PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

SM-5

Manufactured by:

Envea GmbH
Liebigstrasse 5
85757 Karlsfeld
Germany

has been assessed by CSA Group
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, EN15267-2:2009, EN 15267-3:2007
& QAL 1 as defined in EN 14181: 2014

	Certification range:	Supplementary ranges:
Mercury (Hg)	0-5µg/m^3	0-30µg/m^3 0-45µg/m^3 0-100µg/m^3 0-1000µg/m^3

Project No.:	80122602
Certificate No:	CSA MC220404/00
Initial Certification:	30 November 2022
This Certificate issued:	30 November 2022
Renewal Date:	29 November 2027

Andrew Young
Environmental Team Manager

MCERTS is operated on behalf of the Environment Agency by

CSA Group Testing UK Ltd
Unit 6, Hawarden Industrial Park
Hawarden, Deeside, CH5 3US
Tel: +44 (0)1244 670 900

Form 1335
Issue 10

Certificate Contents

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

This instrument is considered suitable for use on waste incineration and large combustion plants. 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 applications.

The field test was conducted over a period of at least seven months in the flue gas of a municipal waste incineration plant. The field test commenced on the 31st May 2021 and ended on the 21st January 2022.

Basis of Certification

This certification is based on the following test report(s) and on CSA Group's assessment and ongoing surveillance of the product and the manufacturing process:

TÜV Rheinland Energy GmbH, Report no. 936/21246513/A, Cologne, 15 September 2021
TÜV Rheinland Energy GmbH, Report no. 936/21246513/B, Cologne, 18 May 2022

Product Certified

The Envea SM-5 measuring system consists of the following parts:

1. Sample Probe	2. Heated Filter	3. Heated Sample Line	4. Gas Conditioning	5. Analyser
M&C SP2200 - heated sampling probe	External heated ceramic filter, 2µm at 200°C	Heated sample line set at 180°C (maximum length of 40m)	Bypass pump and compressed air preparation unit	Cabinet with thermal reactor, gas cooler, switchover unit with Hg absorber and detector(AAS) and microprocessor.

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.

This certificate applies to all instruments fitted with software versions, for the system ‘1.22’, the display ‘2’ and the probe ‘1.02’ onwards (serial number 2437).

Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: +5°C to +40°C
Instrument IP rating: IP54
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 (***Laboratory***)	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time						
Hg 0-5µg/m^3					111s	≤200s
Hg 0-30µg/m^3					108s	≤200s
Hg 0-45µg/m^3					108s	≤200s
Hg 0-100µg/m^3					98s	≤200s
Hg 0-1000µg/m^3					110s	≤200s
Repeatability standard deviation at zero point						
Hg 0-5µg/m^3	0.2					≤2.0%
Repeatability standard deviation at span point						
Hg 0-5µg/m^3		0.6				≤2.0%
Lack of fit						
Hg 0-5µg/m^3			-1.20			≤2.0%
Hg 0-30µg/m^3		-0.63				≤2.0%
Hg 0-45µg/m^3		-0.89				≤2.0%
Hg 0-100µg/m^3	0.40					≤2.0%
Hg 0-1000µg/m^3		0.90				≤2.0%
Influence of ambient temperature change from nominal value at 20°C within specific range at zero point (+5°C to +40°C)						
Hg 0-5µg/m^3	-0.40					≤5.0%
Influence of ambient temperature change from nominal value at 20°C within specific range at span point (+5°C to +40°C)						
Hg 0-5µg/m^3				-2.4		≤5.0%

Certificate No: CSA MC220404/00
This Certificate issued: 29 November 2022

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Influence of sample gas flow on extractive CEMS Hg 0-5µg/m^3	-0.4					≤2.0%
Influence of voltage, at -15% below and at +10% above nominal supply voltage (196V to 253V) Hg 0-5µg/m^3		0.8				≤2.0%
Influence of vibration (10 to 60Hz (±0.3mm), 60 to 150Hz at 19.6m/s^2) Hg 0-5µg/m^3					Note 1	≤2.0%
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 Hg 0-5µg/m^3				3.0		≤4.0%
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 Hg 0-5µg/m^3				-3.8		≤4.0%

Test (***Field***)	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Determination coefficient of calibration function Hg 0-5µg/m^3					0.9050	≥0.90
Response time Hg 0-5µg/m^3					179s	≤200s
Lack of fit Hg 0-5µg/m^3			-1.20			≤2.0%
Minimum maintenance interval					Note 2 3 months	≥8 days
Zero and Span drift requirement	An external test gas generator is required for zero and span checks. It is possible to record zero and span drift. This complies with the requirements for QAL3 according to EN14181.					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 drift within maintenance interval Hg 0-5µg/m^3			-1.2			≤3.0%
Change in span drift within maintenance interval Hg 0-5µg/m^3				2.6		≤3.0%
Availability					98.0	≥95.0%
Reproducibility Hg 0-5µg/m^3			1.7			≤3.3%
Measurement uncertainty Hg (For an ELV of 2 µg/m^3)					Guidance - at least 25% below max permissible uncertainty 16.7	<30% (40%)

Note 1: The SM-5 measuring system utilizes an extractive sampling system with a standard sampling probe – this performance test is not applicable.

Note 2: The Envea SM-5 has a maintenance interval of 3 months. The work detailed below must be carried out in addition to the maintenance interval.

- Carry out a zero and span point check by dispensing instrument air or nitrogen (NP) or wet test gas (e.g. with a Hovacal). An external test gas generator is required.

Certificate No: CSA MC220404/00
This Certificate issued: 29 November 2022

Six monthly work

- Replacement of filters

Annual maintenance work

- Checking/if necessary cleaning the glass insert in the cooler
- Replacement of the pump hose
- Checking/if necessary cleaning the optical cells
- Cleaning the sampling line
- Cleaning/replacing (if necessary) the sampling probe filter
- Replacing filter inserts

Note 3: Functional check and calibration – the following procedure is recommended for functional tests. These should be performed before 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
- Check of the zero and span drift after 4 weeks (check the long-term drift after a basic calibration)
- Determination of lag and response time
- Check of data transmission to the evaluation system (analogue and status signals)

Note 4: The length of the sample gas line used for the laboratory tests was 15m and for the field tests 35m.

Description

The SM-5 measuring system consists of three modules:

- Sampling system consisting of heated sampling tube and external heated dust filter with back-purge valve unit and connection for external test gas feed
- Heated sample gas line (15 m in the laboratory, 35 m in the field)
- Analysis cabinet with high-temperature conversion unit, gas cooler, the photometer. The analysis cabinet contains a bypass pump and a compressed air preparation unit.

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 CSA Group Testing UK Ltd Certificates'.

2. The design of the product certified is held and maintained by TUV Rheinland for certificate No. CSA MC220404.

3. If a certified product is found not to comply, CSA Group 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 CSA Group Testing UK Ltd Certificates'.

5. This document remains the property of CSA Group and shall be returned when requested by CSA Group.