Umwelt Bundes Amt
For our Environment

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CERTIFICATE

about Product Conformity (QAL1)

Number of Certificate: 0000001013

Certified AMS:	Gasmet CEMS for HF, CO, NO, NO_2, N_2O, SO_2, NH_3, HCl, CO_2, H_2O and O_2
Manufacturer:	Gasmet Technologies Oy 00880 Helsinki Pulttitie 8A1 Finland
Test Institute:	TÜV Rheinland Energie und Umwelt GmbH

This is certifying that for the measuring of HF the AMS has been found to comply with:

EN 15267-1: 2009, EN 15267-2: 2009, EN 15267-3: 2007, and EN 14181: 2004

Certification is awarded in respect of the conditions stated in this certificate (see also the following pages).

www.tuv.com TÜVRheinland® ID: 0000001013

- EN 15267-3 tested
- QAL1 certified
- TUV approved
- Annual inspection

Publication in the German Federal Gazette (BAnz.) of 29 July 2011

Umweltbundesamt
Dessau, 19 August 2011

i. A. Dr. Hans-Joachim Hummel

The certificate is valid until:
28 July 2016

TÜV Rheinland Energie und Umwelt GmbH
Köln, 17 August 2011

ppa. Dr. Peter Wilbring

www.umwelt-tuv.de / www.eco-tuv.com teu@umwelt-tuv.de Tel. +49 - 221 - 806 - 2756	TÜV Rheinland Energie und Umwelt GmbH Am Grauen Stein 51105 Köln
Accreditation according to EN ISO/IEC 17025 and certified according to ISO 9001:2008.	

Umwelt Bundes Amt
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Certificate:
0000001013 / 19 August 2011

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Test report:	936/21210692/A of 30 March 2011
First certification:	29 July 2011
Run of validity until:	28 July 2016
Publication	BAnz. 29 July 2011, No 113, page 2725, chapter I, No 4.1

Authorised application

The tested AMS is suitable for the use at combustion plants according to EC directive 2001-80-EC, at waste incinerations plants according to EC directive 2000-76-EC and other plants requiring official permission. The tested ranges have been chosen with respect to the wide application range of the AMS.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a three months test at a municipal waste incinerator. The AMS is authorised for the ambient temperature range from +5 °C to +40 °C.

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

Basis of the certification of the AMS for measuring of HF

This certification is based on:

- test report 936/21210692/A of 30 March 2011 of TÜV Rheinland Energie und Umwelt GmbH
- on the relevant body (German Umweltbundesamt) assessment
- the ongoing surveillance of the product and the manufacturing process
- publication in the German Federal Gazette (BAnz. 29 July 2011, No 113, page 2725, chapter I No 4.1: UBA publication from 15 July 2011)

AMS name:

Gasmet CEMS for HF, CO, NO, NO_2, N_2O, SO_2, NH_3, HCl, CO_2, H_2O and O_2

Manufacturer:

Gasmet Technologies Oy, Helsinki, Finland

Suitability:

For measurements at plants requiring official permission (i. e. 2000-76-EC, waste incineration directive and 2001-80-EC, large combustion plants directive).

Measuring ranges during the suitability test:

Component	Certification-range	Supplementary measurement ranges	Unit
HF	0 - 3	0 - 10	mg/m³
O_2	0 - 25		Vol.-%
CO	0 - 75	0 - 300	mg/m³
NO	0 - 200	0 - 600	mg/m³
NO_2	0 - 200	-	mg/m³
N_2O	0 - 100	-	mg/m³
SO_2	0 - 75	0 - 300	mg/m³
NH_3	0 - 15	-	mg/m³
HCl	0 - 15	0 - 90	mg/m³
CO_2	0 - 25	-	Vol.-%
H_2O	0 - 30	-	Vol.-%

Software versions:

Calcmet: 11.101 with analysis module 4.42.2
and OXITEC Ver. 1.50 np

Restrictions:

The measurement system shall only be operated at plants which waste gas humidity does not constantly exceed 30 Vol.-%.

Remarks:

1. Wet test gases shall be used for the testing of HF, HCl and NH_3.
2. A four weeks period has been determined as maintenance interval.
3. After plant malfunction the sampling probe has to be cleaned.
4. For O_2 measurement the analyser OXITEC 500E SME 5 of ENOTEC GmbH, Marienheide, Germany is integrated.
5. Supplementary testing for component HF on the announcement of the Federal Environment Agency on 14 February 2008 (BAnz. p. 901, chapter I No 2.1).

Test report:

TÜV Rheinland Energie und Umwelt GmbH, Köln
Report-No.: 936/21210692/A of 30 March 2011

Certified product

This certificate applies to automatic measurement systems confirming to the following description:

The measuring equipment Gasmet CEMS consists of the following parts:

1) Sampling system

Sampling probe:	SP2000H of the company of M & C, 1 m length, to 180 °C heated, with PFTE filter element: 2 µm
Heated line:	180 °C with 4 mm teflon tube, 25 m length, (standard 5 to 30 m)
Pump:	heated to 180 °C, with teflon membrane

2) Analysers

FTIR 1:	Gasmet CX-4000, cell temperature: 180 °C, cell with optical path length: 5 m
FTIR HF:	Gasmet CX-4001 for HF, cell temperature: 180 °C, optical path length: 10 m
O_2:	ZrO_2 cell OXITEC 500E SME 5 in 19"-housing at the company ENOTEC with the software OXITEC Ver. 1.50 np
TOC:	Total-C measuring analyzer Thermo-FID of the company M&A

The measuring gas is pressed continuously through the three analysers in parallel (FTIR1, FTIR HF and O_2-measurement) by the sample pump. The amount of the gas is controlled. The injector pump of the TOC system extracts in front of the pump unit a partial gas stream.

