

PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

X-CEMS

manufactured by:

Emerson Process Management GmbH & Co. OHG

Industriestrasse 1
63594 Hasselroth
Germany

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

Environment Agency Guidance

“MCERTS for stack emissions monitoring equipment at industrial installations”

- Continuous emissions monitoring systems (CEMS)

Published 20 October 2020

**EN 15267-1 :2009, EN 15267-2 :2009, EN 15267-3 :2007
& QAL 1 as defined in EN 14181: 2014**

	Certification Ranges	Supplementary Ranges
CO	0 - 75 (mg/m ³)	0 - 3,000 (mg/m ³)
NOx*	0 - 150 (mg/m ³)	0 - 2,000 (mg/m ³)
SO ₂	0 - 150 (mg/m ³)	0 - 2,500 (mg/m ³)
CO ₂	0 - 25 vol. %	
O ₂ (paramagnetic)	0 - 25 vol. %	
O ₂ (electrochemical)	0 - 25 vol. %	

*expressed as NO, corresponds to 0-230mg/m³ NOx as NO₂.

Project number: 80056929
Certificate number: Sira MC200367/00
Initial certification: 23 December 2020
This certificate issued: 23 December 2020
Renewal date: 22 December 2025



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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 technical guidance on monitoring, available at www.mcerts.net

This instrument is considered suitable for use on waste incineration and large combustion plant applications. This CEMS 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. The lowest certified range for each determinand shall not be more than 1.5 times the daily average emission limit value (ELV) for incineration plants, and not more than 2.5 times the ELV for other types of application.

The field test was performed over a period of more than three months in the flue gas of a waste incinerator.

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 Energy GmbH, Cologne, Report no. 936/21247061/B, dated 4 September 2020

Product certified

The X-CEMS measuring system consists of the following parts:

- Heating Bühler GAS 222.17 sampling probe (180°C, self-regulating), filter material: ceramics, pore size 3µm (alternatives: GAS 222.15 and GAS 222.31)
- Heated (180°C) sampling line PFA, 4 mm inner diameter, 20 m long
- Steel panel measuring cabinet with temperature-controlled exhaust air fan consisting of the following components, mounted on a frame:
 - 2-stage test gas cooler Bühler EKG 2-19
 - Sample gas pump

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- Analyser X-STREAM enhanced for CO, NO, SO₂, CO₂ and O₂ paramagnetic or electrochemical
- NOx converter Bühler BÜNOx2+
- Condensate pumps

1. Sample probe	2. Heated filter	3. Heated sample line	4. Gas conditioning	5. Analyser
Bühler GAS 222.17, 222.15 or 222.31	180°C ceramics, pore size 3 µm	180°C PFA, 4 mm inner diameter, 20 m length	Bühler EKG 2-19	X-STREAM enhanced

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 CEMS.
- Additional manifolds and heated valves used to allow more than one analyser to share a sampling system.
- NOx converter Bühler BÜNOx2+ (optional)

This certificate applies to all instruments fitted with software version 1.7.0, serial number XEA06604677327 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: Instruments limited to being mounted in areas where shelter against precipitation is in place (e.g. porch roof), but where precipitation can reach the instrument due to wind shall meet at least IP54 as specified in EN60529.

