



# PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

***EMIRAK Multi Gas Analyser  
NO/NO<sub>x</sub> (Hot Wet), CO, O<sub>2</sub> (Dry & Wet) & SO<sub>2</sub>***

manufactured by:

***Signal Group Ltd***

*Ambitech Division  
Regal Way  
Faringdon  
Oxon SN7 7BX  
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 2.1 dated April 2003  
& the performance criteria specified in Version 3.1 dated July 2008 (EN 15267-3: 2007)  
& QAL 1 as defined in EN 14181: 2004**

Certification Ranges :

NO/NO <sub>x</sub>	0 – 50	to	0 – 200	ppm
CO	0 – 100	to	0 – 1000	ppm
SO <sub>2</sub>	0 – 85	to	0 – 425	ppm
O <sub>2</sub> (wet) & (dry)	0 - 25	%Vol		

Project No: 674/0187  
Certificate No: Sira MC090141/00  
Initial Certification: 17 March 2009  
This Certificate Issued: 17 March 2009  
Renewal Date: 16 March 2014

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

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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 Agency's website at [www.mcerts.net](http://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 Gas Turbine large combustion plant 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 for the ranges specified. The lowest certified range for each determinand shall not be more than 2.5X the ELV for LCPD and other types of application.

## Field Trial

The Emirak measuring system was installed for 3 months on a gas turbine 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:

Laboratory Test Report: Report PED0193RevC, dated 03/03/2009  
Field Test Report: PB Power 63412A-0001, dated February 2009  
Sira Report: Report No. 06-2, dated 03/03/2009

## Product Certified

The Emirak measuring system consists of the following parts:

- Sampling Probe M&C SP2000H
- Signal Heated Line 20m
- Sample Conditioning System based on a refrigerative chiller
- Air Conditioned Enclosure

This certificate applies to all instruments fitted with software version V4.4 and V4.6 (serial number SP02742-005 onwards).

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## Certified Performance

Laboratory and field tests were conducted in accordance with the requirements of EN 15267-3 : 2007 on one Emirak System Model SP02742-EMI, serial No. SP02742-005

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: 18°C-26°C (see Note 1)  
 Enclosure IP rating: IP65

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 the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time						
CO					45s	<200s
NOx					19s	<200s
NO					17s	<200s
SO <sub>2</sub>					70s	<200s
O <sub>2</sub> (Dry)					39s	<200s
O <sub>2</sub> (Wet)					27s	<200s
Repeatability standard deviation at zero point						
CO	0.12					<2%
NOx	0.03					<2%
NO	0.03					<2%
SO <sub>2</sub>	0.04					<2%
O <sub>2</sub> (Dry)	0.01					<0.2%
O <sub>2</sub> (Wet)	0.00					<0.2%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Repeatability standard deviation at span point						
CO	0.08					<2.0%
NOx	0.44					<2.0%
NO	0.41					<2.0%
SO <sub>2</sub>	0.38					<2.0%
O <sub>2</sub> (Dry)	0.08					<0.2%
O <sub>2</sub> (Wet)	0.05					<0.2%
Lack-of-fit						
CO		-0.79				<2.0%
NOx		-0.69				<2.0%
NO		-0.72				<2.0%
SO <sub>2</sub>	-0.28					<2.0%
O <sub>2</sub> (Dry)	0.10					<0.2%
O <sub>2</sub> (Wet)	0.15					<0.2%
Influence of ambient temperature zero point						
CO				-3.10		<5.0%
NOx			-1.76			<5.0%
NO			-1.81			<5.0%
SO <sub>2</sub>	0.29					<5.0%
O <sub>2</sub> (Dry)	-0.16					<0.5%
O <sub>2</sub> (Wet)	-0.38					<0.5%

