Umwelt Bundesamt

TÜVRheinland®
Precisely Right.

CERTIFICATE

of Product Conformity (QAL1)

Certificate No: 0000059865_01

Certified AMS:	CEMS II *ef* for CO, NO, NO_2, N_2O, SO_2, HCl, HF, NH_3, CH_4, CH_2O, TOC, O_2, H_2O and CO_2
Manufacturer:	Gasmet 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 (2014).

Certification is awarded in respect of the conditions stated in this certificate (this certificate contains 24 pages).
The present certificate replaces certificate 0000059865_00 dated 13 April 2018.

TÜVRheinland® CERTIFIED

Suitability Tested
EN 15267
QAL1 Certified
Regular Surveillance

www.tuv.com
ID 0000059865

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

This certificate will expire on:
25 March 2028

German Environment Agency
Dessau, 22 March 2023

TÜV Rheinland Energy GmbH
Cologne, 21 March 2023

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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:	936/21225866/D dated 2 October 2017
Initial certification:	26 March 2018
Expiry date:	25 March 2028
Certificate:	Renewal (of previous certificate 0000059865_00 of 13 April 2018 valid until 25 March 2023)
Publication:	BAnz AT 26.03.2018 B8, chapter I No. 3.2

Approved application
The tested AMS is suitable for use at plants according to Directive 2010/75/EC, chapter III (13th BImSchV:2017), Directive 2010/75/EC, chapter IV (17th BImSchV:2013), Directive 2015/2193/EC (44th BImSchV:2021), 30th BImSchV:2009 and 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 FID for this application was assessed on the basis of a three-month field test at a waste incineration plant. The laboratory test data for the FID were taken from the suitability test report 936/21214670/A dated 05.10.2011 of Graphite 52M. The laboratory and field test data for the components CO, NO_2, N_2O, SO_2, HCl, NH_3, CO_2, H_2O and O_2 were taken from the test report No. 936/21220683/A dated 27.03.2013 and for the components NO, HF, CH_4, CH_2O and for all components the drift data were taken from the test report No. 936/21225866/B dated 23.02.2016 for the CEMS II *e*.

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 correspond to the current state of legislation during certification. 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/D dated 2 October 2017 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 26.03.2018 B8, chapter I No. 3.2, Announcement by UBA dated 21 February 2018:

AMS designation:
CEMS II *ef* for CO, NO, NO_2, N_2O, SO_2, HCl, HF, NH_3, CO_2, H_2O, O_2, CH_4, CH_2O and TOC

Manufacturer:
Gasmet Technologies Oy, Helsinki, Finland

Field of application:
For plants requiring official approval

Measuring ranges during performance testing:

Component	Certification range	supplementary measuring ranges	supplementary measuring ranges	Unit
CO	0 - 75	0 - 300	0 - 1500	mg/m³
NO	0 - 150	0 - 600	0 - 2000	mg/m³
NO_2	0 - 200	0 - 500	-	mg/m³
N_2O	0 - 100	0 - 500	-	mg/m³
SO_2	0 - 75	0 - 300	0 - 1500	mg/m³
HCl	0 - 15	0 - 90	-	mg/m³
HF	0 - 3	0 - 10	-	mg/m³
NH_3	0 - 15	0 - 50	-	mg/m³
O_2	0 - 25	-	-	Vol.-%
CO_2	0 - 25	-	-	Vol.-%
H_2O	0 - 30	0 - 40	-	Vol.-%
CH_4	0 - 15	0 - 50	0 - 150	mg/m³
CH_2O	0 - 20	0 - 30	0 - 90	mg/m³
TOC	0 - 15	0 - 500	-	mg/m³

Software versions:
Calcmet: 12.20 c/w evaluation module 4.42.2
OXITEC Ver. 1.50 np
Graphite 52M: v2.21 (Calculation Process), v3.1.b (Display Process)

Restrictions:
None

Notes:

