

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000056506

AMS designation: CMM for Hg

Manufacturer: Gasmot Technologies Oy
Pulittie 8 A 1
00880 Helsinki
Finland

Test Laboratory: TÜV Rheinland Energy GmbH

This is to certify that the AMS has been tested and certified according to 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).



Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

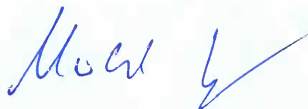
www.tuv.com
ID 0000056506

Publication in the German Federal Gazette
(BAnz) of 26 March 2018

This certificate will expire on:
25 March 2023

German Federal Environment Agency
Dessau, 13 April 2018

TÜV Rheinland Energy GmbH
Cologne, 12 April 2018



Dr. Marcel Langner
Head of Section II 4.1



ppa. Dr. Peter Wilbring

www.umwelt-tuv.eu
tre@umwelt-tuv.eu
Phone: + 49 221 806-5200

TÜV Rheinland Energy GmbH
Am Grauen Stein
51105 Köln

Test institute accredited to EN ISO/IEC 17025:2005 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: | 936/21238865/A dated 2 October 2017 |
| Initial certification: | 26 March 2018 |
| Expiry date: | 25 March 2023 |
| Publication: | BAnz AT 26.03.2018 B8, chapter I number 2.1 |

Approved application

The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13. BImSchV). 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 three-months field test at lignite-fired power plant.

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

Basis of the certification

This certification is based on:

- Test report 936/21238865/A dated 2 October 2017 issued by 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

Publication in the German Federal Gazette: BAnz AT 26.03.2018 B8, chapter I number 2.1,
UBA announcement dated 21 February 2018:

AMS designation:

CMM for Hg

Manufacturer:

Gasmet Technologies Oy, Helsinki, Finland

Field of application:

For plants according to 13th BImSchV

Measuring ranges during performance testing:

| Component | Certification range | Supplementary measuring ranges | | | Unit |
|-----------|---------------------|--------------------------------|-------|---------|-------------------|
| Hg | 0–10 | 0–45 | 0–100 | 0–1 000 | µg/m ³ |

Software version:

1.189

Restrictions:

none

Notes:

1. The maintenance interval is four weeks.
2. Wet test gases should be used for testing Hg.
3. An external test gas generator is needed for regular span checks during the maintenance interval.
4. The length of the sample gas line was 12 m for the laboratory and field test.
5. The measuring system needs to be aligned with the zero and span point daily using the integrated Hg(0) generator.

Test Report:

TÜV Rheinland Energy GmbH, Cologne
Report no. 936/21238865/A dated 2 October 2017

Certified product

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

The AMS CMM is an extractive continuous mercury emission monitoring system. A sample flow is extracted from the waste gas using an electronically heated probe tube and diluted with nitrogen in the probe. The diluted sample gas is then transported to the analyser cabinet via a heated test gas line where it first passes through a thermal catalytic converter which converts chemically bound mercury present in the waste gas into atomic mercury. The mercury present in the waste gas is then measured with the help of a spectrometer using atomic fluorescence spectroscopy (CVAF; cold vapour atomic fluorescence).

The AMS under test comprises the following main components:

- Sampling probe (stainless steel, glass coated) heated to 180 °C with diluter and back purging unit.
- Cable bundle between probe and analyser cabinet containing 4 separate gas lines (diluted sample gas from the probe to the analyser cabinet (heated), adjustment gas (heated), compressed air for back purging and nitrogen for diluting from analyser cabinet to probe), max. 12 m in length
- Air-conditioned analyser cabinet (dimensions 2.03/0.6/0.6 m c/w air conditioning) comprising the following components:
 - Mercury analyser with integrated high temperature converter
 - Adjustment gas generator for Hg(0) and HgCl₂ adjustment gas (not part of the performance test)
 - Nitrogen generator for the purpose of dilution
 - Windows PC running Gasmert MAUI (Mercury Analyzer User Interface) software for control and evaluation
 - Sample gas pump
 - Compressed air preparation
 - Interface card for analogue and digital inputs and outputs

The adjustment generator is able to generate Hg(0) and HgCl₂ separately. A heated line transports the adjustment gas generated to the probe. During the performance test period, the AMS zero and span points were automatically compared with Hg(0) daily.

