PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

ENDA-5000 Series
Stack Gas Analysis System

Manufactured by:

Horiba GmbH
Kaplanstrasse 5
A-3430 Tulln
Austria

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 3.5 dated June 2016
EN15267-3:2007,
& QAL 1 as defined in EN 14181: 2004

Certification Ranges :

CO	0 to 50 mg/m^3	0 to 500 mg/m^3
NO_x	0 to 100 mg/m^3	0 to 1000 mg/m^3
SO_2	0 to 75 mg/m^3	0 to 750 mg/m^3
CO_2	0 to 20 Vol.-%	
O_2	0 to 25 Vol.-%	

Project No.:	16A28926/7017426
Certificate No:	Sira MC 120212/02
Initial Certification:	26 November 2012
This Certificate issued:	28 February 2018
Renewal Date:	25 November 2022

Joe Prince MSc, MInst MC
Certification Manager

MCERTS is operated on behalf of the Environment Agency by

Sira Certification Service
Unit 6, Hawarden Industrial Park
Hawarden, Deeside, CH5 3US
Tel: +44 (0)1244 670 900

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. 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.

The field test was conducted on a municipal waste incineration plant downstream of the exhaust gas cleaning system for 8 months, between 13th May 2011 and 26th January 2012.

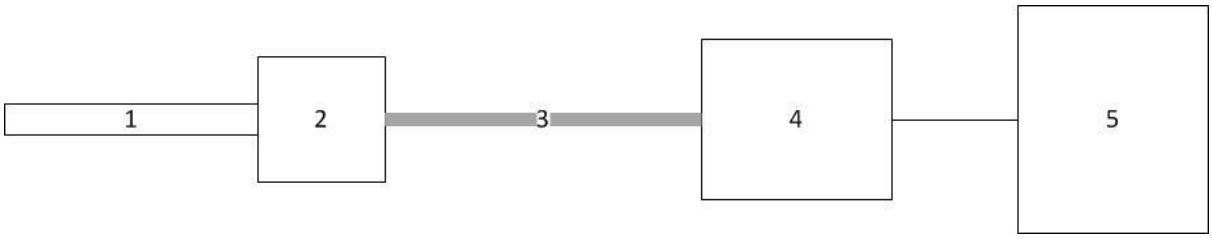
Basis of Certification

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:

- TUV Report No. 936/21218525/A_en dated 20/03/2012
- QAL 1 Test Report for HORIBA ENDA 5000 Multi Gas Analyser – Corrected Tables for Lack-of-fit test in the field.

Product Certified

The Horiba ENDA-5000 series Stack Gas Analysis System consists of the following parts:



1. Sample Probe	2. Heated Filter	3. Heated Sample Line	4. Gas Conditioning	5. Analyser
Model: M&C PSP 4000-H	Model: N/A - Integrated with sampling probe	Model: RACO Sample Line Length: 10m	Model: ENDA-5000	Model: ENDA-5000 with CMA-5800 Analysing module

This certificate applies to all instruments fitted with software version P1000877001I (serial number 0900500 onwards).

Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: 5°C to 40°C
Instrument IP rating: IP54

Results are expressed as % of the certification range, unless otherwise stated. O2 results are reported as %vol.

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time						
NO_x					60s	<200s
SO_2					117s	<200s
CO					64s	<200s
CO_2					64s	<200s
O_2					57s	<200s
Repeatability standard deviation at zero point						
NO_x	0.1					<2.0%
SO_2	0.1					<2.0%
CO		0.6				<2.0%
CO_2	0.0					<2.0%
O_2	0.01					<0.2%
Repeatability standard deviation at reference point						
NO_x	0.2					<2.0%
SO_2	0.2					<2.0%
CO			1.3			<2.0%
CO_2	1.0					<2.0%
O_2	0.02					<0.2%

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Lack-of-fit						
NO_x	0.3					<2.0%
SO_2		0.8				<2.0%
CO		0.6				<2.0%
CO_2			1.0			<2.0%
O_2	0.07					<0.2%
Influence of ambient temperature zero point						
NO_x		-0.5				<5.0%
SO_2				-2.3		<5.0%
CO		0.5				<5.0%
CO_2	-0.2					<5.0%
O_2	0.43					<0.5%
Influence of ambient temperature reference point						
NO_x			1.9			<5.0%
SO_2				-2.0		<5.0%
CO				2.4		<5.0%
CO_2			1.0			<5.0%
O_2	0.11					<0.5%

