

PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

ENOX II AMS CEMS

Manufactured by:

Fer Strumenti Srl

Via Ripamonti 58
Seregno (Milan)
Italy

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 (CEMS) and T-CEMS, Version 4 dated July 2018
EN15267-3:2007,
& QAL 1 as defined in EN 14181: 2014**

Certification Ranges:

NO	0 to 200ppm 0 to 2000ppm
NO _x	0 to 200ppm
CO	0 to 156ppm 0 to 2000ppm
CO ₂	0 to 15 Vol. -%
SO ₂	0 to 1200ppm

Project No. : 70039897 / 70161214
Certificate No : Sira MC160301/04
Initial Certification : 13 July 2016
This Certificate issued : 15 January 2019
Renewal Date : 12 July 2021

Emily Alexander
Environmental Project Engineer

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. 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 IED Chapter III and IED Chapter IV 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 IED Chapter IV applications, and not more than 2.5X the ELV for IED Chapter III and other types of application.

The AMS ENox II for CO₂ should be operated at an interval of 6 hours for automatic alignment. The zero points for components CO₂ shall be realigned. The CEM emits negative values on analogue output 4-20 mA for CO₂ without live zero.

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 SUD Report No. 2448303.1 dated January 2016

TUV SUD Report No. 2448303.2 Rev 2 dated July 2016

Test Report E 28715136 dated April 2016

QAL2 Report 0669A16 dated April 2016

TÜV SÜD Industrie Service GmbH, Munich. Report No. 2493266 dated September 2017

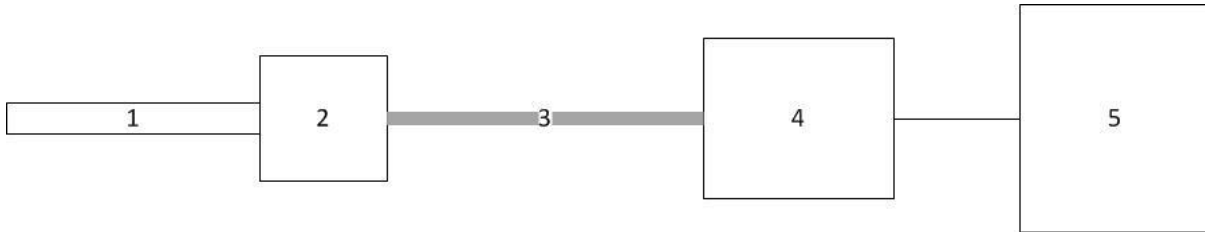
TÜV SÜD Industrie Service GmbH, Munich. Report No. 2448303.1 dated July 2016

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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
<p>Manufacturer: Buhler Technologies GmbH</p> <p>Type: 222.17</p>	<p>Manufacturer: Buhler Technologies GmbH</p> <p>Model 222.17</p> <p>Type: SiC filter 3</p>	<p>Manufacturer: Raco sas, K4842702</p> <p>Heated temps: 140°C</p>	<p>Manufacturer: KNF Neuberger GmbH</p> <p>Model N86 KTE Pump</p> <p>Manufacturer: Buhler Technologies GmbH</p> <p>Model EGK½, compressor cooler</p>	<p>Manufacturer: FER Strumenti srl, Enox II Multigas NDIR analyser (CO₂)</p> <p>Fer Strumenti model E705</p>

Allowable variations could include:

- A different brand or model of sampling system of the same type, provided that there is evidence the alternative system works with similar types of CEM.
- Additional manifolds and heated valves used to allow more than one analyser to share a sampling system.

Different Probes and filter are:

Fer Strumenti Model 7030 and 7040

This certificate applies to all instruments fitted with software version 1.8Q (serial number 0.380 onwards).

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Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: +5°C to +40°C
Instrument IP rating: IP55

Note: For outdoor installations the analyser needs to be mounted into an IP65 environment. 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.

Results are expressed as error % of certification range, unless otherwise stated.

