

# CERTIFICATE

## of Product Conformity (QAL1)

Certificate No: 0000001013\_07

**Certified AMS:** CEMS II e for CO, NO, NO<sub>2</sub>, N<sub>2</sub>O, SO<sub>2</sub>, HCl, HF, NH<sub>3</sub>, CH<sub>4</sub>, CH<sub>2</sub>O, O<sub>2</sub>, H<sub>2</sub>O and CO<sub>2</sub>

**Manufacturer:** Gasmot Technologies Oy  
Mestarintie 6  
01730 Vantaa  
Finland

**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 (2015).**

Certification is awarded in respect of the conditions stated in this certificate  
(this certificate contains 24 pages).  
The present certificate replaces certificate 0000001013\_06 dated 28 July 2021.



Suitability Tested  
EN 15267  
QAL1 Certified  
Regular  
Surveillance

www.tuv.com  
ID 0000001013

Publication in the German Federal Gazette  
(BAnz) of 15 March 2017

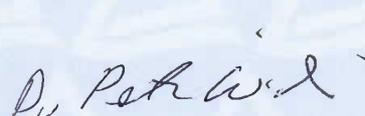
German Environment Agency  
Dessau, 29 July 2022

This certificate will expire on:  
28 July 2027

TÜV Rheinland Energy GmbH  
Cologne, 28 July 2022



Dr. Marcel Langner  
Head of Section II 4.1



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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.

<b>Test report:</b>	936/21225866/C dated 13 October 2016
<b>Initial certification:</b>	19 August 2011
<b>Expiry date:</b>	28 July 2027
<b>Certificate:</b>	Renewal (of previous certificate 0000001013_06 of 28. Juli 2021 valid until 28 July 2022)
<b>Publication:</b>	BAnz AT 15.03.2017 B6, Chap. I No. 3.3

### Approved application

The tested AMS is suitable for use at plants to Directive 2010/75/EU, chapter III (13th BImSchV:2009), chapter IV (17th BImSchV:2013), 30th BImSchV:2009, Directive 2015/2193/EC (44th BImSchV:2021), TA Luft:2002. 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 several laboratory tests and three field tests, each over three months. For the maintenance interval extension a further field test was carried out over twelve months. The field tests occurred at two different waste incineration plants.

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 and oxygen concentration 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 not correspond to the current state of legislation in every case. 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 936/21225866/C dated 13 October 2016 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

Publication in the German Federal Gazette: BAnz AT 15.03.2017 B6, Chap. I No. 3.3,  
Announcement by UBA dated 22 February 2017:

**AMS designation:**

CEMS II e for CO, NO, NO<sub>2</sub>, N<sub>2</sub>O, SO<sub>2</sub>, HCl, HF, NH<sub>3</sub>, CH<sub>4</sub>, CH<sub>2</sub>O, O<sub>2</sub>, H<sub>2</sub>O and CO<sub>2</sub>

**Manufacturer:**

Gasmet Technologies Oy, Helsinki, Finland

**Field of application:**

For plants requiring official approval

**Measuring ranges during the performance test:**

Component	Certification range	Supplementary measurement ranges		Unit
CO	0 – 75	0 – 300	0 – 1,500	mg/m <sup>3</sup>
NO	0 – 150	0 – 600	0 – 2,000	mg/m <sup>3</sup>
NO <sub>2</sub>	0 – 200	0 – 500	-	mg/m <sup>3</sup>
N <sub>2</sub> O	0 – 100	0 – 500	-	mg/m <sup>3</sup>
SO <sub>2</sub>	0 – 75	0 – 300	0 – 1,500	mg/m <sup>3</sup>
HCl	0 – 15	0 – 90	-	mg/m <sup>3</sup>
HF	0 – 3	0 – 10	-	mg/m <sup>3</sup>
NH <sub>3</sub>	0 – 15	0 – 50	-	mg/m <sup>3</sup>
O <sub>2</sub>	0 – 25	-	-	vol.-%
CO <sub>2</sub>	0 – 25	-	-	vol.-%
H <sub>2</sub> O	0 – 30	0 – 40	-	vol.-%
CH <sub>4</sub>	0 – 15	0 – 50	0 – 150	mg/m <sup>3</sup>
CH <sub>2</sub> O	0 – 20	0 – 30	0 – 90	mg/m <sup>3</sup>

**Software version:**

Calcmnet: 12.18 with evaluation module 4.42.2 and  
OXITEC Ver. 1.50 np

**Restriction/s:**

None

**Notes:**

1. The maintenance interval is six months.
2. During the test with HF, HCl, NH<sub>3</sub> and CH<sub>2</sub>O wet test gases are to be used.
3. The sampling probe should be cleansed after plant failures.
4. The measuring system is available as variant A (air conditioner unit on top of the measurement cabinet) and variant B (air conditioner unit on the back of the measurement cabinet).

5. For the measurement of the component O<sub>2</sub> (optional) the OXITEC 500E SME 5 analyser manufactured by ENOTEC GmbH, Marienheide, Germany is integrated.
6. Supplementary testing (maintenance interval extension) for notification of the German Federal Environment Agency (UBA) dated 14 July 2016 (BAnz AT 01.08.2016 B11, chapter I number 3.1).

**Test report:**

TÜV Rheinland Energy GmbH, Cologne  
Report No.: 936/21225866/C dated 13 October 2016

Publication in the German Federal Gazette: BAnz AT 26.03.2018 B8, chapter V notification 50, UBA announcement dated 21 February 2018:

**50 Notification as regards Federal Environmental Agency (UBA) notices of 22 February 2017 (BAnz AT 15.03.2017 B6, chapter I number 3.3)**

The current software versions of the measuring system CEMS II e for the components O<sub>2</sub>, CO, NO, NO<sub>2</sub>, N<sub>2</sub>O, SO<sub>2</sub>, HCl, HF, NH<sub>3</sub>, H<sub>2</sub>O, CO<sub>2</sub>, H<sub>2</sub>CO and CH<sub>4</sub> from Gaset Technology Oy are:

Calcmet: 12.20 with evaluation module 4.42.2 OXITEC Ver. 1.50 np  
Calcmet version 12.19 can also be used.

Statement issued by TÜV Rheinland Energy GmbH dated 7 December 2017

Publication in the German Federal Gazette: BAnz AT 26.03.2019 B7, chapter IV notification 36, UBA announcement dated 27 February 2019:

**36 Notification as regards Federal Environmental Agency (UBA) notices of 22 February 2017 (BAnz AT 15.03.2017 B6, chapter I number 3.3) and of 21 February 2018 (BAnz AT 26.03.2018 B8, chapter V notification 50)**

The current software versions of the measuring system CEMS II e for the components O<sub>2</sub>, CO, NO, NO<sub>2</sub>, N<sub>2</sub>O, SO<sub>2</sub>, HCl, HF, NH<sub>3</sub>, H<sub>2</sub>O, CO<sub>2</sub>, H<sub>2</sub>CO and CH<sub>4</sub> from Gaset Technology Oy are:

Calcmnet: 12.202 with evaluation module 4.42.2

OXITEC 4.10

Calcmnet version 12.201 can also be used.

The optionally installed oxygen analyser OXITEC 500E can be installed with a new front panel with modified display and operation. With the new front panel, the reference to the manufacturer Enotec is no longer included.

