PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

FGA^{II} Flue Gas Analyser & ChillerProbe
(Standard & Twinstream versions)
manufactured by:

Land Instruments International Ltd
Stubley Lane
Dronfield
Derbyshire
S18 1DJ
England
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 3.4 dated July 2012, EN15267-3:2007,
& QAL 1 as defined in EN 14181: 2004

Certification Ranges :

SO_2	0 to 75 mg/m^3				
NO_2	0 to 50 mg/m^3				
CO_2	0 to 20 % vol				
O_2	0 to 10 % vol	to	0 to 25 % vol		
NO	0 to 200 mg/m^3	to	0 to 1500 mg/m^3		
CO	0 to 75 mg/m^3	to	0 to 150mg/m3	to	0 to 2500 mg/m^3

Project No:	16A0372C
Certificate No:	Sira MC040027/05
Initial Certification:	16 February 2004
This Certificate Issued	24 August 2012
Renewal Date:	15 February 2014

Technical Director

MCERTS is operated on behalf of the Environment Agency by

Sira Certification Service
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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

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. However, see Note 1 regarding the measurement of CO on WID 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.

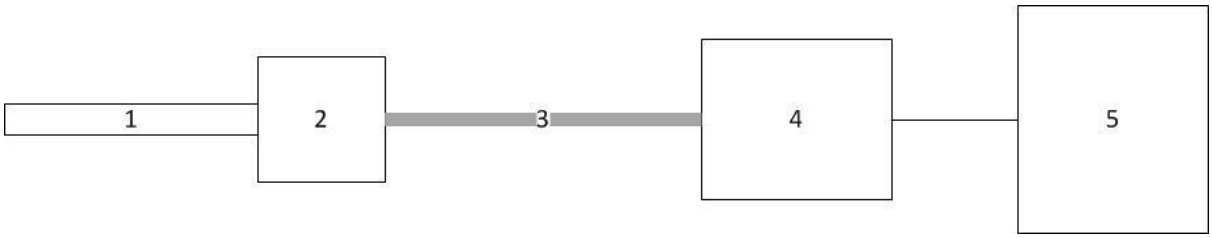
Basis of Certification

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 No: 936/802004/B dated 28.07.2003
TÜV Rheinland	Report No: 936/21216419/A dated 15.08.2011

Product Certified

The measuring system consists of the following parts:



1. Sample Probe	2. Heated Filter	3. Heated Sample Line	4. Gas Conditioning	5. Analyser
Model: Land ChillerProbe	Model: Land 180 degC	Model: RaCo freeze-protected Length: 20m	Model: Integrated with ChillerProbe	Model: FGAII

This certificate applies to all instruments fitted with software version 1.03 onwards (serial number 0213504 onwards)

Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: -20°C to +50°C
Instrument IP rating: 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.

Unless otherwise stated the evaluation was carried out on the certification range SO_2 0 to 75mg/m^3, CO 0 to 75mg/m^3, NO 0 to 200mg/m^3, NO_2 0 to 50mg/m^3, CO_2 0 to 20%vol and O_2 0 to 25%vol

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time						
SO_2					99s	<200s
CO					130s	<200s
NO					113s	<200s
NO_2					195s	<200s
CO_2					60s	<200s
O_2					81s	<200s
Repeatability standard deviation at zero point						
SO_2	0.44					<2.0%
CO			1.06			<2.0%
NO	0.45					<2.0%
NO_2		0.62				<2.0%
CO_2	0.31					<2.0%
O_2	0.05					<0.2%

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Repeatability standard deviation at reference point						
SO_2		0.6				<2.0%
CO		0.9				<2.0%
NO		0.8				<2.0%
NO_2			1.9			<2.0%
CO_2	0.2					<2.0%
O_2	0.0					<0.2%
Lack-of-fit						
SO_2			-1.4			<2.0%
CO (0-75mg/m^3)		0.81				<2.0%
CO (0-150mg/m^3)		-0.67				<2.0%
CO (0-2500mg/m^3)	0.32					<2.0%
NO (0-200mg/m^3)			-1.9			<2.0%
NO (0-1500mg/m^3)	0.40					<2.0%
NO_2			-1.6			<2.0%
CO_2			1.9			<2.0%
O_2 (0-25%vol)	0.20					<0.2%
O_2 (0-10%vol)	-0.20					<0.2%
Influence of ambient temperature zero point						
SO_2			-1.1			<5.0%
CO				3.2		<5.0%
NO	0.4					<5.0%
NO_2				-2.4		<5.0%
CO_2	0.3					<5.0%
O_2	0.09					<0.50%