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						
CO (0 - 75mg/m ³)					38s	<200s
CO (0 - 3,000mg/m ³)					38s	<200s
NO _x (0 - 150mg/m ³)					51s	<200s
NO _x (0 - 2,000mg/m ³)					59s	<200s
SO ₂ (0 - 150mg/m ³)					181s	<200s
SO ₂ (0 - 2,500mg/m ³)					98s	<200s
CO ₂ (0 - 25 vol. %)					41s	<200s
O ₂ (para) (0 - 25 vol. %)					37s	<200s
O ₂ (ele) (0 - 25 vol. %)					99s	<200s
Repeatability standard deviation at zero point						
CO	0.1					<2.0%
NO _x	0.2					<2.0%
SO ₂	0.0					<2.0%
CO ₂	0.0					<2.0%
O ₂ (paramagnetic)	0.0					<0.2%
O ₂ (electrochemical)	0.1					<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 reference point						
CO	0.1					<2.0%
NOx	0.4					<2.0%
SO ₂	0.1					<2.0%
CO ₂	0.0					<2.0%
O ₂ (paramagnetic)	0.01					<0.2%
O ₂ (electrochemical)	0.01					<0.2%
Lack-of-fit						
CO (0 - 75mg/m ³)		-0.61				<2.0%
CO (0 - 3,000mg/m ³)		-0.50				<2.0%
NOx (0 - 150mg/m ³)		0.79				<2.0%
NOx (0 - 2,000mg/m ³)		-0.55				<2.0%
SO ₂ (0 - 150mg/m ³)		0.71				<2.0%
SO ₂ (0 - 2,500mg/m ³)			-1.16			<2.0%
CO ₂ (0 - 25 vol. %)	0.32					<2.0%
O ₂ (para) (0 - 25 vol. %)	0.10					<0.2%
O ₂ (electro) (0 - 25 vol. %)	0.10					<0.2%
Influence of ambient temperature zero point (+5°C to +40°C)						
CO				2.5		<5.0%
NOx			1.7			<5.0%
SO ₂				-2.8		<5.0%
CO ₂	0.10					<5.0%
O ₂ (paramagnetic)	0.11					<0.5%
O ₂ (electrochemical)	0.18					<0.5%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Influence of ambient temperature reference point (+5°C to +40°C)						
CO			1.3			<5.0%
NO _x				2.1		<5.0%
SO ₂				2.3		<5.0%
CO ₂		-0.8				<5.0%
O ₂ (paramagnetic)	-0.20					<0.5%
O _{0.12} (electrochemical)	-0.35					<0.5%
Influence of sample gas flow for extractive CEMS						
CO		-0.7				<2.0%
NO _x		-0.9				<2.0%
SO ₂			-1.1			<2.0%
CO ₂			-1.2			<2.0%
O ₂ (paramagnetic)	-0.17					<0.2%
O ₂ (electrochemical)	-0.15					<0.2%
Influence of voltage variations (340V to 440V)						
CO		0.5				<2.0%
NO _x		0.6				<2.0%
SO ₂			1.0			<2.0%
CO ₂	0.1					<2.0%
O ₂ (paramagnetic)	0.01					<0.2%
O ₂ (electrochemical)	0.04					<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 ₂ , H ₂ O, CO ₂ , CH ₄ , N ₂ O, NO, NO ₂ , NH ₃ , SO ₂ , HCl						
CO				3.75		<4.0%
NO _x				2.94		<4.0%
SO ₂				2.25		<4.0%
CO ₂	0.0					<4.0%
O ₂ (paramagnetic)	0.00					<0.4%
O ₂ (electrochemical)	-0.11					<0.4%
Cross-sensitivity at reference with interferents: O ₂ , H ₂ O, CO ₂ , CH ₄ , N ₂ O, NO, NO ₂ , NH ₃ , SO ₂ , HCl						
CO				3.87		<4.0%
NO _x			1.52			<4.0%
SO ₂				-2.93		<4.0%
CO ₂		-0.80				<4.0%
O ₂ (paramagnetic)	0.00					<0.4%
O ₂ (electrochemical)	0.00					<0.4%
Converter Efficiency NO _x					95.4%	>95%
Measurement uncertainty					Guidance - at least 25% below max permissible uncertainty	
CO (For and ELV of 50 mg/m ³)					8.0%* (note 1)	<7.5% (10%)
NO _x (For and ELV of 80 mg/m ³)					14.6%	<15% (20%)
SO ₂ (For and ELV of 60 mg/m ³)					14.6%*	<15% (20%)
CO ₂					3.0%	<7.5% (10%)
O ₂ (paramagnetic)					2.0%	<7.5% (10%)
O ₂ (electrochemical)					2.4%	<7.5% (10%)