The background colour of the rotameters in the purge gas supply module has been changed from black to white. The Fujitsu B19-7 LED monitor can also be used as a monitor for device display.

Statement issued by TÜV Rheinland Energy GmbH dated 8 October 2018

Publication in the German Federal Gazette: BAnz AT 22.07.2019 B8, chapter V notification 6, UBA announcement dated 28 June 2019:

**6 Notification as regards Federal Environmental Agency (UBA) notices of 22 February 2017 (BAnz AT 15.03.2017 B6, chapter I number 3.3) and of 27 February 2019 (BAnz AT 26.03.2019 B7, chapter IV notification 36)**

The new address of Gaset Technology Oy, manufacturer of the CEM II e measuring system for O<sub>2</sub>, CO, NO, NO<sub>2</sub>, N<sub>2</sub>O, SO<sub>2</sub>, HCl, HF, NH<sub>3</sub>, H<sub>2</sub>O, CO<sub>2</sub>, H<sub>2</sub>CO und CH<sub>4</sub>, is as follows:

Gaset Technologies Oy, Mestarintie 6, 01730 Vantaa, Finland

Statement issued by TÜV Rheinland Energy GmbH dated 7 March 2019

Publication in the German Federal Gazette: BAnz AT 24.03.2020 B7, chapter IV notification 47, UBA announcement dated 24 February 2020:

**47 Notification as regards Federal Environmental Agency (UBA) notices of 22 February 2017 (BAnz AT 15.03.2017 B6, chapter I number 3.3) and of 28 June 2019 (BAnz AT 22.07.2019 B8, chapter V notification 6)**

The label at the door of the CEMS II e measuring system for O<sub>2</sub>, CO, NO, NO<sub>2</sub>, N<sub>2</sub>O, SO<sub>2</sub>, HCl, HF, NH<sub>3</sub>, H<sub>2</sub>O, CO<sub>2</sub>, H<sub>2</sub>CO and CH<sub>4</sub> manufactured by Gaset Technology Oy was adapted to the latest corporate design.

The measuring system may also be equipped with a SIMATIC IPC847E PC running the Windows 10 operating system.

The cylinder of the FTIR measuring cell may also be used when gold-coated from two sides.

Statement issued by TÜV Rheinland Energy GmbH dated 16 December 2019

Publication in the German Federal Gazette: BAnz AT 03.05.2021 B9, chapter III notification 30, UBA announcement dated 31 March 2021:

**30 Notification as regards Federal Environmental Agency (UBA) notices of 22 February 2017 (BAnz AT 15.03.2017 B6, chapter I number 3.3) and of 24 February 2020 (BAnz AT 24.03.2020 B7, chapter IV notification 47)**

The latest software versions of the CEMS II e measuring system for the components O<sub>2</sub>, CO, NO, NO<sub>2</sub>, N<sub>2</sub>O, SO<sub>2</sub>, HCl, HF, NH<sub>3</sub>, H<sub>2</sub>O, CO<sub>2</sub>, H<sub>2</sub>CO and CH<sub>4</sub> manufactured by Gaset Technology Oy are:

Calcmnet: 12.210 with evaluation module 4.42.2

Calcmnet version 12.206 may also be used.

The software version of the Oxitex 500E remains unchanged at 4.10.

In addition to the previously used power supply unit, the PSF-125-12 power supply unit from Powerbox Oy can also be used in the future.

Statement issued by TÜV Rheinland Energy GmbH dated 9 September 2020

Publication in the German Federal Gazette: BAnz AT 05.08.2021 B5, chapter. IV  
notification 33, Announcement by UBA dated 29 June 2021:

**33 Notification as regards Federal Environment Agency (UBA) notices  
of 22 February 2017 (BAnz AT 15.03.2017 B6, chapter I number 3.3) and  
of 31 March 2021 (BAnz AT 03.05.2021 B9, chapter III notification 30)**

The latest software versions of the CEMS II e measuring system for the  
components O<sub>2</sub>, CO, NO, NO<sub>2</sub>, N<sub>2</sub>O, SO<sub>2</sub>, HCl, HF, NH<sub>3</sub>, H<sub>2</sub>O, CO<sub>2</sub>, H<sub>2</sub>CO and CH<sub>4</sub>  
manufactured by Gaset Technology Oy are:

Calcmnet: 12.220 with evaluation module 4.42.2.

Oxitex 500E: 4.10

The measuring system has been adapted to the current corporate design with new  
labelling. The colour scheme is now blue instead of yellow.

Statement issued by TÜV Rheinland Energy GmbH dated 03 May 2021

Publication in the German Federal Gazette: BAnz AT 11.04.2022 B10, chapter. VI  
notification 37, Announcement by UBA dated 09 March 2022:

**37 Notification as regards Federal Environment Agency (UBA) notices  
of 22 February 2017 (BAnz AT 15.03.2017 B6, chapter I number 3.3) and  
of 29 June 2021 (BAnz AT 05.08.2021 B5, chapter IV notification 33)**

The current software versions of the measuring device CEMS II e for the compo-  
nents O<sub>2</sub>, CO, NO, NO<sub>2</sub>, N<sub>2</sub>O, SO<sub>2</sub>, HCl, HF, NH<sub>3</sub>, H<sub>2</sub>O, CO<sub>2</sub>, H<sub>2</sub>CO and CH<sub>4</sub> of the  
manufacturer Gaset Technology Oy are:

Calcmnet: 12.230 with evaluation module 4.42.2

Oxitex 500E: 4.10

Statement issued by TÜV Rheinland Energy GmbH dated 14 September 2021

**Fehler! Hyperlink-Referenz ungültig.**

### Certified product

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

The measuring system CEMS II e consists of the parts:

**1) Sampling system:**

Sampling probe: SP2000H from the company M & C,  
heated to 180 °C, with PTFE filter: 2 µm  
Heated line: 180 °C with 4 mm Teflon hose, 25 m length,  
(standard 5 to 30 m)  
Pump: heated to 180 °C, with Teflon membrane

**2) Analysers:**

FTIR: Gasetmet CX-4000, cuvette temperature: 180 °C,  
optical path length: 5 m,  
IR source: SiC,  
O<sub>2</sub>:optional: ZrO<sub>2</sub> measuring cell OXITEC 500E SME 5 in the 19"-module  
manufactured by ENOTEC GmbH

**3) PC:**

Standard industrial PC with Windows 7 Ultimate 32bit.  
To analyse the Gasetmet CEMS spectra, the calculated spectra are transmitted to a PC  
via RS232 interface for further processing. The PC also controls and monitors sam-  
pling and gaseous analyte flow of the analysers.

**4) Software:**

Evaluation software Calcmet

**5) Measuring cabinet**

Air-conditioning adjusted to approx. 30 °C,  
Sampling pump, control units, analysers, interface boards for analogue and digital  
input and output and computer.

The measurement cabinet is available as version:

A (dimensions: 212x61x70 cm, air conditioner unit on top of the measurement  
cabinet) and

B (dimensions: 210x61x113 cm, air conditioner unit on the back of the  
measurement cabinet).

Both versions can be equipped with the OXITEC 500E SME 5 O<sub>2</sub> analyser manufac-  
tured by ENOTEC GmbH in addition to the FTIR. All other components are identical.