1. The maintenance interval is four weeks.
2. Wet test gases should be used for testing HF, HCl, NH_3 and CH_2O.
3. After any plant failure, the sample probe needs to be cleaned.
4. The measuring system is available as variant A (air conditioning unit on top of the measuring rack) and as variant B (air conditioning unit at the back of the measuring rack).
5. For applications where O_2 is intended to be measured (optional), the OXITEC 500E SME 5 analyser manufactured by ENOTEC GmbH, Marienheide, Germany, is integrated.
6. The performance test covers the following versions of the AMS:

Rack version	FTIR	O_2	FID
A	X		X
B	X		X
B	X	X	X

Test Report:
TÜV Rheinland Energy GmbH, Cologne
Report no. 936/21225866/D dated 2 October 2017

Publication in the German Federal Gazette: BAnz AT 26.03.2019 B7, chap. IV notification 37, Announcement by UBA dated 27 February 2019:

37 Notification as regards Federal Environment Agency (UBA) notice of 21 February 2018 (BAnz AT 26.03.2018 B8, chapter I number 3.2)

The current software versions of the CEMS II *ef* measuring system for O_2, CO, NO, NO_2, N_2O, SO_2, HCl, HF, NH_3, H_2O, CO_2, H_2CO, CH_4 and TOC manufactured by Gasmet Technologies Oy are:

Calcmet: 12.202 c/w evaluation unit 4.42.2
OXITEC 4.10
Graphite 52M: v2.21 (Calculation Process), v3.1.b (Display Process)

Calcmet version 12.201 may also be used.

The optional OXITEC 500E oxygen sensor may also be built in with a new front panel with modified display and operating unit. The new front panel does no longer mention the manufacturer Enotec.
The background colour of the rotameter integrated in the purge air supply module changed from black to white. A Fujitsu B19-7 LED monitor may also be used as instrument display.

Statement issued by TÜV Rheinland Energy GmbH dated 8 October 2018

Publication in the German Federal Gazette: BAnz AT 22.07.2019 B8, chap. V notification 7, Announcement by UBA dated 28 June 2019:

7 Notification as regards Federal Environment Agency (UBA) notices of 21 February 2018 (BAnz AT 26.03.2018 B8, chapter I number 3.2) and of 27 February 2019 (BAnz AT 26.03.2019 B7, chapter IV notification 37)

The new address of Gasmet Technology Oy, manufacturer of the CEMS II *ef* measuring system for O_2, CO, NO, NO_2, N_2O, SO_2, HCl, HF, NH_3, H_2O, CO_2, H_2CO, CH_4 and TOC is as follows:

Gasmet 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, chap. IV notification 48, Announcement by UBA dated 24 February 2020:

48 Notification as regards Federal Environment Agency (UBA) notices of 21 February 2018 (BAnz AT 26.03.2018 B8, chapter I number 3.2) and of 28 June 2019 (BAnz AT 22.07.2019 B8, chapter V notification 7)

The label at the door of the CEMS II *ef* measuring system for O_2, CO, NO, NO_2, N_2O, SO_2, HCl, HF, NH_3, H_2O, CO_2, H_2CO, CH_4 and TOC manufactured by Gasmet Technology Oy was adapted to the latest corporate design. Likewise, the label at the front plate of the FID Graphite 52M was adapted to the corporate design and the FID is now called GFID.