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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					0.9987	>0.90
NOx					0.9120	>0.90
SO ₂					0.9322	>0.90
CO ₂					0.9996	>0.90
O ₂ (paramagnetic)					0.9999	>0.90
O ₂ (electrochemical)					0.9995	>0.90
Response time (field)						
CO					56s	<200s
NOx					57s	<200s
SO ₂					114s	<200s
CO ₂					52s	<200s
O ₂ (paramagnetic)					42s	<200s
O ₂ (electrochemical)					110s	<200s
Lack of fit (field)						
CO		-0.53				<2.0%
NOx		0.67				<2.0%
SO ₂			-1.09			<2.0%
CO ₂			1.00			<2.0%
O ₂ (paramagnetic)	-0.20					<0.2%
O ₂ (electrochemical)	-0.20					<0.2%
Maintenance interval					4 weeks (note 2)	>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	It is possible to record zero and span drift. This complies with the requirements for QAL 3 according to EN 14181. The system provides automatic drift compensation. Note 3.					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						
CO	0.4					<3.0%
NO _x			1.0			<3.0%
SO ₂			1.3			<3.0%
CO ₂	-0.1					<3.0%
O ₂ (paramagnetic)	0.04					<0.20%
O ₂ (electrochemical)	0.06					<0.20%
Change in reference point over maintenance interval						
CO			1.6			<3.0%
NO _x				2.3		<3.0%
SO ₂				2.4		<3.0%
CO ₂			1.5			<3.0%
O ₂ (paramagnetic)	-0.05					<0.20%
O ₂ (electrochemical)	-0.06					<0.20%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Availability					98.3%	>95% (>98% for O ₂)
Reproducibility						
CO		0.7				<3.3%
NO _x				2.2		<3.3%
SO ₂			1.3			<3.3%
CO ₂	0.2					<3.3%
O ₂ (paramagnetic)	0.03					<0.20%
O ₂ (electrochemical)	0.13					<0.20%

Note 1 - The CO module's relative expanded uncertainty for an ELV of 50mg/m³ was 0.5% above the value taken from clause (14) in EN 15267-3, which specifies that it should be at least 25% below the maximum expanded uncertainty specified by the IED (Industrial Emissions Directive, 2010/75/EU). The minimum requirement of 10% for CO specified by the IED was met.

Note 2: The maintenance interval is four weeks – Work in the maintenance interval:

- Regular visual inspections i) check test gas stocks, ii) check analyser status, iii) check probe and sample gas line temperatures.
- Check test gas filter, gas conditioning system, sample gas lines, condensate pumps and gas inlets.
- Perform zero and span point checks by applying test gases every four weeks (or use automatic gas feeding instead). Nitrogen must be applied to the probe for leak tightness tests).
- Please refer to the manufacturer's instructions.

Note 3: Functional check and calibration

- Visual inspection of the instrument and sampling system.
- Check of leak tightness by feeding zero and test gas to the probe.
- Linearity check with zero and test gases of different concentrations every four weeks.
- Check the zero and span point drift every 4 weeks with daily automatic adjustment of the zero point. Adjust span point weekly.
- Determination of lag and response time.
- Check of data transmission to the evaluation system (analogue and status signals).

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Description

The modular X-CEMS continuous emissions monitoring system (CEMS) consists of the X-STREAM enhanced continuous gas analyser, capable of supporting the following measuring principles: non-dispersive infrared (NDIR) and non-dispersive ultraviolet (NDUV) photometer technology, and specifically for oxygen measurement, either paramagnetic or an electrochemical sensor. The modular gas analyser can be housed together with a gas cooler, pump and optional NO₂ converter in a cabinet. The sample gas is extracted by a sample probe at 180°C and transported to the cabinet using heated line operating at 180°C heated 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'.
2. The design of the product certified is held and maintained by TUV Rheinland for certificate No. Sira MC200367/00.
3. If a certified product is found not to comply, Sira should be notified immediately at the address shown on this certificate.
4. 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'.
5. This document remains the property of Sira and shall be returned if requested by Sira.

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