### **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](http://gal1.de).

### **History of documents**

Certification of **CEMS II e** is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

#### **Basic test**

Test report 936/21200448/A dated 7 July 2006  
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH  
Publication BAnz. 14 October 2006, No. 194, p. 6715, chapter I number 2.5  
UBA announcement dated 12 September 2006

#### **Notifications**

Statement issued by TÜV Rheinland Immissionsschutz und Energiesysteme GmbH dated 14 December 2006  
Publication BAnz. 20 April 2007, No. 75, p. 4139, chapter IV notification 8  
UBA announcement dated 12 April 2007  
(new housing)

#### **Supplementary testing**

Test report 936/21203240/B dated 3 September 2007  
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH  
Publication BAnz. 07 March 2008, No. 38, p. 901, chapter I number 2.1  
UBA announcement dated 14 February 2008

#### **Notifications**

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 29 March 2011  
Publication BAnz. 29 July 2011, No. 113, p. 2725, chapter III notification 10  
UBA announcement dated 15 July 2011  
(Software changes)

**Initial certification according to EN 15267**

Certificate No. 0000001013\_00: 19 August 2011  
Expiry date of the certificate: 28 July 2016  
Test report 936/21210692/A dated 30 March 2011  
TÜV Rheinland Energie und Umwelt GmbH  
Publication BAnz. 29 July 2011, No. 113, p. 2725, chapter I number 4.1  
UBA announcement dated 15 July 2011

**Supplementary testing according to EN 15267**

Certificate No. 0000001013\_01: 20 August 2012  
Expiry date of the certificate: 28 July 2016  
Test report 936/21218384/A dated 16 March 2012  
TÜV Rheinland Energie und Umwelt GmbH  
Publication BAnz AT 20.07.2012 B11, chapter I number 3.1  
UBA announcement dated 6 July 2012

**Supplementary testing according to EN 15267**

Certificate No. 0000001013\_02: 20 August 2013  
Expiry date of the certificate: 28 July 2016  
Test report 936/21220683/A dated 27 March 2013  
TÜV Rheinland Energie und Umwelt GmbH  
Publication BAnz AT 23.07.2013 B4, chapter I number 3.1  
UBA announcement dated 3 July 2013

**Notifications**

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 30 September 2013  
Publication BAnz AT 01.04.2014 B12, chapter VI notification 12  
UBA announcement dated 27 February 2014  
(Software changes)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 1 October 2014  
Publication BAnz AT 02.04.2015 B5, chapter IV notification 33  
UBA announcement dated 25 February 2015  
(Soft- and hardware changes)

**Renewal of certificate**

Certificate No. 0000001013\_03: 22 July 2016  
Expiry date of the certificate: 28 July 2021

**Supplementary testing according to EN 15267**

Certificate No. 0000001013\_04: 19 August 2016  
Expiry date of the certificate: 28 July 2021  
Test report 936/21225866/B dated 23 February 2016  
TÜV Rheinland Energie und Umwelt GmbH  
Publication BAnz AT 01.08.2016 B11, chapter I number 3.1  
UBA announcement dated 14 July 2016

**Supplementary testing according to EN 15267**

Certificate No. 0000001013\_05: 25 April 2017  
Expiry date of the certificate: 28 July 2021  
Test report 936/21225866/C dated 13 October 2016  
TÜV Rheinland Energy GmbH  
Publication BAnz AT 15.03.2017 B6, chapter I number 3.3  
UBA announcement dated 22 February 2017

**Notifications**

Statement issued by TÜV Rheinland Energy GmbH dated 7 December 2017  
Publication BAnz AT 26.03.2018 B8, chapter V notification 50  
UBA announcement dated 21 February 2018  
(Software changes)

Statement issued by TÜV Rheinland Energy GmbH dated 8 October 2018  
Publication BAnz AT 26.03.2019 B7, chapter IV notification 36  
UBA announcement dated 27 February 2019  
(Hard and software changes)

Statement issued by TÜV Rheinland Energy GmbH dated 7 March 2019  
Publication BAnz AT 22.07.2019 B8, chapter V notification 6  
UBA announcement dated 28 June 2019  
(New address)

Statement issued by TÜV Rheinland Energy GmbH dated 16 December 2019  
Publication BAnz AT 24.03.2020 B7, chapter IV notification 47  
UBA announcement dated 24 February 2020  
(Hardware changes)

Statement issued by TÜV Rheinland Energy GmbH dated 9 September 2020  
Publication BAnz AT 03.05.2021 B9, chapter III notification 30  
UBA announcement dated 31 March 2021  
(Soft- and hardware changes)

**Renewal of certificate**

Certificate No. 0000001013\_06: 28 July 2021  
Expiry date of the certificate: 28 July 2022

**Notifications**

Statement issued by TÜV Rheinland Energy GmbH dated 3 May 2021  
Publication BAnz AT 05.08.2021 B5, chapter IV notification 33  
UBA announcement dated 29 June 2021  
(Software change Softwareänderung)

Statement issued by TÜV Rheinland Energy GmbH dated 14 September 2021  
Publication BAnz AT 11.04.2022 B10, chapter VI notification 37  
UBA announcement dated 9 March 2022  
(Software changes)

**Renewal of certificate**

Certificate No. 0000001013\_07: 29 July 2022  
Expiry date of the certificate: 28 July 2027

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

**Measuring system**

Manufacturer	Gasmet Technologies Oy
AMS designation	CEMS II e
Serial number of units under test	14433 / 14434
Measuring principle	FTIR

**Test report**

Test laboratory	TÜV Rheinland
Date of report	2016-10-13

**Measured component**

Certification range	HF	0 - 3 mg/m <sup>3</sup>
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**Evaluation of the cross-sensitivity (CS)**

(system with largest CS)

Sum of positive CS at zero point	0.00 mg/m <sup>3</sup>
Sum of negative CS at zero point	0.04 mg/m <sup>3</sup>
Sum of positive CS at span point	0.12 mg/m <sup>3</sup>
Sum of negative CS at span point	-0.09 mg/m <sup>3</sup>
Maximum sum of cross-sensitivities	0.12 mg/m <sup>3</sup>
Uncertainty of cross-sensitivity	$u_i$ 0.068 mg/m <sup>3</sup>

**Calculation of the combined standard uncertainty**

**Tested parameter**

			$u^2$
Standard deviation from paired measurements under field conditions *	$u_D$	0.010 mg/m <sup>3</sup>	0.000 (mg/m <sup>3</sup> ) <sup>2</sup>
Lack of fit	$u_{lof}$	0.032 mg/m <sup>3</sup>	0.001 (mg/m <sup>3</sup> ) <sup>2</sup>
Zero drift from field test	$u_{d,z}$	0.002 mg/m <sup>3</sup>	0.000 (mg/m <sup>3</sup> ) <sup>2</sup>
Span drift from field test	$u_{d,s}$	-0.040 mg/m <sup>3</sup>	0.002 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of ambient temperature at span	$u_t$	0.040 mg/m <sup>3</sup>	0.002 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of supply voltage	$u_v$	0.016 mg/m <sup>3</sup>	0.000 (mg/m <sup>3</sup> ) <sup>2</sup>
Cross-sensitivity (interference)	$u_i$	0.068 mg/m <sup>3</sup>	0.005 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of sample gas flow	$u_p$	-0.006 mg/m <sup>3</sup>	0.000 (mg/m <sup>3</sup> ) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	$u_{rm}$	0.024 mg/m <sup>3</sup>	0.001 (mg/m <sup>3</sup> ) <sup>2</sup>

