

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000056506_02

AMS designation: CMM for Mercury

Manufacturer: Gasmot Technologies Oy
Pultitie 8A1
00880 Helsinki
Finland

Test Laboratory: TÜV Rheinland Energy GmbH

This is to certify that the AMS has been tested
and found to comply with:

EN 15267-1: 2009, EN 15267-2: 2009, EN 15267-3: 2007
and EN 14181: 2015

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

The present certificate replaces certificate 0000056506_01 of 4 September 2018.



Suitability Tested
EN 15267
QAL1 Certified
Regular Surveillance

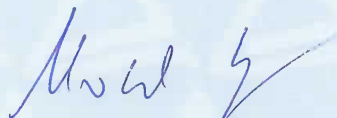
www.tuv.com
ID 0000056506

Publication in the German Federal Gazette
(BAnz) of 26 March 2019

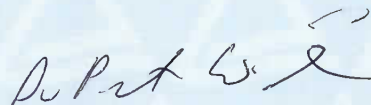
German Federal Environment Agency
Dessau, 12 June 2019

This certificate will expire on:
25 March 2024

TÜV Rheinland Energy GmbH
Cologne, 11 June 2019



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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/D dated 1 October 2018
Initial certification:	26 March 2018
Expiry date:	25 March 2024
Publication:	BAnz AT 26.03.2019 B7, chapter I number 1.1

Approved application

The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13th BImSchV), at waste incineration plants according to Directive 2010/75/EU, chapter IV (17th BImSchV), the 27th and 30th BImSchV and TA Luft. 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, a six-months field test as well as two additional one-month field tests at various plant types.

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/D dated 1 October 2018 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 26.03.2019 B7, chapter I number 1.1
UBA announcement dated 27 February 2019:

AMS designation:

CMM for Mercury

Manufacturer:

Gasmet Technologies Oy, Helsinki, Finland

Field of application:

For plants requiring official approval and for plants according to the 27th BImSchV

Measuring ranges during supplementary testing:

Component	Certification range	supplementary measuring ranges				Unit
Hg	0–5	0–10	0–45	0–100	0–1 000	µg/m ³

Software version:

1.198

Restrictions:

None

Notes:

1. The maintenance interval is three months.
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 sample gas line used in the laboratory test and in the field test at a power plant was 12 m long, it was 25 m long in the field test at a waste incinerator; in the field test at a cement kiln, it was 8m long.
5. The measuring system needs to be aligned with the zero and span point daily using the integrated Hg(0) generator.
6. Supplementary test (software revision, expansion of the scope of approval to cover plants requiring official approval and plants according to the 27th BImSchV) as regards Federal Environment Agency notice of 3 July 2018 (BAnz AT 17.07.2018 B9, chapter I, number 2.2)

Test Report:

TÜV Rheinland Energy GmbH, Cologne
Report no.: 936/21238865/D dated 1 October 2018

Certified product

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

The CMM measuring system is a continuous extractive mercury analyser. 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 then flows to the analyser cabinet via a heated sample 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 c/w dilution unit and back purging unit
- Cable bundle connecting 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), Lines of 8 to 25 m length were used during the performance test.
- Air-conditioned analyser cabinet (dimensions 2.03/0.6/0.6 m c/w air conditioning) comprising the following components:
 - Mercury analyser c/w high-temperature converter
 - Adjustment gas generator, which produces Hg(0) and HgCl₂ adjustment gas (outside the scope of testing),
 - Nitrogen generator for dilution,
 - Windows PC c/w Gasmert MAUI software (Mercury Analyzer User Interface) for control and evaluation purposes (Mercury Analyzer User Interface) Software,
 - Sample gas pump,
 - Compressed air preparation,
 - Interface chips for analogue and digital inputs and outputs.

The adjustment gas generator produces Hg(0) and HgCl₂ separately. The adjustment gas produced reaches the probe through a heated line. During performance testing, the zero point and span point were checked daily and automatically using Hg(0).

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

The current software version is: 1.198.

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 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. 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 qal1.de.

Document history

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 2024
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

Supplementary testing according to EN 15267

Certificate no.0000056506_01: 4 September 2018
Expiry date of the certificate: 25 March 2024
Test report: 936/21238865/C dated 8 March 2018
TÜV Rheinland Energy GmbH, Cologne
Publication: BAnz AT 17.07.2018 B9, chapter I number 2.2
UBA announcement dated 3 July 2018

Certificate no. 0000056506_02: 12 June 2019
Expiry date of the certificate: 25 March 2024
Test report: 936/21238865/D dated 1 October 2018
TÜV Rheinland Energy GmbH, Cologne
Publication: BAnz AT 26.03.2019 B7, chapter I number 1.1
UBA announcement dated 27 February 2019

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/D
Date of report	TÜV Rheinland
	2018-10-01

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	0.00 µg/m³
Sum of negative CS at zero point	0.01 µg/m³
Sum of positive CS at span point	0.16 µg/m³
Sum of negative CS at span point	0.00 µg/m³
Maximum sum of cross-sensitivities	0.16 µg/m³
Uncertainty of cross-sensitivity	u_i 0.091 µg/m³

Calculation of the combined standard uncertainty

Tested parameter

			u^2
Standard deviation from paired measurements under field conditions *	u_D 0.057 µg/m³		0.003 (µg/m³)²
Lack of fit	u_{lof} -0.030 µg/m³		0.001 (µg/m³)²
Zero drift from field test	$u_{d,z}$ 0.049 µg/m³		0.002 (µg/m³)²
Span drift from field test	$u_{d,s}$ -0.081 µg/m³		0.007 (µg/m³)²
Influence of ambient temperature at span	u_t 0.038 µg/m³		0.001 (µg/m³)²
Influence of supply voltage	u_v 0.023 µg/m³		0.001 (µg/m³)²
Cross-sensitivity (interference)	u_i 0.091 µg/m³		0.008 (µg/m³)²
Influence of sample gas flow	u_p -0.020 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)	$u_c = \sqrt{\sum (u_{max, i})^2}$	0.16 µg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.31 µg/m³

Relative total expanded uncertainty

Requirement of 2010/75/EU	U in % of the ELV 2 µg/m³	15.6
Requirement of EN 15267-3	U in % of the ELV 2 µg/m³	40.0
	U in % of the ELV 2 µg/m³	30.0