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time						
NO (0 to 200ppm)					91s	<200s
CO (0 to 156ppm)					91s	<200s
NO (0 to 2000ppm)					96	<200s
CO (0 to 2000ppm)					64	<200s
CO ₂ (0 to 15 Vol. -%)					74s	<200s
SO ₂ (0 to 1200ppm)					114s	<200s
Repeatability standard deviation at zero point						
NO			1.17			<2.0%
CO	0.38					<2.0%
CO ₂	0.04					<2.0%
SO ₂	0.25					<2.0%
Repeatability standard deviation at reference point						
NO	0.46					<2.0%
CO	0.28					<2.0%
CO ₂	0.04					<2.0%
SO ₂	0.26					<2.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Lack-of-fit						
NO (0 to 200ppm)		0.79				<2.0%
CO (0 to 156ppm)		0.59				<2.0%
NO (0 to 2000ppm)		-0.72				<2.0%
CO (0 to 2000ppm)	0.41					<2.0%
CO ₂ (0 to 15 Vol. -%)			1.66			<2.0%
SO ₂ (0 to 1200ppm)		0.81				<2.0%
Influence of ambient temperature zero point (5°C to +40°C)						
NO				-2.2		<5.0%
CO			1.4			<5.0%
CO ₂	0.05					<5.0%
SO ₂				4.24		<5.0%
Influence of ambient temperature reference point (5°C to +40°C)						
NO			-1.7			<5.0%
CO				2.0		<5.0%
CO ₂		0.74				<5.0%
SO ₂				-4.53		<5.0%
Influence of sample gas flow for extractive CEMS (zero)						
NO		0.63				<2.0%
CO		0.75				<2.0%
CO ₂	0.04					<2.0%
SO ₂		0.96				<2.0%

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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 (span)						
NO		-0.85				<2.0%
CO			1.83			<2.0%
CO ₂	0.02					<2.0%
SO ₂	-0.42					<2.0%
Influence of voltage variations (zero) (196V to 253V)						
NO		0.94				<2.0%
CO		-0.94				<2.0%
CO ₂	0.02					<2.0%
Influence of voltage variations (span) (196V to 253V)						
NO			1.81			<2.0%
CO			1.51			<2.0%
CO ₂	0.31					<2.0%
SO ₂		0.96				<2.0%
Cross-sensitivity at zero with interferents: O ₂ , H ₂ O, CO, CO ₂ , CH ₄ , N ₂ O, NO, NO ₂ , NH ₃ , SO ₂ , HCl						
NO				-3.38		<4.0%
CO				-2.94		<4.0%
CO ₂	0.5					<4.0%
SO ₂				3.83		<4.0%

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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 ₂ O, CO, CO ₂ , CH ₄ , N ₂ O, NO, NO ₂ , NH ₃ , SO ₂ , HCl						
NO				-3.92		<4.0%
CO				-3.83		<4.0%
CO ₂			-2.18			<4.0%
SO ₂				3.94		<4.0%
Convertor Efficiency					<u>Note 1</u> 95.9%	>95%
Measurement uncertainty					Guidance - at least 25% below max permissible uncertainty	
NO					6.66	<15% (20%)
NO _x					8.12	<15% (20%)
CO					6.02	<7.5% (10%)
CO ₂					6.3	<7.5% (10%)
SO ₂					19.9	<15% (20%)
Calibration function (field)						
NO					0.916	>0.90
CO					0.977	>0.90
CO ₂					0.99	>0.90
SO ₂					0.99	>0.90
Response time (field)						
NO					184s	<200s
CO					184s	<200s
CO ₂					69s	<200s
SO ₂					178s	<200s
Lack of fit (field)						
NO			1.17			<2.0%
CO			1.23			<2.0%
CO ₂			1.08			<2.0%
SO ₂		-0.80				<2.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Maintenance interval					<u>Note 2</u>	
NO					15 days	≥8 days
CO					3 months	≥8 days
CO ₂					8 days	≥8 days
SO ₂					8 days	≥8 days
Zero and Span drift requirement	<p>The CEM has a means of manually and automatic checking and, as necessary re-adjusting zero and span point. The deviations are recorded and checked with a reference limit. A status signal is set if the recorded level should exceed the limit set.</p>					Clause 6.13 & 10.13
Change in zero point over maintenance interval						
NO	-0.45					<3.0%
CO		-0.9				<3.0%
CO ₂			1.2			<3.0%
SO ₂				2.5		<3.0%
Change in reference point over maintenance interval						
NO				-2.95		<3.0%
CO				2.7		<3.0%
CO ₂				-2.6		<3.0%
SO ₂				2.9		<3.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Availability					96.5%	>95%
Reproducibility						
NO				2.24		<3.3%
CO	0.22					<3.3%
CO ₂				2.4		<3.3%
SO ₂				3.3		<3.3%

Note 1: The NO_x conversion-efficiency was above 95% during the laboratory test for NO₂ concentrations up to 90% of NO_x and a measurement-gas flow-rate of 1 l/min.

Note 2: The Enox II, E705 has a maintenance interval of 8 days.

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Description

The system continuously measures CO and NO in flue gas. The system sample the gas from the process and pump to the analyzer having filtered and dried it. The infrared sensor is controlled at very low temperature by a Peltier based cooler. This gives a Lambert-Beer response to the infrared light absorbed from the specific gas present inside the measuring cell. An electronic unit calculate CO-NO content from the sensor output linearized with a 5 point polynomial function.

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 V00 for certificate No. Sira MC160301/03
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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