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

Combined standard uncertainty ( $u_c$ )	$u_c = \sqrt{\sum (u_{max, j})^2}$	0.10 mg/m <sup>3</sup>
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.19 mg/m <sup>3</sup>

**Relative total expanded uncertainty**

Requirement of 2010/75/EU	<b>U in % of the ELV 1 mg/m<sup>3</sup></b>	<b>19.4</b>
Requirement of EN 15267-3	<b>U in % of the ELV 1 mg/m<sup>3</sup></b>	<b>40.0</b>
	<b>U in % of the ELV 1 mg/m<sup>3</sup></b>	<b>30.0</b>

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

**Measuring system**

Manufacturer	Gaset Technologies Oy
AMS designation	CEMS II e
Serial number of units under test	14433 / 14434
Measuring principle	FTIR

**Test report**

Test laboratory	936/21225866/C
Date of report	TÜV Rheinland
	2016-10-13

**Measured component**

Certification range	CH <sub>2</sub> O	0 - 20 mg/m <sup>3</sup>
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**Evaluation of the cross-sensitivity (CS)**

(system with largest CS)

Sum of positive CS at zero point	0.16 mg/m <sup>3</sup>
Sum of negative CS at zero point	0.00 mg/m <sup>3</sup>
Sum of positive CS at span point	0.36 mg/m <sup>3</sup>
Sum of negative CS at span point	-0.19 mg/m <sup>3</sup>
Maximum sum of cross-sensitivities	0.36 mg/m <sup>3</sup>
Uncertainty of cross-sensitivity	$u_i$ 0.208 mg/m <sup>3</sup>

**Calculation of the combined standard uncertainty**

**Tested parameter**

			$u^2$
Standard deviation from paired measurements under field conditions *	$u_D$	0.038 mg/m <sup>3</sup>	0.001 (mg/m <sup>3</sup> ) <sup>2</sup>
Lack of fit	$u_{lof}$	-0.104 mg/m <sup>3</sup>	0.011 (mg/m <sup>3</sup> ) <sup>2</sup>
Zero drift from field test	$u_{d,z}$	0.000 mg/m <sup>3</sup>	0.000 (mg/m <sup>3</sup> ) <sup>2</sup>
Span drift from field test	$u_{d,s}$	-0.242 mg/m <sup>3</sup>	0.059 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of ambient temperature at span	$u_t$	0.153 mg/m <sup>3</sup>	0.023 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of supply voltage	$u_v$	0.047 mg/m <sup>3</sup>	0.002 (mg/m <sup>3</sup> ) <sup>2</sup>
Cross-sensitivity (interference)	$u_i$	0.208 mg/m <sup>3</sup>	0.043 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of sample gas flow	$u_p$	-0.051 mg/m <sup>3</sup>	0.003 (mg/m <sup>3</sup> ) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	$u_{rm}$	0.162 mg/m <sup>3</sup>	0.026 (mg/m <sup>3</sup> ) <sup>2</sup>

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

Combined standard uncertainty ( $u_c$ )	$u_c = \sqrt{\sum (u_{max,i})^2}$	0.41 mg/m <sup>3</sup>
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.80 mg/m <sup>3</sup>

**Relative total expanded uncertainty**

Requirement of 2010/75/EU	<b>U in % of the range 20 mg/m<sup>3</sup></b>	<b>4.0</b>
Requirement of EN 15267-3	<b>U in % of the range 20 mg/m<sup>3</sup></b>	<b>30.0 **</b>
	<b>U in % of the range 20 mg/m<sup>3</sup></b>	<b>22.5</b>

\*\* The EU-directive 2010/75/EU on industrial emissions provides no requirements for this component.  
A value of 30.0 % was used for this.

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

**Measuring system**

Manufacturer	Gasmet Technologies Oy
AMS designation	CEMS II e
Serial number of units under test	14433 / 14434
Measuring principle	FTIR

**Test report**

Test laboratory	936/21225866/C
Date of report	TÜV Rheinland 2016-10-13

**Measured component**

Certification range	CH <sub>4</sub> 0 - 15 mg/m <sup>3</sup>
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**Evaluation of the cross-sensitivity (CS)**

(system with largest CS)

Sum of positive CS at zero point	0.00 mg/m <sup>3</sup>
Sum of negative CS at zero point	0.00 mg/m <sup>3</sup>
Sum of positive CS at span point	0.08 mg/m <sup>3</sup>
Sum of negative CS at span point	-0.38 mg/m <sup>3</sup>
Maximum sum of cross-sensitivities	-0.38 mg/m <sup>3</sup>
Uncertainty of cross-sensitivity	$u_i$ -0.217 mg/m <sup>3</sup>

**Calculation of the combined standard uncertainty**

**Tested parameter**

			$u^2$
Standard deviation from paired measurements under field conditions *	$u_D$	0.034 mg/m <sup>3</sup>	0.001 (mg/m <sup>3</sup> ) <sup>2</sup>
Lack of fit	$u_{lof}$	0.035 mg/m <sup>3</sup>	0.001 (mg/m <sup>3</sup> ) <sup>2</sup>
Zero drift from field test	$u_{d,z}$	0.000 mg/m <sup>3</sup>	0.000 (mg/m <sup>3</sup> ) <sup>2</sup>
Span drift from field test	$u_{d,s}$	0.156 mg/m <sup>3</sup>	0.024 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of ambient temperature at span	$u_t$	0.057 mg/m <sup>3</sup>	0.003 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of supply voltage	$u_v$	0.026 mg/m <sup>3</sup>	0.001 (mg/m <sup>3</sup> ) <sup>2</sup>
Cross-sensitivity (interference)	$u_i$	-0.217 mg/m <sup>3</sup>	0.047 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of sample gas flow	$u_p$	-0.069 mg/m <sup>3</sup>	0.005 (mg/m <sup>3</sup> ) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	$u_{rm}$	0.121 mg/m <sup>3</sup>	0.015 (mg/m <sup>3</sup> ) <sup>2</sup>

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

Combined standard uncertainty ( $u_c$ )	$u_c = \sqrt{\sum (u_{max, i})^2}$	0.31 mg/m <sup>3</sup>
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.61 mg/m <sup>3</sup>

**Relative total expanded uncertainty**

<b>Requirement of 2010/75/EU</b>	<b>U in % of the range 15 mg/m<sup>3</sup></b>	<b>4.1</b>
Requirement of EN 15267-3	U in % of the range 15 mg/m <sup>3</sup>	30.0 **
	U in % of the range 15 mg/m <sup>3</sup>	22.5

\*\* The EU-directive 2010/75/EU on industrial emissions provides no requirements for this component.  
A value of 30.0 % was used for this.