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Influence of sample gas flow for extractive CEMS						
NO_x	0.4					<2.0%
SO_2	0.1					<2.0%
CO	-0.1					<2.0%
CO_2	0.1					<2.0%
O_2	0.07					<0.2%
Influence of voltage variations 190 to 250V						
NO_x		-0.9				<2.0%
SO_2			-1.0			<2.0%
CO		0.5				<2.0%
CO_2		-0.6				<2.0%
O_2	0.04					<0.2%
Influence of vibration (10 to 60Hz (±0.3mm), 60 to 150Hz at 19.6m/s^2)					Not applicable for extractive CEMS.	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						
NO_x			1.96			<4.0%
SO_2				3.80		<4.0%
CO				2.46		<4.0%
CO_2	<0.5					<4.0%
O_2	<0.1					<0.4%
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						
NO_x				3.00		<4.0%
SO_2				3.73		<4.0%
CO				2.60		<4.0%
CO_2		-0.95				<4.0%
O_2	-0.19					<0.4%
Converter Efficiency					97.6%	>95%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Measurement uncertainty						
NO_x					5.1%	Guidance - at least 25% below max permissible uncertainty
SO_2					8.8%	
CO					5.6%	
CO_2					4.1%	
O_2					2.3%	
Calibration function (field)						
NO_x					0.9967	>0.90
SO_2					0.9960	>0.90
CO					0.9148	>0.90
CO_2					0.9788	>0.90
O_2					0.9994	>0.90
Response time (field)						
NO_x					67s	<200s
SO_2					98s	<200s
CO					54s	<200s
CO_2					58s	<200s
O_2					57s	<200s
Lack of fit (field)						
NO_x	0.3					<2.0%
SO_2	-0.47					<2.0%
CO	0.4					<2.0%
CO_2			-1.8			<2.0%
O_2	0.1					<0.2%
Maintenance interval					3 Months	Note 1 >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 Horiba ENDA-5000 system is an extractive system that uses various particulate filters to protect the optical system from contamination. The recommendations of the manufacturer with regard to filter changes should be followed. No compensation for zero and span drift is employed. Drift can be determined from normal automatic or manual zero and span checks.					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						
NO_x		-0.94				<3.0%
SO_2			-1.44			<3.0%
CO		0.50				<3.0%
CO_2		-0.63				<3.0%
O_2	0.19					<0.2%
Change in reference point over maintenance interval						
NO_x				-2.81		<3.0%
SO_2			1.81			<3.0%
CO				2.25		<3.0%
CO_2				2.69		<3.0%
O_2	0.16					<0.2%
Availability					99.1%	>95% (>98% for O_2)
Reproducibility						
NO_x		0.7				<3.3%
SO_2			1.1			<3.3%
CO			1.7			<3.3%
CO_2		0.9				<3.3%
O_2	0.19					<0.2%

Note 1: The ENDA 5000 Series Gas Analyser has a maintenance interval of 3 months. The work detailed below has to be carried out at regular intervals, depending on local conditions:

QAL3 activities in accordance with EN 14181 require monthly zero and span point checks for the component CO_2. It has been noted that container volumes for phosphoric acid collectors need to be adjusted for a three months maintenance

interval. It should be at least 120L. If smaller containers are used, these should be checked more often and refilled as the case may be.

Description

The Horiba ENDA-5000 system is an extractive emission analysis system. This comprises a heated sample probe and filter, heated line, sample conditioning system and an analyser module for the measurement of up to five components. Carbon Monoxide, Carbon Dioxide, Oxides of Nitrogen, Sulphur Dioxide are measured by non-dispersive infra-red absorption (NDIR) and Oxygen by magneto-pneumatic method which does not require a carrier gas from a gas cylinder.
The sample conditioning system and analyser module are contained in a single unit with controller for the heated sample line.

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 120212/00

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.