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, chap. III notification 31, Announcement by UBA dated 31 March 2021:

31 Notification as regards Federal Environment Agency (UBA) notices of 21 February 2018 (BAnz AT 26.03.2018 B8, chapter I number 3.2) and of 24 February 2020 (BAnz AT 24.03.2020 B7, chapter IV notification 48)

The latest software version of the CEMS II *ef* measuring system for the components O_2, CO, NO, NO_2, N_2O, SO_2, HCl, HF, NH_3, H_2O, CO_2, H_2CO, CH_4 and TOC manufactured by Gasmet Technology Oy are as follows:
Calcmet: 12.210 with evaluation module 4.42.2
Calcmet version 12.206 may also be used.
GFID: v2.22 (Calculation Process) und
v3.8.c (Display Process).
Versions v3.8.a and v3.8.b (Display Process) may also be used.
The software version of the OXITEC 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, chap. IV notification 34, Announcement by UBA dated 29 June 2021:

34 Notification as regards Federal Environment Agency (UBA) notices of 21 February 2018 (BAnz AT 26.03.2018 B8, chapter I number 3.2) and of 31 March 2021 (BAnz AT 03.05.2021 B9, chapter III notification 31)

The latest software versions of the CEMS II *ef* measuring system for the components O_2, CO, NO, NO_2, N_2O, SO_2, HCl, HF, NH_3, H_2O, CO_2, H_2CO, CH_4 and TOC manufactured by Gasmet Technology Oy are:
Calcmet: 12.220 with evaluation module 4.42.2,
GFID: v2.22 (Calculation Process)
and v3.8.c (Display Process), OXITEC 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 3 May 2021

Publication in the German Federal Gazette: BAnz AT 11.04.2022 B10, chap. VI notification 38
Announcement by UBA dated 9 March 2022:

38 Notification as regards Federal Environment Agency (UBA) notices of 21 February 2018 (BAnz AT 26.03.2018 B8, chapter I number 3.2) and of 29 June 2021 (BAnz AT 05.08.2021 B5, chapter IV notification 34)

The current software versions of the measuring device CEMS II *ef* for the components O_2, CO, NO, NO_2, N_2O, SO_2, HCl, HF, NH_3, H_2O, CO_2, H_2CO, CH_4 and TOC of the manufacturer Gasmet Technology Oy are:
Calcmet: 12.230 with evaluation module 4.42.2
GFID: v2.22 (Calculation Process) and v3.8.c (Display Process).
OXITEC 500E: 4.10

Statement issued by TÜV Rheinland Energy GmbH dated 14 September 2021

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

The CEMS II *ef* measuring system comprises the following components:

1)	**Sampling**	
	Sampling probe:	SP2000H manufactured by M & C, heated to 180 °C, c/w PTFE filter: 2 µm
	heated line:	180 °C c/w 4 mm Teflon hose, 25 m in length, (normally 5 to 30 m)
	Pump:	heated to 180 °C, c/w Teflon membrane
2)	**Analysers**	
	FTIR:	Gasmet CX-4000, cell temperature: 180 °C, cell length: 5 m, IR source: SiC,
	O_2:(optional)	ZrO_2 measurement cell, OXITEC 500E SME 5 in a 19" slot manufactured by ENOTEC GmbH running OXITEC 500E software
	TOC:	Graphite 52M total C measuring system manufactured by Environnement running software components for Calculation Process and Display Process
3)	**Evaluation system**	
	Standard industrial PC operating Windows 7 Ultimate 32bit. For the purpose of evaluating analyser spectra, spectra are sent to a PC via the RS232 interface where they are processed. The PC is also used for controlling and monitoring sampling and the sample gas flow rate of the analysers.	
4)	**Measuring cabinet**	
	– Temperature controlled at about 30°C – Sampling pump, control units, analysers, interface cards for the analogue inputs/outputs and PC The measuring rack is available as version A (dimensions 212/61/70 cm, air conditioning unit on top of the measuring rack) and as version B (dimensions 210x61x113 cm, air conditioning unit at the back of the measuring rack). Version A provides room for the FTIR and either the oxygen analyser or the FID analyser. The larger version B provides room for both the oxygen and the FID analyser. All other components are the same.	

Rack version	FTIR	O_2	FID
A	X		X
B	X		X
B	X	X	X

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: **qal1.de**.