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

**Measuring system**

Manufacturer	Gasmet Technologies Oy
AMS designation	CEMS II e
Serial number of units under test	14433 / 14434
Measuring principle	FTIR

**Test report**

Test laboratory	936/21225866/C
Date of report	TÜV Rheinland 2016-10-13

**Measured component**

Certification range	NO 0 - 150 mg/m <sup>3</sup>
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**Evaluation of the cross-sensitivity (CS)**

(system with largest CS)

Sum of positive CS at zero point	0.00 mg/m <sup>3</sup>
Sum of negative CS at zero point	0.00 mg/m <sup>3</sup>
Sum of positive CS at span point	0.00 mg/m <sup>3</sup>
Sum of negative CS at span point	-2.60 mg/m <sup>3</sup>
Maximum sum of cross-sensitivities	-2.60 mg/m <sup>3</sup>
Uncertainty of cross-sensitivity	$u_i$ -1.498 mg/m <sup>3</sup>

**Calculation of the combined standard uncertainty**

**Tested parameter**

			$u^2$
Standard deviation from paired measurements under field conditions *	$u_D$ 0.360 mg/m <sup>3</sup>		0.130 (mg/m <sup>3</sup> ) <sup>2</sup>
Lack of fit	$u_{lof}$ 0.580 mg/m <sup>3</sup>		0.336 (mg/m <sup>3</sup> ) <sup>2</sup>
Zero drift from field test	$u_{d,z}$ 0.087 mg/m <sup>3</sup>		0.008 (mg/m <sup>3</sup> ) <sup>2</sup>
Span drift from field test	$u_{d,s}$ 1.645 mg/m <sup>3</sup>		2.706 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of ambient temperature at span	$u_t$ 0.709 mg/m <sup>3</sup>		0.503 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of supply voltage	$u_v$ 0.379 mg/m <sup>3</sup>		0.144 (mg/m <sup>3</sup> ) <sup>2</sup>
Cross-sensitivity (interference)	$u_i$ -1.498 mg/m <sup>3</sup>		2.244 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of sample gas flow	$u_p$ -0.577 mg/m <sup>3</sup>		0.333 (mg/m <sup>3</sup> ) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	$u_{rm}$ 1.212 mg/m <sup>3</sup>		1.470 (mg/m <sup>3</sup> ) <sup>2</sup>

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

Combined standard uncertainty ( $u_c$ )	$u_c = \sqrt{\sum (u_{max, i})^2}$	2.81 mg/m <sup>3</sup>
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	5.50 mg/m <sup>3</sup>

**Relative total expanded uncertainty**

Requirement of 2010/75/EU	<b>U in % of the ELV 98 mg/m<sup>3</sup></b>	<b>5.6</b>
Requirement of EN 15267-3	<b>U in % of the ELV 98 mg/m<sup>3</sup></b>	<b>20.0</b>
	<b>U in % of the ELV 98 mg/m<sup>3</sup></b>	<b>15.0</b>

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

**Measuring system**

Manufacturer	Gasmet Technologies Oy
AMS designation	CEMSII e
Serial number of units under test	14433 / 14434
Measuring principle	FTIR

**Test report**

Test laboratory	936/21225866/C
Date of report	TÜV Rheinland 2016-10-13

**Measured component**

Certification range	HCl 0 - 15 mg/m <sup>3</sup>
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**Evaluation of the cross-sensitivity (CS)**

(system with largest CS)

Sum of positive CS at zero point	0.00 mg/m <sup>3</sup>
Sum of negative CS at zero point	-0.06 mg/m <sup>3</sup>
Sum of positive CS at span point	0.60 mg/m <sup>3</sup>
Sum of negative CS at span point	-0.10 mg/m <sup>3</sup>
Maximum sum of cross-sensitivities	0.60 mg/m <sup>3</sup>
Uncertainty of cross-sensitivity	$u_i$ 0.346 mg/m <sup>3</sup>

**Calculation of the combined standard uncertainty**

**Tested parameter**

			$u^2$
Standard deviation from paired measurements under field conditions *	$u_D$	0.209 mg/m <sup>3</sup>	0.044 (mg/m <sup>3</sup> ) <sup>2</sup>
Lack of fit	$u_{lof}$	0.173 mg/m <sup>3</sup>	0.030 (mg/m <sup>3</sup> ) <sup>2</sup>
Zero drift from field test	$u_{d,z}$	0.000 mg/m <sup>3</sup>	0.000 (mg/m <sup>3</sup> ) <sup>2</sup>
Span drift from field test	$u_{d,s}$	0.208 mg/m <sup>3</sup>	0.043 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of ambient temperature at span	$u_t$	0.265 mg/m <sup>3</sup>	0.070 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of supply voltage	$u_v$	0.091 mg/m <sup>3</sup>	0.008 (mg/m <sup>3</sup> ) <sup>2</sup>
Cross-sensitivity (interference)	$u_i$	0.346 mg/m <sup>3</sup>	0.120 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of sample gas flow	$u_p$	-0.045 mg/m <sup>3</sup>	0.002 (mg/m <sup>3</sup> ) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	$u_{rm}$	0.121 mg/m <sup>3</sup>	0.015 (mg/m <sup>3</sup> ) <sup>2</sup>

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

Combined standard uncertainty ( $u_c$ )	$u_c = \sqrt{\sum (u_{max, i})^2}$	0.58 mg/m <sup>3</sup>
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	1.13 mg/m <sup>3</sup>

**Relative total expanded uncertainty**

Requirement of 2010/75/EU	<b>U in % of the ELV 10 mg/m<sup>3</sup></b>	<b>11.3</b>
Requirement of EN 15267-3	<b>U in % of the ELV 10 mg/m<sup>3</sup></b>	<b>40.0</b>
	<b>U in % of the ELV 10 mg/m<sup>3</sup></b>	<b>30.0</b>

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

**Measuring system**

Manufacturer	Gasmet Technologies Oy
AMS designation	CEMS II e
Serial number of units under test	14433 / 14434
Measuring principle	FTIR

**Test report**

Test laboratory	936/21225866/C
Date of report	TÜV Rheinland 2016-10-13

**Measured component**

	H <sub>2</sub> O
Certification range	0 - 30 Vol.-%

**Evaluation of the cross-sensitivity (CS)**

(system with largest CS)

Sum of positive CS at zero point	0.00	Vol.-%
Sum of negative CS at zero point	0.00	Vol.-%
Sum of positive CS at span point	1.10	Vol.-%
Sum of negative CS at span point	-0.10	Vol.-%
Maximum sum of cross-sensitivities	1.10	Vol.-%
Uncertainty of cross-sensitivity	$u_i$ 0.632	Vol.-%

**Calculation of the combined standard uncertainty**

**Tested parameter**

				$u^2$
Standard deviation from paired measurements under field conditions *	$u_D$	0.292	Vol.-%	0.085 (Vol.-%) <sup>2</sup>
Lack of fit	$u_{lof}$	0.230	Vol.-%	0.053 (Vol.-%) <sup>2</sup>
Zero drift from field test	$u_{d,z}$	0.000	Vol.-%	0.000 (Vol.-%) <sup>2</sup>
Span drift from field test	$u_{d,s}$	-0.329	Vol.-%	0.108 (Vol.-%) <sup>2</sup>
Influence of ambient temperature at span	$u_t$	0.231	Vol.-%	0.053 (Vol.-%) <sup>2</sup>
Influence of supply voltage	$u_v$	0.262	Vol.-%	0.069 (Vol.-%) <sup>2</sup>
Cross-sensitivity (interference)	$u_i$	0.632	Vol.-%	0.400 (Vol.-%) <sup>2</sup>
Influence of sample gas flow	$u_p$	0.112	Vol.-%	0.013 (Vol.-%) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	$u_{rm}$	0.242	Vol.-%	0.059 (Vol.-%) <sup>2</sup>

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

Combined standard uncertainty ( $u_c$ )	$u_c = \sqrt{\sum (u_{max, i})^2}$	0.92	Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	1.80	Vol.-%

**Relative total expanded uncertainty**

<b>Requirement of 2010/75/EU</b>	<b>U in % of the range 30 Vol.-%</b>	<b>6.0</b>
Requirement of EN 15267-3	U in % of the range 30 Vol.-%	10.0 **
	U in % of the range 30 Vol.-%	7.5

\*\* The EU-directive 2010/75/EU on industrial emissions provides no requirements for this component.  
A value of 10.0 % was used for this.