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Influence of ambient temperature reference point						
SO_2				-3.7		<5.0%
CO				3.7		<5.0%
NO				-4.7		<5.0%
NO_2				-4.7		<5.0%
CO_2				-3.6		<5.0%
O_2	-0.18					<0.50%
Influence of sample gas flow for extractive CEMS						
SO_2, CO, NO, NO_2, CO_2		<1.0				<2.0%
O_2	<0.2					<2.0%
Influence of voltage variations 190 to 250V						<2.0%
SO_2, CO, NO, NO_2, CO_2, O_2					No influence	<0.2% O_2
Influence of vibration (10 to 60Hz (±0.3mm), 60 to 150Hz at 19.6m/s^2)					No influence	To be reported
Cross-sensitivity at zero with interferents: O_2, H_2O, CO, CO_2, CH_4, N_2O, NO, NO_2, NH_3, SO_2, HCl, H_2S						
SO_2				4.0		<4.0%
CO				-3.1		<4.0%
NO				2.5		<4.0%
NO_2		-0.8				<4.0%
CO_2	0.5					<4.0%
O_2	-0.07					<0.40%

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Cross-sensitivity at reference with interferents: O_2, H_2O, CO, CO_2, CH_4, N_2O, NO, NO_2, NH_3, SO_2, HCl, H_2S						
SO_2				-4.0		<4.0%
CO				-3.4		<4.0%
NO				2.2		<4.0%
NO_2		-0.8				<4.0%
CO_2	0.5					<4.0%
O_2	-0.13					<0.40%
Measurement uncertainty					Guidance - at least 25% below max permissible uncertainty	
SO_2 (Based on ELV 50mg/m^3)					11.6%	<15%
CO (Based on ELV 50mg/m^3)					11.1% Note 1	<7.5%
NO (Based on ELV 130mg/m^3)					12.91%	<15%
NO_2 (Based on ELV 70mg/m^3)					5.27%	<15%
CO_2 (Based on ELV 20%vol)					5.27%	<7.5%
O_2 (Based on ELV 25%vol)					3.15%	<7.5%
Calibration function (field)						
SO_2, CO, NO, NO_2, CO_2, O_2					0.99	>0.90
Response time (field)						
SO_2					99s	<200s
CO					85s	<200s
NO					88s	<200s
NO_2					195s	<400s
CO_2					60s	<400s
O_2					81s	<200s

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Lack of fit (field)					Note 2	
SO_2, CO, NO, NO_2, CO_2					<2.0%	<2.0%
O_2					<0.2%	<0.2%
Maintenance interval					4 weeks	>8 days
Zero and Span drift requirement	Zero and reference drift data may be collected by an external DAS during the calibration sequence; optional synchronisation relays are available. Synchronisation data is accessible via Modbus. Drift data complying with UBA/TÜV requirements is available via the Modbus					Clause 6.13 & 10.13 Manufacturer shall provide a description of the technique to determine and compensate for zero and span drift.
Change in zero point over maintenance interval						
SO_2		-0.9				<3.0%
CO			-2.0			<3.0%
NO	-0.4					<3.0%
NO_2		0.6				<3.0%
CO_2	0.2					<3.0%
O_2	-0.16					<0.2%
Change in span point over maintenance interval						
SO_2			-1.6			<3.0%
CO			-1.9			<3.0%
NO			-2.0			<3.0%
NO_2			2.0			<3.0%
CO_2			1.7			<3.0%
O_2	-0.17					<0.2%

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Availability					98.5%	>95% (>98% for O_2)
Reproducibility						
SO_2			1.49			<3.3%
CO			1.41			<3.3%
NO	0.48					<3.3%
NO_2		0.53				<3.3%
CO_2	0.50					<3.3%
O2	0.13					<0.20%

Note 1: CO has a measurement uncertainty of 11.1% at an ELV of 50mg/m^3, which exceeds the permissible uncertainties of 7.5% / 10% in EN15267-3 and EN14181 respectively.

Note 2: Data derived from the analysis function / calibration function test

Description:

The FGA^{II} gas analyser measures the concentrations of carbon monoxide, nitric oxide, nitrogen dioxide, total oxides of nitrogen, sulphur dioxide, carbon dioxide and oxygen in the exhaust gases produced by combustion processes. The measurement technique uses pairs of electrochemical cells using the Land Instruments Advanced Dual Sensor Technology (ADST).

The analyser contains pumps to provide a flow of sample gas. An integral diluter is available as an option for higher concentration measurement at dilution ratios of 5:1, 10:1, 20:1 or 50:1. The analyser tested was equipped with the dilutor for an additional NO measuring channel. Linearity checks with concentrations of up to 10,000mg/m^3 NO have been performed and the linearity error meets MCERTS requirements for the ranges 0 to 1000mg/m^3 and 0 to 10,000mg/m^3.

The certified configuration includes the Land 'ChillerProbe'. This comprises a heated filter unit with hot air blow-back and a sample cooler system with a facility for condensate removal. All internal temperatures are monitored and a water carry-over sensor is fitted.

Two versions of the FGA^{II} are available the standard and twinstream, both are identical except that the twinstream system allows two or more sample probes to be connected to the sensor unit, using an additional pump and valve unit.

For applications in which ammonium salts may form, a higher filter temperature option is available. A sample gas temperature sensor is available for use when required by local regulations.

The manufacturer states that a variety of open-ended and pre-filtered sampling tubes for use with the ChillerProbe can be provided on request. Auto-calibration is performed automatically at regular intervals or as and when requested.

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 MC040027/02

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.