

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000074628_01

Certified AMS: SM-5 for Hg

Manufacturer: ENVEA GmbH
Liebigstr. 5
85757 Karlsfeld
Germany

Test Institute: TÜV Rheinland Energy GmbH

**This is to certify that the AMS has been tested
and found to comply with the standards
EN 15267-1 (2009), EN 15267-2 (2009), EN 15267-3 (2007)
and EN 14181 (2014).**

Certification is awarded in respect of the conditions stated in this certificate
(this certificate contains 6 pages).

The present certificate replaces certificate 0000074628_00 dated 31 May 2022.



Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

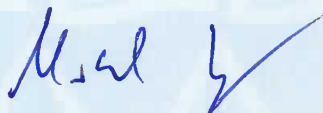
www.tuv.com
ID 0000074628

Publication in the German Federal Gazette
(BAnz) of 28 July 2022

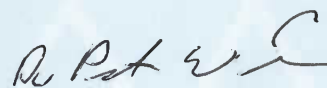
German Environment Agency
Dessau, 09 August 2022

This certificate will expire on:
27 July 2027

TÜV Rheinland Energy GmbH
Cologne, 08 August 2022



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Test institute accredited to EN ISO/IEC 17025 by DAkkS (German Accreditation Body).
This accreditation is limited to the accreditation scope defined in the enclosure to the certificate D-PL-11120-02-00.

Test report: 936/21246513/B dated 18 May 2022
Initial certification: 11 April 2022
Expiry date: 27 July 2027
Publication: BAnz AT 28.07.2022 B4, chapter I No. 2.1

Approved application

The tested AMS is suitable for use at Directive 2010/75/EC chapter IV (17th BImSchV:2021). The measured ranges have been selected so as to ensure as broad a field of application as possible.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a 7 month field test at a waste incineration.

The AMS is approved for an ambient temperature range of +5° to 40°C.

The notification of suitability of the AMS, performance testing and the uncertainty calculation have been effected on the basis of the regulations applicable at the time of testing. As changes in legal provisions are possible, any potential user should ensure that this AMS is suitable for monitoring the emission limit values relevant to the application.

Any potential user should ensure, in consultation with the manufacturer, that this AMS is suitable for the installation at which it will be installed.

Note:

The legal regulations mentioned do correspond to the current state of. Each user should, if necessary, in consultation with the competent authority, ensure that this AMS meets the legal requirements for the intended use. In addition, it cannot be ruled out that legal regulations governing the use of a measuring device for emission monitoring may change during the lifetime of the certificate.

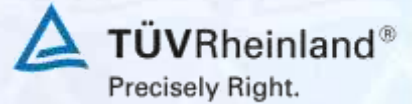
Basis of the certification

This certification is based on:

- Test report 936/21246513/B dated 18 May 2022 of TÜV Rheinland Energy GmbH
- Suitability announced by the German Federal Environment Agency (UBA) as the relevant body
- The ongoing surveillance of the product and the manufacturing process



Certificate:
0000074628_01 / 09 August 2022



Publication in the German Federal Gazette: BAnz AT 28.07.2022 B4, chapter I No. 2.1,
Announcement by UBA dated 28 June 2022:

AMS designation:

SM-5 for Hg

Manufacturer:

ENVEA GmbH, Karlsfeld, Germany

Field of application:

For plants according to the 17th BImSchV

Measuring ranges during the performance test:

Component	Certification range	additional range				Unit
		0 - 30	0 - 45	0 - 100	0 - 1,000	
Hg	0 - 5	0 - 30	0 - 45	0 - 100	0 - 1,000	µg/m ³

Software versions:

Software system: 1.22
Software display: 2
Software probe: 1.02

Restrictions:

none

Notes:

1. The maintenance interval is three months.
2. Moist test gases shall be used when testing Hg.
3. An external test gas generator shall be used for regular check of reference point in maintenance interval.
4. The length of the sample gas line was 15 m in the laboratory test and 35 m in the field test.
5. Supplementary test (maintenance interval extension) to the announcement of the Federal Environment Agency of 9 March 2022 (BAnz AT 11.04.2022 B10, Chapter I Number 3.1).

Test institute: TÜV Rheinland Energy GmbH, Cologne

Report No.: 936/21246513/B dated 18 May 2022

Certified product

This certificate applies to automated measurement systems conforming to the following description:

The SM-5 measuring system is a continuously operating, extractive mercury measuring device for recording the emissions of total mercury, i.e. the sum of elemental mercury, ionic mercury and mercury compounds.

The test gas is continuously conveyed to the analyser cabinet via a sampling probe heated to 200 °C with a hot filter and via a sampling line heated to 180 °C. In the analyser cabinet, the test gas first flows through a heat reactor. There, at a temperature of about 950 °C, the mercury compounds are broken down and ionic mercury is converted into the elemental form. The test gas then flows through an acid absorber and is dried in a gas cooler. In turn, a partial flow is alternately sucked through the detector - directly or via an Hg absorber.