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

**Measuring system**

Manufacturer	Gasmet Technologies Oy
AMS designation	CEMS II e
Serial number of units under test	14433 / 14434
Measuring principle	FTIR

**Test report**

Test laboratory	936/21225866/C
Date of report	TÜV Rheinland 2016-10-13

**Measured component**

Certification range	SO <sub>2</sub> 0 - 75 mg/m <sup>3</sup>
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**Evaluation of the cross-sensitivity (CS)**

(system with largest CS)

Sum of positive CS at zero point	0.24 mg/m <sup>3</sup>
Sum of negative CS at zero point	0.00 mg/m <sup>3</sup>
Sum of positive CS at span point	2.30 mg/m <sup>3</sup>
Sum of negative CS at span point	-2.90 mg/m <sup>3</sup>
Maximum sum of cross-sensitivities	-2.90 mg/m <sup>3</sup>
Uncertainty of cross-sensitivity	u <sub>i</sub> -1.676 mg/m <sup>3</sup>

**Calculation of the combined standard uncertainty**

**Tested parameter**

		u <sup>2</sup>
Repeatability standard deviation at set point *	u <sub>r</sub> 0.357 mg/m <sup>3</sup>	0.127 (mg/m <sup>3</sup> ) <sup>2</sup>
Lack of fit	u <sub>lof</sub> -0.316 mg/m <sup>3</sup>	0.100 (mg/m <sup>3</sup> ) <sup>2</sup>
Zero drift from field test	u <sub>d,z</sub> 0.043 mg/m <sup>3</sup>	0.002 (mg/m <sup>3</sup> ) <sup>2</sup>
Span drift from field test	u <sub>d,s</sub> 0.996 mg/m <sup>3</sup>	0.992 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of ambient temperature at span	u <sub>t</sub> 0.557 mg/m <sup>3</sup>	0.310 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of supply voltage	u <sub>v</sub> 0.898 mg/m <sup>3</sup>	0.806 (mg/m <sup>3</sup> ) <sup>2</sup>
Cross-sensitivity (interference)	u <sub>i</sub> -1.676 mg/m <sup>3</sup>	2.808 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of sample gas flow	u <sub>p</sub> 0.226 mg/m <sup>3</sup>	0.051 (mg/m <sup>3</sup> ) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	u <sub>rm</sub> 0.606 mg/m <sup>3</sup>	0.368 (mg/m <sup>3</sup> ) <sup>2</sup>

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

Combined standard uncertainty (u <sub>c</sub> )	$u_c = \sqrt{\sum (u_{max, i})^2}$	2.36 mg/m <sup>3</sup>
Total expanded uncertainty	U = u <sub>c</sub> * k = u <sub>c</sub> * 1.96	4.62 mg/m <sup>3</sup>

**Relative total expanded uncertainty**

Requirement of 2010/75/EU	U in % of the ELV 50 mg/m <sup>3</sup>	9.2
Requirement of EN 15267-3	U in % of the ELV 50 mg/m <sup>3</sup>	20.0
	U in % of the ELV 50 mg/m <sup>3</sup>	15.0

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

**Measuring system**

Manufacturer	Gasmet Technologies Oy
AMS designation	CEMS II e
Serial number of units under test	14433 / 14434
Measuring principle	FTIR

**Test report**

Test laboratory	936/21225866/C
Date of report	TÜV Rheinland 2016-10-13

**Measured component**

Certification range	CO 0 - 75 mg/m <sup>3</sup>
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**Evaluation of the cross-sensitivity (CS)**

(system with largest CS)

Sum of positive CS at zero point	0.32 mg/m <sup>3</sup>
Sum of negative CS at zero point	0.00 mg/m <sup>3</sup>
Sum of positive CS at span point	1.90 mg/m <sup>3</sup>
Sum of negative CS at span point	-1.00 mg/m <sup>3</sup>
Maximum sum of cross-sensitivities	1.90 mg/m <sup>3</sup>
Uncertainty of cross-sensitivity	$u_i$ 1.096 mg/m <sup>3</sup>

**Calculation of the combined standard uncertainty**

**Tested parameter**

			$u^2$
Standard deviation from paired measurements under field conditions *	$u_D$ 0.478 mg/m <sup>3</sup>		0.228 (mg/m <sup>3</sup> ) <sup>2</sup>
Lack of fit	$u_{lof}$ 0.554 mg/m <sup>3</sup>		0.307 (mg/m <sup>3</sup> ) <sup>2</sup>
Zero drift from field test	$u_{d,z}$ -0.043 mg/m <sup>3</sup>		0.002 (mg/m <sup>3</sup> ) <sup>2</sup>
Span drift from field test	$u_{d,s}$ 0.693 mg/m <sup>3</sup>		0.480 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of ambient temperature at span	$u_t$ 0.208 mg/m <sup>3</sup>		0.043 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of supply voltage	$u_v$ 0.298 mg/m <sup>3</sup>		0.089 (mg/m <sup>3</sup> ) <sup>2</sup>
Cross-sensitivity (interference)	$u_i$ 1.096 mg/m <sup>3</sup>		1.200 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of sample gas flow	$u_p$ 0.117 mg/m <sup>3</sup>		0.014 (mg/m <sup>3</sup> ) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	$u_{rm}$ 0.606 mg/m <sup>3</sup>		0.368 (mg/m <sup>3</sup> ) <sup>2</sup>

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

Combined standard uncertainty ( $u_c$ )	$u_c = \sqrt{\sum (u_{max,i})^2}$	1.65 mg/m <sup>3</sup>
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	3.24 mg/m <sup>3</sup>

**Relative total expanded uncertainty**

Requirement of 2010/75/EU	<b>U in % of the ELV 50 mg/m<sup>3</sup></b>	<b>6.5</b>
Requirement of EN 15267-3	<b>U in % of the ELV 50 mg/m<sup>3</sup></b>	<b>10.0</b>
	<b>U in % of the ELV 50 mg/m<sup>3</sup></b>	<b>7.5</b>

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

**Measuring system**

Manufacturer	Gasmet Technologies Oy
AMS designation	CEMS II e
Serial number of units under test	14433 / 14434
Measuring principle	FTIR