History of documents
Certification of CEMS II *ef* 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. 0000059865_00: 13 April 2018
Expiry date of the certificate: 25 March 2023
Test report 936/21225866/D dated 2 October 2017
TÜV Rheinland Energy GmbH
Publication BAnz AT 26.03.2018 B8, chapter I number 3.2
UBA announcement dated 21 February 2018

Notifications
Statement issued by TÜV Rheinland Energy GmbH dated 8 October 2018
Publication BAnz AT 26.03.2019 B7, chapter IV notification 37
UBA announcement dated 27 February 2019
(Soft- and hardware changes)

Statement issued by TÜV Rheinland Energy GmbH dated 7 March 2019
Publication BAnz AT 22.07.2019 B8, chapter V notification 7
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 48
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 31
UBA announcement dated 31 March 2021
(Soft- and hardware changes)

Statement issued by TÜV Rheinland Energy GmbH dated 3 May 2021
Publication BAnz AT 05.08.2021 B5, chapter IV notification 34
UBA announcement dated 29 June 2021
(Software changeSoftwareänderung)

Statement issued by TÜV Rheinland Energy GmbH dated 14 September 2021
Publication BAnz AT 11.04.2022 B10, chapter VI notification 38
UBA announcement dated 9 March 2022
(Software changes)

Renewal of certificate
Certificate No. 0000059865_01: 22 March 2023
Expiry date of the certificate: 25 March 2028

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

Measuring system			
Manufacturer		Gasmet Technologies Oy	
AMS designation		CEMS II ef	
Serial number of units under test		14433 / 14434	
Measuring principle		FID	
Test report		936/21225866/D	
Test laboratory		TÜV Rheinland	
Date of report		2017-10-02	
Measured component		TOC	
Certification range		0 - 15	mg/m³
Evaluation of the cross-sensitivity (CS)			
(system with largest CS)			
Sum of positive CS at zero point		0.38	mg/m³
Sum of negative CS at zero point		-0.24	mg/m³
Sum of postive CS at span point		0.51	mg/m³
Sum of negative CS at span point		-0.58	mg/m³
Maximum sum of cross-sensitivities		-0.58	mg/m³
Uncertainty of cross-sensitivity	u_i	-0.335	mg/m³

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.050	mg/m³	0.003	(mg/m³)²
Lack of fit	u_{lof}	-0.069	mg/m³	0.005	(mg/m³)²
Zero drift from field test	$u_{d,z}$	0.052	mg/m³	0.003	(mg/m³)²
Span drift from field test	$u_{d,s}$	-0.251	mg/m³	0.063	(mg/m³)²
Influence of ambient temperature at span	u_t	0.173	mg/m³	0.030	(mg/m³)²
Influence of supply voltage	u_v	0.015	mg/m³	0.000	(mg/m³)²
Cross-sensitivity (interference)	u_i	-0.335	mg/m³	0.112	(mg/m³)²
Influence of sample gas flow	u_p	-0.034	mg/m³	0.001	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.121	mg/m³	0.015	(mg/m³)²
Variation of response factors (TOC)	u_{rf}	0.046	mg/m³	0.002	(mg/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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.48	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.95	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 10 mg/m³**	**9.5**
Requirement of 2010/75/EU	**U in % of the ELV 10 mg/m³**	**30.0**
Requirement of EN 15267-3	U in % of the ELV 10 mg/m³	22.5

The values for the uncertainty calculation were taken from the test report on the CEMS II *e* measuring system.