3) Computer

PC standard with at least 512 MB RAM, 2 serial interfaces, analogue input card for O_2 and FID-analyser, network access and Windows XP.
For the evaluation of the spectrums of the analyser the spectra are transferred via a RS232-interface into the computer and processed there. In this computer also the interface cards for the analog and digital in- and output are integrated.
Furthermore the computer takes over the control of sampling and the gas flows of the analysers.

4) Software

The evaluation-software Calcmet 11.101 is based on Windows for the Gasmet CEMS.

5) Measuring cabinet with

Air-conditioning on approx. 30 °C,
Sampling pump, Control units, Analysers and Computer

General notes

This certificate is based upon the equipment tested. The manufacturer is responsible for a long-lasting compliance of the ongoing production process with the requirements of EN 15267. The manufacturer is obliged to maintain a certified quality management system to control the production of the certified product. Both product and quality management system shall be subject to regular surveillance.

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

The certification mark with the product specific ID-Number which may be applied to the product or used in promotion material of the certified product is presented on page 1 of this certificate.

This document as well as the certification mark remain property of TÜV Rheinland Energie und Umwelt GmbH. Upon revocation of the announcement the certificate loses validity. After expiration of the validity of the certificate or on request of the TÜV Rheinland Energie und Umwelt GmbH this document shall be returned and the certification mark shall longer be used.

The current version of this certificate and its validity is also listed at the Internet Address: **qal1.de**

Certification of Gasmet CEMS for HF, CO, NO, NO_2, N_2O, SO_2, NH_3, HCl, CO_2, H_2O and O_2 are based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

Basic approval tests

Test report: 936/21200448/A from 07 July 2006
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Köln

Publication: BAnz. 14 October 2006, No 194, p. 6715, chapter I No 2.5:
Announcement by UBA from 12 September 2006

Supplementary test for O_2: 936/21203240/B from 03 September 2007
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Köln

Publication: BAnz. 07 March 2008, No 38, p. 901, chapter I No 2.1:
Announcement by UBA from 14 February 2008

Notification

Publication: BAnz. 20 April 2007, No 75, p. 4139, chapter IV notification 8:
Announcement by UBA from 12 April 2007 (changing of air conditioning system)

Initial certification according to EN 15267 for measuring HF

Certificate No 0000001013 of: 19 August 2011

Validity of the certificate: 28 July 2016

Test report: 936/21210692/A of 30 March 2011
TÜV Rheinland Energie und Umwelt GmbH, Köln

Publication: BAnz. 29 July 2011, No 113, p. 2725, chapter I No 4.1:
Announcement by UBA from 15 July 2011.

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

Measuring system			
Manufacturer	Gasmet		
Name of measuring system	CEMS		
Serial number of the candidates	434 / 435		
Measuring principle	FTIR		
Test report	936/21210692/A		
Test laboratory	TÜV Rheinland		
Date of report	2011-03-30		
Measured component	HF		
Certification range	0 - 3	mg/m³	

Evaluation of the cross sensitivity (CS)
(system with largest CS)

Sum of positive CS at zero point	0.02	mg/m³
Sum of negative CS at zero point	0.00	mg/m³
Sum of postive CS at reference point	0.00	mg/m³
Sum of negative CS at reference point	-0.08	mg/m³
Maximum sum of cross sensitivities	-0.08	mg/m³
Uncertainty of cross sensitivity	-0.046	mg/m³

Calculation of the combined standard uncertainty

Tested parameter		u		u²	
Standard deviation from paired measurements under field conditions *	u_D	0.030	mg/m³	0.001	(mg/m³)²
Lack of fit	u_{lof}	0.029	mg/m³	0.001	(mg/m³)²
Zero drift from field test	$u_{d,z}$	0.000	mg/m³	0.000	(mg/m³)²
Span drift from field test	$u_{d,s}$	0.052	mg/m³	0.003	(mg/m³)²
Influence of ambient temperature at span	u_t	0.035	mg/m³	0.001	(mg/m³)²
Influence of supply voltage	u_v	0.015	mg/m³	0.000	(mg/m³)²
Cross sensitivity (interference)	u_i	-0.046	mg/m³	0.002	(mg/m³)²
Influence of sample gas flow	u_p	-0.013	mg/m³	0.000	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_m	0.024	mg/m³	0.001	(mg/m³)²

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

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.09	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.18	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 1 mg/m³**	**18.4**
Requirement of 2000/76/EC and 2001/80/EC	**U in % of the ELV 1 mg/m³**	**40.0**
Requirement of EN 15267-3	U in % of the ELV 1 mg/m³	30.0