**Test report**

Test laboratory	936/21225866/C
Date of report	TÜV Rheinland 2016-10-13

**Measured component**

Certification range	NO <sub>2</sub> 0 - 150 mg/m <sup>3</sup>
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**Evaluation of the cross-sensitivity (CS)**

(system with largest CS)

Sum of positive CS at zero point	1.66 mg/m <sup>3</sup>
Sum of negative CS at zero point	0.00 mg/m <sup>3</sup>
Sum of positive CS at span point	7.90 mg/m <sup>3</sup>
Sum of negative CS at span point	-1.60 mg/m <sup>3</sup>
Maximum sum of cross-sensitivities	7.90 mg/m <sup>3</sup>
Uncertainty of cross-sensitivity	u <sub>i</sub> 4.561 mg/m <sup>3</sup>

**Calculation of the combined standard uncertainty**

**Tested parameter**

		u <sup>2</sup>
Standard deviation from paired measurements under field conditions *	u <sub>D</sub> 1.200 mg/m <sup>3</sup>	1.440 (mg/m <sup>3</sup> ) <sup>2</sup>
Lack of fit	u <sub>lof</sub> -0.520 mg/m <sup>3</sup>	0.270 (mg/m <sup>3</sup> ) <sup>2</sup>
Zero drift from field test	u <sub>d,z</sub> 0.115 mg/m <sup>3</sup>	0.013 (mg/m <sup>3</sup> ) <sup>2</sup>
Span drift from field test	u <sub>d,s</sub> -1.155 mg/m <sup>3</sup>	1.334 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of ambient temperature at span	u <sub>t</sub> 0.529 mg/m <sup>3</sup>	0.280 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of supply voltage	u <sub>v</sub> 0.571 mg/m <sup>3</sup>	0.326 (mg/m <sup>3</sup> ) <sup>2</sup>
Cross-sensitivity (interference)	u <sub>i</sub> 4.561 mg/m <sup>3</sup>	20.803 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of sample gas flow	u <sub>p</sub> -0.313 mg/m <sup>3</sup>	0.098 (mg/m <sup>3</sup> ) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	u <sub>rm</sub> 1.212 mg/m <sup>3</sup>	1.470 (mg/m <sup>3</sup> ) <sup>2</sup>

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

Combined standard uncertainty (u <sub>c</sub> )	$u_c = \sqrt{\sum (u_{max,i})^2}$	5.10 mg/m <sup>3</sup>
Total expanded uncertainty	U = u <sub>c</sub> * k = u <sub>c</sub> * 1.96	10.00 mg/m <sup>3</sup>

**Relative total expanded uncertainty**

Requirement of 2010/75/EU	<b>U in % of the ELV 150 mg/m<sup>3</sup></b>	<b>6.7</b>
Requirement of EN 15267-3	<b>U in % of the ELV 150 mg/m<sup>3</sup></b>	<b>20.0</b>
	<b>U in % of the ELV 150 mg/m<sup>3</sup></b>	<b>15.0</b>

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

**Measuring system**

Manufacturer	Gaset Technologies Oy
AMS designation	CEMS II e
Serial number of units under test	14433 / 14434
Measuring principle	FTIR

**Test report**

Test laboratory	936/21225866/C
Date of report	TÜV Rheinland 2016-10-13

**Measured component**

	N <sub>2</sub> O
Certification range	0 - 100 mg/m <sup>3</sup>

**Evaluation of the cross-sensitivity (CS)**

(system with largest CS)

Sum of positive CS at zero point	0.00 mg/m <sup>3</sup>
Sum of negative CS at zero point	0.00 mg/m <sup>3</sup>
Sum of positive CS at span point	3.20 mg/m <sup>3</sup>
Sum of negative CS at span point	-0.80 mg/m <sup>3</sup>
Maximum sum of cross-sensitivities	3.20 mg/m <sup>3</sup>
Uncertainty of cross-sensitivity	$u_i$ 1.848 mg/m <sup>3</sup>

**Calculation of the combined standard uncertainty**

**Tested parameter**

			$u^2$
Standard deviation from paired measurements under field conditions *	$u_D$ 0.630 mg/m <sup>3</sup>		0.397 (mg/m <sup>3</sup> ) <sup>2</sup>
Lack of fit	$u_{lof}$ -0.231 mg/m <sup>3</sup>		0.053 (mg/m <sup>3</sup> ) <sup>2</sup>
Zero drift from field test	$u_{d,z}$ 0.000 mg/m <sup>3</sup>		0.000 (mg/m <sup>3</sup> ) <sup>2</sup>
Span drift from field test	$u_{d,s}$ 0.346 mg/m <sup>3</sup>		0.120 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of ambient temperature at span	$u_t$ 0.252 mg/m <sup>3</sup>		0.064 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of supply voltage	$u_v$ 0.314 mg/m <sup>3</sup>		0.099 (mg/m <sup>3</sup> ) <sup>2</sup>
Cross-sensitivity (interference)	$u_i$ 1.848 mg/m <sup>3</sup>		3.413 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of sample gas flow	$u_p$ -0.120 mg/m <sup>3</sup>		0.014 (mg/m <sup>3</sup> ) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	$u_{rm}$ 0.808 mg/m <sup>3</sup>		0.653 (mg/m <sup>3</sup> ) <sup>2</sup>

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

Combined standard uncertainty ( $u_c$ )	$u_c = \sqrt{\sum (u_{max,i})^2}$	2.19 mg/m <sup>3</sup>
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	4.30 mg/m <sup>3</sup>

**Relative total expanded uncertainty**

<b>Requirement of 2010/75/EU</b>	<b>U in % of the range 100 mg/m<sup>3</sup></b>	<b>4.3</b>
Requirement of EN 15267-3	U in % of the range 100 mg/m <sup>3</sup>	20.0 **
	U in % of the range 100 mg/m <sup>3</sup>	15.0

\*\* The EU-directive 2010/75/EU on industrial emissions provides no requirements for this component.  
A value of 20.0 % was used for this.

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

**Measuring system**

Manufacturer	Gaset Technologies Oy
AMS designation	CEMS II e
Serial number of units under test	14433 / 14434
Measuring principle	FTIR

**Test report**

Test laboratory	936/21225866/C TÜV Rheinland
Date of report	2016-10-13

**Measured component**

Certification range	NH <sub>3</sub> 0 - 15 mg/m <sup>3</sup>
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**Evaluation of the cross-sensitivity (CS)**

(system with largest CS)

Sum of positive CS at zero point	0.06 mg/m <sup>3</sup>
Sum of negative CS at zero point	0.00 mg/m <sup>3</sup>
Sum of positive CS at span point	0.30 mg/m <sup>3</sup>
Sum of negative CS at span point	-0.60 mg/m <sup>3</sup>
Maximum sum of cross-sensitivities	-0.60 mg/m <sup>3</sup>
Uncertainty of cross-sensitivity	$u_i$ -0.346 mg/m <sup>3</sup>

