Issued: 08 February 2012
Renewal Date: 13 July 2013

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 portable emission monitoring system is suitable for the intended application.

Cross sensitivity tests using Hydrogen Sulphide, H₂S, were not carried out on this instrument. Therefore users should be aware if H₂S is present on sites, as it may have an interferent effect.

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 Report Report Ref: C1245 dated January 2007
Sira Report Report Ref: C1263 dated May 2008

Product Certified

The GEM2000 Plus measuring system consists of the following parts:

- Dual wavelength infra-red cell with reference channel for CO₂ and CH₄
- Internal electrochemical cell for O₂ and CO

This certificate applies to all instruments fitted with software version 3.02 onwards (serial number 10000 onwards).

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Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: +5⁰C to +40⁰C

Unless otherwise stated the evaluation was carried out on the certification range CH₄ 0 to 60%vol, O₂ 0 to 21%vol, CO₂ 0 to 60%vol & CO 0-2000ppm. The instrument was calibrated using CO₂ gas.

Test report 1 (TR1) - C1245 dated January 2007 / Test report 2 (TR2) - C1263 dated May 2008

Test	Results expressed as % of certification range				Other results	MCERTS specification
	<0.5	<1	<2	<4		
Warm up time					28s	To be reported
Zero drift (1 hour) (TR1)						
CH ₄	0.0					<3%
CO ₂	0.0					
O ₂	0.0					
CO	0.0					
Span drift (1 hour) (TR1)						
CH ₄		-1.0				<3%
CO ₂	0.2					
O ₂		-1.0				
CO		1.7				
Linearity (TR2)						
CH ₄			1.56			<5%
CO ₂		0.84				<5%
O ₂			1.2			<5%
CO	0.32					
Repeatability (TR1) (Note 1)						
CH ₄	0.5					<5%
CO ₂	0.5					
O ₂	0.48					
CO		0.7				

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Test	Results expressed as % of certification range				Other results	MCERTS specification
	<0.5	<1	<2	<4		
Cross-sensitivity to interfering substances (CH ₄ , CO ₂ , CO) (TR2)						
CH ₄				2.7		<5%
CO ₂	-0.1					<5%
CO					4.4	<5%
Temperature dependent zero shift (TR1)						
CH ₄	0.0					<0.5%/°C
CO ₂	-0.03					<0.5%/°C
O ₂	0.0					<0.5%/°C
CO	0.0					<0.5%/°C
Temperature dependent span shift (TR1)						
CH ₄	0.16					<0.5%/°C
CO ₂	-0.36					<0.5%/°C
O ₂	-0.32					<0.5%/°C
CO	-0.48					<0.5%/°C
Response time (TR1)						
CH ₄ (0-30%vol)					13s	
CO ₂ (0-30%vol)					13s	<60s
O ₂ (10-20.9%vol)					25s	
CO (0-1000ppm)					34s	
Detection Limit (TR1)						
CH ₄	0.0					
CO ₂	0.0					<5%
O ₂	0.0					
CO	0.0					

Note 1. The repeatability data was taken from 4 readings at 50% of certification range

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Description:

The GEM2000 Plus Gas Analyser operates on the principle of infra-red absorption for the measurement of Carbon Dioxide and Methane. The radiation from a broad band IR source is passed through filters to select only the wavelengths that will be absorbed by CO₂ and CH₄. A gas sample is pumped into the measurement cell where the IR radiation is passed through the gas onto a detector. The IR source is pulsed to improve the signal to noise ratio. A separate reference beam is used to compensate for any instrumental drift. The measurement is compensated for temperature and pressure changes.

Oxygen and Carbon Monoxide are measured by electrochemical cells. The carbon Monoxide measurement is compensated for the presence of Hydrogen.

All data is digitized and manipulated, displayed and stored digitally. Readings can be stored and downloaded for further analysis.

The GEM2000Plus can measure other gases and parameters that are not included in the certification. The GEM2000Plus also provides facilities for balancing landfill gas sites.

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 MC080127/03
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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