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

Measuring system			
Manufacturer		Gasmet Technologies Oy	
AMS designation		CEMS II ef	
Serial number of units under test		14433 / 14434	
Measuring principle		FTIR	
Test report		936/21225866/D	
Test laboratory		TÜV Rheinland	
Date of report		2017-10-02	
Measured component		CO	
Certification range		0 - 75	mg/m³

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

Sum of positive CS at zero point		0.32	mg/m³
Sum of negative CS at zero point		0.00	mg/m³
Sum of postive CS at span point		1.90	mg/m³
Sum of negative CS at span point		-1.00	mg/m³
Maximum sum of cross-sensitivities		1.90	mg/m³
Uncertainty of cross-sensitivity	u_i	1.096	mg/m³

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.478	mg/m³	0.228	(mg/m³)²
Lack of fit	u_{lof}	0.554	mg/m³	0.307	(mg/m³)²
Zero drift from field test	$u_{d,z}$	-0.043	mg/m³	0.002	(mg/m³)²
Span drift from field test	$u_{d,s}$	0.693	mg/m³	0.480	(mg/m³)²
Influence of ambient temperature at span	u_t	0.208	mg/m³	0.043	(mg/m³)²
Influence of supply voltage	u_v	0.298	mg/m³	0.089	(mg/m³)²
Cross-sensitivity (interference)	u_i	1.096	mg/m³	1.200	(mg/m³)²
Influence of sample gas flow	u_p	0.117	mg/m³	0.014	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.606	mg/m³	0.368	(mg/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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	1.65	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	3.24	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 50 mg/m³**	**6.5**
Requirement of 2010/75/EU	**U in % of the ELV 50 mg/m³**	**10.0**
Requirement of EN 15267-3	U in % of the ELV 50 mg/m³	7.5

The values for the uncertainty calculation were taken from the test report on the CEMS II *e* measuring system.

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

Measuring system			
Manufacturer		Gasmet Technologies Oy	
AMS designation		CEMS II ef	
Serial number of units under test		14433 / 14434	
Measuring principle		FTIR	
Test report		936/21225866/D	
Test laboratory		TÜV Rheinland	
Date of report		2017-10-02	
Measured component		NO	
Certification range		0 - 150	mg/m³
Evaluation of the cross-sensitivity (CS)			
(system with largest CS)			
Sum of positive CS at zero point		0.00	mg/m³
Sum of negative CS at zero point		0.00	mg/m³
Sum of postive CS at span point		0.00	mg/m³
Sum of negative CS at span point		-2.60	mg/m³
Maximum sum of cross-sensitivities		-2.60	mg/m³
Uncertainty of cross-sensitivity	u_i	-1.498	mg/m³

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.360	mg/m³	0.130	(mg/m³)²
Lack of fit	u_{lof}	0.580	mg/m³	0.336	(mg/m³)²
Zero drift from field test	$u_{d,z}$	0.087	mg/m³	0.008	(mg/m³)²
Span drift from field test	$u_{d,s}$	1.645	mg/m³	2.706	(mg/m³)²
Influence of ambient temperature at span	u_t	0.709	mg/m³	0.503	(mg/m³)²
Influence of supply voltage	u_v	0.379	mg/m³	0.144	(mg/m³)²
Cross-sensitivity (interference)	u_i	-1.498	mg/m³	2.244	(mg/m³)²
Influence of sample gas flow	u_p	-0.577	mg/m³	0.333	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	1.212	mg/m³	1.470	(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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	2.81	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	5.50	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 98 mg/m³**	**5.6**
Requirement of 2010/75/EU	**U in % of the ELV 98 mg/m³**	**20.0**
Requirement of EN 15267-3	U in % of the ELV 98 mg/m³	15.0

The values for the uncertainty calculation were taken from the test report on the CEMS II *e* measuring system.