**Calculation of the combined standard uncertainty**

**Tested parameter**

			$u^2$
Standard deviation from paired measurements under field conditions *	$u_D$ 0.074 mg/m <sup>3</sup>		0.005 (mg/m <sup>3</sup> ) <sup>2</sup>
Lack of fit	$u_{lof}$ -0.139 mg/m <sup>3</sup>		0.019 (mg/m <sup>3</sup> ) <sup>2</sup>
Zero drift from field test	$u_{d,z}$ 0.000 mg/m <sup>3</sup>		0.000 (mg/m <sup>3</sup> ) <sup>2</sup>
Span drift from field test	$u_{d,s}$ -0.199 mg/m <sup>3</sup>		0.040 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of ambient temperature at span	$u_t$ 0.115 mg/m <sup>3</sup>		0.013 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of supply voltage	$u_v$ 0.091 mg/m <sup>3</sup>		0.008 (mg/m <sup>3</sup> ) <sup>2</sup>
Cross-sensitivity (interference)	$u_i$ -0.346 mg/m <sup>3</sup>		0.120 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of sample gas flow	$u_b$ 0.061 mg/m <sup>3</sup>		0.004 (mg/m <sup>3</sup> ) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	$u_{rm}$ 0.121 mg/m <sup>3</sup>		0.015 (mg/m <sup>3</sup> ) <sup>2</sup>

\* The larger value is used :

"Repeatability standard deviation at set point" or

"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty ( $u_c$ )	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.47 mg/m <sup>3</sup>
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.93 mg/m <sup>3</sup>

**Relative total expanded uncertainty**

Requirement of 2010/75/EU	<b>U in % of the ELV 10 mg/m<sup>3</sup></b>	<b>9.3</b>
Requirement of EN 15267-3	<b>U in % of the ELV 10 mg/m<sup>3</sup></b>	<b>40.0 **</b>
	<b>U in % of the ELV 10 mg/m<sup>3</sup></b>	<b>30.0</b>

\*\* The EU-directive 2010/75/EU on industrial emissions provides no requirements for this component.

A value of 40.0 % was used for this.

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

**Measuring system**

Manufacturer	Gasmet Technologies Oy
AMS designation	CEMS II e
Serial number of units under test	14433 / 14434
Measuring principle	Zirconium dioxide

**Test report**

Test laboratory	936/21225866/C
Date of report	TÜV Rheinland 2016-10-13

**Measured component**

	O <sub>2</sub>
Certification range	0 - 25 Vol.-%

**Evaluation of the cross-sensitivity (CS)**

(system with largest CS)

Sum of positive CS at zero point	0.00	Vol.-%
Sum of negative CS at zero point	0.00	Vol.-%
Sum of positive CS at span point	0.00	Vol.-%
Sum of negative CS at span point	0.00	Vol.-%
Maximum sum of cross-sensitivities	0.00	Vol.-%
Uncertainty of cross-sensitivity	u <sub>i</sub>	0.000 Vol.-%

**Calculation of the combined standard uncertainty**

**Tested parameter**

				u <sup>2</sup>
Standard deviation from paired measurements under field conditions *	u <sub>D</sub>	0.047	Vol.-%	0.002 (Vol.-%) <sup>2</sup>
Lack of fit	u <sub>lof</sub>	-0.104	Vol.-%	0.011 (Vol.-%) <sup>2</sup>
Zero drift from field test	u <sub>d,z</sub>	0.069	Vol.-%	0.005 (Vol.-%) <sup>2</sup>
Span drift from field test	u <sub>d,s</sub>	-0.098	Vol.-%	0.010 (Vol.-%) <sup>2</sup>
Influence of ambient temperature at span	u <sub>t</sub>	0.165	Vol.-%	0.027 (Vol.-%) <sup>2</sup>
Influence of supply voltage	u <sub>v</sub>	0.015	Vol.-%	0.000 (Vol.-%) <sup>2</sup>
Cross-sensitivity (interference)	u <sub>i</sub>	0.000	Vol.-%	0.000 (Vol.-%) <sup>2</sup>
Influence of sample gas flow	u <sub>p</sub>	-0.012	Vol.-%	0.000 (Vol.-%) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	u <sub>rm</sub>	0.202	Vol.-%	0.041 (Vol.-%) <sup>2</sup>

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

Combined standard uncertainty (u <sub>c</sub> )	$u_c = \sqrt{\sum (u_{max, i})^2}$	0.31	Vol.-%
Total expanded uncertainty	U = u <sub>c</sub> * k = u <sub>c</sub> * 1.96	0.61	Vol.-%

**Relative total expanded uncertainty**

<b>Requirement of 2010/75/EU</b>	<b>U in % of the range 25 Vol.-%</b>	<b>2.4</b>
Requirement of EN 15267-3	U in % of the range 25 Vol.-%	10.0 **
	U in % of the range 25 Vol.-%	7.5

\*\* The EU-directive 2010/75/EU on industrial emissions provides no requirements for this component.  
A value of 10.0 % was used for this.

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

**Measuring system**

Manufacturer	Gasmet Technologies Oy
AMS designation	CEMS II e
Serial number of units under test	14433 / 14434
Measuring principle	FTIR

**Test report**

Test laboratory	936/21225866/C
Date of report	TÜV Rheinland 2016-10-13

**Measured component**

Certification range	CO <sub>2</sub> 0 - 25 Vol.-%
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**Evaluation of the cross-sensitivity (CS)**

(system with largest CS)

Sum of positive CS at zero point	0.00 Vol.-%
Sum of negative CS at zero point	0.00 Vol.-%
Sum of positive CS at span point	0.10 Vol.-%
Sum of negative CS at span point	-0.90 Vol.-%
Maximum sum of cross-sensitivities	-0.90 Vol.-%
Uncertainty of cross-sensitivity	$u_i$ -0.520 Vol.-%

**Calculation of the combined standard uncertainty**

**Tested parameter**

			$u^2$
Standard deviation from paired measurements under field conditions *	$u_D$ 0.100 Vol.-%		0.010 (Vol.-%) <sup>2</sup>
Lack of fit	$u_{lof}$ 0.115 Vol.-%		0.013 (Vol.-%) <sup>2</sup>
Zero drift from field test	$u_{d,z}$ 0.014 Vol.-%		0.000 (Vol.-%) <sup>2</sup>
Span drift from field test	$u_{d,s}$ -0.188 Vol.-%		0.035 (Vol.-%) <sup>2</sup>
Influence of ambient temperature at span	$u_t$ 0.231 Vol.-%		0.053 (Vol.-%) <sup>2</sup>
Influence of supply voltage	$u_v$ 0.099 Vol.-%		0.010 (Vol.-%) <sup>2</sup>
Cross-sensitivity (interference)	$u_i$ -0.520 Vol.-%		0.270 (Vol.-%) <sup>2</sup>
Influence of sample gas flow	$u_p$ -0.060 Vol.-%		0.004 (Vol.-%) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	$u_{rm}$ 0.202 Vol.-%		0.041 (Vol.-%) <sup>2</sup>

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

Combined standard uncertainty ( $u_c$ )	$u_c = \sqrt{\sum (u_{max, i})^2}$	0.66 Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	1.29 Vol.-%

**Relative total expanded uncertainty**

<b>Requirement of 2010/75/EU</b>	<b>U in % of the range 25 Vol.-%</b>	<b>5.2</b>
Requirement of EN 15267-3	U in % of the range 25 Vol.-%	10.0 **

\*\* The EU-directive 2010/75/EU on industrial emissions provides no requirements for this component.  
A value of 10.0 % was used for this.