The HgCl₂-function of the adjustment gas generator was deactivated during the performance test and is not suitability tested.

The current software version is: 1.189.

The current manual version is: D2.2 (19.9.2017).

General remarks

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 manufacturing process for 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 document as well as the certification mark remains property of TÜV Rheinland Energy GmbH. Upon revocation of the publication the certificate loses its validity. After the expiration of the certificate and on request of TÜV Rheinland Energy GmbH this document shall be returned and the certificate mark must no longer be used.

The relevant version of this certificate and its expiration date are also accessible on the internet at gal1.de.

Certification of the CMM measuring system is based on the documents listed below and the regular, continuous surveillance of the manufacturer's quality management system:

Initial certification according to EN 15267

Certificate no. 0000056506: 13 April 2018
Expiry date of the certificate: 25 March 2023

Test report: 936/21238865/A dated 2 October 2017
TÜV Rheinland Energy GmbH, Cologne
Publication: BANz AT 26.03.2018 B8, chapter I number 2.1
UBA announcement dated 21 February 2018

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

Measuring system

| | |
|-----------------------------------|------------------------|
| Manufacturer | Gasmet Technologies Oy |
| AMS designation | CMM |
| Serial number of units under test | 17010 / 17011 |
| Measuring principle | atomic fluorescence |

Test report

| | |
|-----------------|---------------------------------|
| Test laboratory | 936/21238865/A TÜV Rheinland |
| Date of report | 2017-10-02 |

Measured component

| | |
|---------------------|--------------------------------|
| Certification range | Hg 0 - 10 µg/m ³ |
|---------------------|--------------------------------|

Evaluation of the cross-sensitivity (CS)

(system with largest CS)

| | |
|------------------------------------|-------------------------------|
| Sum of positive CS at zero point | 0.00 µg/m ³ |
| Sum of negative CS at zero point | 0.01 µg/m ³ |
| Sum of positive CS at span point | 0.16 µg/m ³ |
| Sum of negative CS at span point | 0.00 µg/m ³ |
| Maximum sum of cross-sensitivities | 0.16 µg/m ³ |
| Uncertainty of cross-sensitivity | u_i 0.091 µg/m ³ |

Calculation of the combined standard uncertainty

Tested parameter

| | | | u^2 |
|--|------------------------------------|-------|-----------------------------------|
| Standard deviation from paired measurements under field conditions * | u_D 0.057 µg/m ³ | 0.003 | (µg/m ³) ² |
| Lack of fit | u_{lof} -0.030 µg/m ³ | 0.001 | (µg/m ³) ² |
| Zero drift from field test | $u_{d,z}$ 0.049 µg/m ³ | 0.002 | (µg/m ³) ² |
| Span drift from field test | $u_{d,s}$ -0.072 µg/m ³ | 0.005 | (µg/m ³) ² |
| Influence of ambient temperature at span | u_t 0.038 µg/m ³ | 0.001 | (µg/m ³) ² |
| Influence of supply voltage | u_v 0.023 µg/m ³ | 0.001 | (µg/m ³) ² |
| Cross-sensitivity (interference) | u_i 0.091 µg/m ³ | 0.008 | (µg/m ³) ² |
| Influence of sample gas flow | u_b -0.020 µg/m ³ | 0.000 | (µg/m ³) ² |
| Uncertainty of reference material at 70% of certification range | u_{rm} 0.081 µg/m ³ | 0.007 | (µg/m ³) 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) | $u_c = \sqrt{\sum (u_{max,j})^2}$ | 0.17 µg/m ³ |
| Total expanded uncertainty | $U = u_c * k = u_c * 1.96$ | 0.33 µg/m ³ |

Relative total expanded uncertainty

| | | |
|---------------------------|---|-------------|
| Requirement of 2010/75/EU | U in % of the ELV 4 µg/m³ | 8.3 |
| Requirement of EN 15267-3 | U in % of the ELV 4 µg/m³ | 40.0 |
| | U in % of the ELV 4 µg/m³ | 30.0 |