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	<0.5	<1	<2	<5		
Influence of ambient temperature span point						
CO	0.00					<5.0%
NOx				-3.80		<5.0%
NO				-3.50		<5.0%
SO <sub>2</sub>				-2.10		<5.0%
O <sub>2</sub> (Dry)	-0.40					<0.5%
O <sub>2</sub> (Wet)	-0.35					<0.5%
Influence of sample gas flow for extractive						
CO	0.45					<2.0%
NOx		-0.89				<2.0%
NO		0.98				<2.0%
SO <sub>2</sub>		0.54				<2.0%
O <sub>2</sub> (Dry)	-0.09					<0.2%
O <sub>2</sub> (Wet)	-0.16					<0.2%
Influence of voltage variations 190 to 250V						
CO	0.27					<2.0%
NOx			1.56			<2.0%
NO			1.45			<2.0%
SO <sub>2</sub>	-0.21					<2.0%
O <sub>2</sub> (Dry)	0.04					<0.2%
O <sub>2</sub> (Wet)	0.06					<0.2%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Cross-sensitivity at zero with interferents O <sub>2</sub> , H <sub>2</sub> O, CO, CO <sub>2</sub> , CH <sub>4</sub> , NO, NO <sub>2</sub> , SO <sub>2</sub>		-0.54	1.50 1.30			<4.0% <4.0% <4.0% <4.0% <0.4% <0.4%
CO						
NO <sub>x</sub>						
NO						
SO <sub>2</sub>				-3.82		
O <sub>2</sub> (Dry)	0.00					
O <sub>2</sub> (Wet)	0.00					
Cross-sensitivity at span with interferents O <sub>2</sub> , H <sub>2</sub> O, CO, CO <sub>2</sub> , CH <sub>4</sub> , NO, NO <sub>2</sub> , SO <sub>2</sub> ,			-1.24			<4.0% <4.0% <4.0% <4.0% <0.4% <0.4%
CO						
NO <sub>x</sub>		-0.75				
NO	0.00					
SO <sub>2</sub>				2.38		
O <sub>2</sub> (Dry)	0.00					
O <sub>2</sub> (Wet)	0.00					
Converter Efficiency					97.3%	>95%
Measurement uncertainty						
CO (100 ppm)					4.5 mg/Nm <sup>3</sup>	Guidance – at least 25% below max permissible uncertainty
CO (1000 ppm)					31 mg/Nm <sup>3</sup>	
NO <sub>x</sub> (50 ppm)					8.4 mg/Nm <sup>3</sup>	
NO <sub>x</sub> (200 ppm)					31 mg/Nm <sup>3</sup>	
NO (50 ppm)					4.8 mg/Nm <sup>3</sup>	
NO(200 ppm)					18mg/Nm <sup>3</sup>	
SO <sub>2</sub> (85 ppm)					21 mg/Nm <sup>3</sup>	
SO <sub>2</sub> (425 ppm)					53 mg/Nm <sup>3</sup>	
O <sub>2</sub> (dry)					0.98%	
O <sub>2</sub> (Wet)					0.86%	

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Calibration function (field)						
CO					0.98	>0.90
NOx					0.99	>0.90
NO					0.99	>0.90
SO <sub>2</sub>					0.97	>0.90
O <sub>2</sub> (Dry)					0.99	>0.90
O <sub>2</sub> (wet)					0.99	>0.90
Response time (field)						
CO					42s	<200s
NOx					22s	<200s
NO					23s	<200s
SO <sub>2</sub>					103s	<200s
O <sub>2</sub> (Dry)					42s	<200s
O <sub>2</sub> (Wet)					28s	<200s
Lack of fit (field)						
CO		-0.79				<2.0%
NOx			1.38			<2.0%
NO		-0.93				<2.0%
SO <sub>2</sub>			-1.07			<2.0%
O <sub>2</sub> (Dry)	0.03					<0.2%
O <sub>2</sub> (Wet)	-0.14					<0.2%
Maintenance interval					>8 days	>8 days

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Zero and Span drift requirement	The system performs an automatic calibration daily at a preset time. Performing a $y=mx+c$ correction to the data.					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			1.65			<3%
CO						<3%
NOx		0.46				<3%
NO	0.39					<3%
SO <sub>2</sub>		0.75				<3%
O <sub>2</sub> (Dry)	0.05					<0.2%
O <sub>2</sub> (Wet)	0.00					<0.2%
Change in span point over maintenance interval						<3%
CO	0.32					<3%
NOx				2.64		<3%
NO				2.39		<3%
SO <sub>2</sub>	0.47					<3%
O <sub>2</sub> (Dry)	0.09					<0.2%
O <sub>2</sub> (Wet)	0.06					<0.2%
Availability					98.2%	>95%
					98.2%	(>98% for O <sub>2</sub> )
<b>Reproducibility</b> It was impractical due to size constraints to conduct parallel tests of the AMS. Therefore it was not possible to calculate the reproducibility..						

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## Description:

The Emirak multi gas analyser uses the following measuring principles:

- NO/NO<sub>2</sub>/NO<sub>x</sub> Wet Hot Chemiluminescent analyser with partial vacuum
- O<sub>2</sub> Hot Wet Zirconia analyser
- O<sub>2</sub> Dry Paramagnetic analyser.
- CO Dry Gas Filter Correlation (GFC) analyser operating on the infrared principle.
- SO<sub>2</sub> Dry Non-Dispersive analyser operating on the infrared principle.

The gaseous components of the emissions are monitored using extractive sampling which is achieved by continuously transporting a gas sample from the stack to the CEMS mounted in the equipment shelter. The power and the signals for the probe are controlled via the CEMS equipment within the shelter. The CEMS system is an integrated computer controlled gas analysis and data logging system. The data from the Emirak is collected by a Data Acquisition and Data Handling System (DAHS) computer which is located in the Turbine control room. The DAHS computer generates the emission compliance report to the regulating authority.

## 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 MC090141/00.
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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