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

Measuring system			
Manufacturer		Gasmet Technologies Oy	
AMS designation		CEMS II ef	
Serial number of units under test		14433 / 14434	
Measuring principle		FTIR	
Test report		936/21225866/D	
Test laboratory		TÜV Rheinland	
Date of report		2017-10-02	
Measured component		NO_2	
Certification range		0 - 150	mg/m³
Evaluation of the cross-sensitivity (CS)			
(system with largest CS)			
Sum of positive CS at zero point		1.66	mg/m³
Sum of negative CS at zero point		0.00	mg/m³
Sum of postive CS at span point		7.90	mg/m³
Sum of negative CS at span point		-1.60	mg/m³
Maximum sum of cross-sensitivities		7.90	mg/m³
Uncertainty of cross-sensitivity	u_i	4.561	mg/m³

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	1.200	mg/m³	1.440	(mg/m³)²
Lack of fit	u_{lof}	-0.520	mg/m³	0.270	(mg/m³)²
Zero drift from field test	$u_{d,z}$	0.115	mg/m³	0.013	(mg/m³)²
Span drift from field test	$u_{d,s}$	-1.155	mg/m³	1.334	(mg/m³)²
Influence of ambient temperature at span	u_t	0.529	mg/m³	0.280	(mg/m³)²
Influence of supply voltage	u_v	0.571	mg/m³	0.326	(mg/m³)²
Cross-sensitivity (interference)	u_i	4.561	mg/m³	20.803	(mg/m³)²
Influence of sample gas flow	u_p	-0.313	mg/m³	0.098	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	1.212	mg/m³	1.470	(mg/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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	5.10	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	10.00	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 150 mg/m³**	**6.7**
Requirement of 2010/75/EU	**U in % of the ELV 150 mg/m³**	**20.0**
Requirement of EN 15267-3	U in % of the ELV 150 mg/m³	15.0

The values for the uncertainty calculation were taken from the test report on the CEMS II *e* measuring system.

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

Measuring system					
Manufacturer			Gasmet Technologies Oy		
AMS designation			CEMS II ef		
Serial number of units under test			14433 / 14434		
Measuring principle			FTIR		
Test report			936/21225866/D		
Test laboratory			TÜV Rheinland		
Date of report			2017-10-02		
Measured component			N_2O		
Certification range			0 - 100	mg/m³	
Evaluation of the cross-sensitivity (CS)					
(system with largest CS)					
Sum of positive CS at zero point			0.00	mg/m³	
Sum of negative CS at zero point			0.00	mg/m³	
Sum of postive CS at span point			3.20	mg/m³	
Sum of negative CS at span point			-0.80	mg/m³	
Maximum sum of cross-sensitivities			3.20	mg/m³	
Uncertainty of cross-sensitivity	u_i		1.848	mg/m³	

Calculation of the combined standard uncertainty

Tested parameter				u²	
Standard deviation from paired measurements under field conditions *	u_D	0.630	mg/m³	0.397	(mg/m³)²
Lack of fit	u_{lof}	-0.231	mg/m³	0.053	(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	$u_{d,s}$	0.346	mg/m³	0.120	(mg/m³)²
Influence of ambient temperature at span	u_t	0.252	mg/m³	0.064	(mg/m³)²
Influence of supply voltage	u_v	0.314	mg/m³	0.099	(mg/m³)²
Cross-sensitivity (interference)	u_i	1.848	mg/m³	3.413	(mg/m³)²
Influence of sample gas flow	u_p	-0.120	mg/m³	0.014	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.808	mg/m³	0.653	(mg/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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	2.19	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	4.30	mg/m³

Relative total expanded uncertainty	**U in % of the range 100 mg/m³**	**4.3**
Requirement of 2010/75/EU	**U in % of the range 100 mg/m³**	**20.0 ****
Requirement of EN 15267-3	U in % of the range 100 mg/m³	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.

The values for the uncertainty calculation were taken from the test report on the CEMS II *e* measuring system.