The measuring principle used to determine the mercury concentration is the resonance absorption of the Hg atoms by UV radiation of wavelength 253.7 nm (atomic absorption spectrometry, AAS). The measurement itself takes place in a cycle of 1 min.

The measuring system comprises the following components:

- Sampling system (manufacturer: M&C; type: SP2200), consisting of heated sampling tube and external heated dust filter with backflush valve unit and connection for the external test gas feed
- Heated sample gas line (15 m in the laboratory, 35 m in the field), including: heated sample gas line (180 °C), line for back-purging air and the communication line
- Lockable analyser cabinet with thermal reactor, acid absorber, gas cooler, switchover unit with Hg absorber and the detector with microprocessor. Furthermore, the analyser cabinet contains a bypass pump and a compressed air preparation unit.



Certificate:
0000074628_01 / 09 August 2022



General notes

This certificate is based upon the equipment tested. The manufacturer is responsible for ensuring that on-going production complies with the requirements of the EN 15267. 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 systems shall be subject to regular surveillance.

If a product of the current production does not conform to the certified product, TÜV Rheinland Energy GmbH must be notified at the address given on page 1.

A certification mark with an ID-Number that is specific to the certified product is presented on page 1 of this certificate. This certification mark may be applied to the product or used in advertising materials for the certified product.

This document as well as the certification mark remains property of TÜV Rheinland Energy GmbH. With revocation of the publication the certificate loses its validity. After the expiration of the certificate and on requests of the TÜV Rheinland Energy GmbH this document shall be returned and the certificate mark must not be employed anymore.

The relevant version of this certificate and its expiration is also accessible on the internet: gal1.de.

History of documents

Certification of SM-5 is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

Initial certification according to EN 15267

Certificate No. 0000074628_00: 31 May 2022
Expiry date of the certificate: 11 April 2027
Test report 936/21246513/A dated 15 September 2021
TÜV Rheinland Energy GmbH
Publication BAnz AT 11.04.2022 B10, chapter I number 3.1
UBA announcement dated 9 March 2022

Supplementary testing according to EN 15267
Certificate No. 0000074628_01: 09 August 2022
Expiry date of the certificate: 27 July 2027
Test report 936/21246513/B dated 18 May 2022
TÜV Rheinland Energy GmbH
Publication BAnz AT 28.07.2022 B4, chapter I number 2.1
UBA announcement dated 28 June 2022

Calculation of overall uncertainty according to EN 14181 and EN 15267-3

Measuring system

Manufacturer	ENVEA GmbH
AMS designation	SM-5
Serial number of units under test	#2437 / #2438
Measuring principle	Atomic absorption spectrometry

Test report

Test laboratory	936/21246513/B
Date of report	TÜV Rheinland
	2022-05-18

Measured component

Certification range	Hg	0 - 5 µg/m³
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Evaluation of the cross-sensitivity (CS)

(system with largest CS)

Sum of positive CS at zero point	0.07 µg/m³
Sum of negative CS at zero point	0.00 µg/m³
Sum of positive CS at span point	0.07 µg/m³
Sum of negative CS at span point	-0.19 µg/m³
Maximum sum of cross-sensitivities	-0.19 µg/m³
Uncertainty of cross-sensitivity	u_i -0.110 µg/m³

Calculation of the combined standard uncertainty

Tested parameter

			u^2
Standard deviation from paired measurements under field conditions *	u_D	0.043 µg/m³	0.002 (µg/m³)²
Lack of fit	u_{lof}	-0.035 µg/m³	0.001 (µg/m³)²
Zero drift from field test	$u_{d,z}$	-0.035 µg/m³	0.001 (µg/m³)²
Span drift from field test	$u_{d,s}$	0.075 µg/m³	0.006 (µg/m³)²
Influence of ambient temperature at span	u_t	0.064 µg/m³	0.004 (µg/m³)²
Influence of supply voltage	u_v	0.035 µg/m³	0.001 (µg/m³)²
Cross-sensitivity (interference)	u_i	-0.110 µg/m³	0.012 (µg/m³)²
Influence of sample gas flow	u_p	-0.012 µg/m³	0.000 (µg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.040 µg/m³	0.002 (µg/m³)²

* The larger value is used :
"Repeatability standard deviation at set point" or
"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_c)	$u_c = \sqrt{\sum (u_{max, i})^2}$	0.17 µg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.33 µg/m³

Relative total expanded uncertainty

Requirement of 2010/75/EU	U in % of the ELV 3.3 µg/m³	10.1
Requirement of EN 15267-3	U in % of the ELV 3.3 µg/m³	40.0
	U in % of the ELV 3.3 µg/m³	30.0