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

Measuring system					
Manufacturer			Gasmet Technologies Oy		
AMS designation			CEMS II ef		
Serial number of units under test			14433 / 14434		
Measuring principle			FTIR		
Test report			936/21225866/D		
Test laboratory			TÜV Rheinland		
Date of report			2017-10-02		
Measured component			SO_2		
Certification range			0 - 75	mg/m³	
Evaluation of the cross-sensitivity (CS)					
(system with largest CS)					
Sum of positive CS at zero point			0.24	mg/m³	
Sum of negative CS at zero point			0.00	mg/m³	
Sum of postive CS at span point			2.30	mg/m³	
Sum of negative CS at span point			-2.90	mg/m³	
Maximum sum of cross-sensitivities			-2.90	mg/m³	
Uncertainty of cross-sensitivity		u_i	-1.676	mg/m³	

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Repeatability standard deviation at set point *	u_r	0.357	mg/m³	0.127	(mg/m³)²
Lack of fit	u_{lof}	-0.316	mg/m³	0.100	(mg/m³)²
Zero drift from field test	$u_{d,z}$	0.043	mg/m³	0.002	(mg/m³)²
Span drift from field test	$u_{d,s}$	0.996	mg/m³	0.992	(mg/m³)²
Influence of ambient temperature at span	u_t	0.557	mg/m³	0.310	(mg/m³)²
Influence of supply voltage	u_v	0.898	mg/m³	0.806	(mg/m³)²
Cross-sensitivity (interference)	u_i	-1.676	mg/m³	2.808	(mg/m³)²
Influence of sample gas flow	u_p	0.226	mg/m³	0.051	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.606	mg/m³	0.368	(mg/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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	2.36	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	4.62	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 50 mg/m³**	**9.2**
Requirement of 2010/75/EU	**U in % of the ELV 50 mg/m³**	**20.0**
Requirement of EN 15267-3	U in % of the ELV 50 mg/m³	15.0

The values for the uncertainty calculation were taken from the test report on the CEMS II *e* measuring system.

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

Measuring system			
Manufacturer		Gasmet Technologies Oy	
AMS designation		CEMSII ef	
Serial number of units under test		14433 / 14434	
Measuring principle		FTIR	
Test report		936/21225866/D	
Test laboratory		TÜV Rheinland	
Date of report		2017-10-02	
Measured component		HCl	
Certification range		0 - 15	mg/m³
Evaluation of the cross-sensitivity (CS)			
(system with largest CS)			
Sum of positive CS at zero point		0.00	mg/m³
Sum of negative CS at zero point		-0.06	mg/m³
Sum of postive CS at span point		0.60	mg/m³
Sum of negative CS at span point		-0.10	mg/m³
Maximum sum of cross-sensitivities		0.60	mg/m³
Uncertainty of cross-sensitivity	u_i	0.346	mg/m³

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.209	mg/m³	0.044	(mg/m³)²
Lack of fit	u_{lof}	0.173	mg/m³	0.030	(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	$u_{d,s}$	0.208	mg/m³	0.043	(mg/m³)²
Influence of ambient temperature at span	u_t	0.265	mg/m³	0.070	(mg/m³)²
Influence of supply voltage	u_v	0.091	mg/m³	0.008	(mg/m³)²
Cross-sensitivity (interference)	u_i	0.346	mg/m³	0.120	(mg/m³)²
Influence of sample gas flow	u_p	-0.045	mg/m³	0.002	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.121	mg/m³	0.015	(mg/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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.58	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	1.13	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 10 mg/m³**	**11.3**
Requirement of 2010/75/EU	**U in % of the ELV 10 mg/m³**	**40.0**
Requirement of EN 15267-3	U in % of the ELV 10 mg/m³	30.0

The values for the uncertainty calculation were taken from the test report on the CEMS II *e* measuring system.

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

Measuring system			
Manufacturer		Gasmet Technologies Oy	
AMS designation		CEMS II ef	
Serial number of units under test		14433 / 14434	
Measuring principle		FTIR	
Test report		936/21225866/D	
Test laboratory		TÜV Rheinland	
Date of report		2017-10-02	
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		0.00	mg/m³
Sum of negative CS at zero point		0.04	mg/m³
Sum of postive CS at span point		0.12	mg/m³
Sum of negative CS at span point		-0.09	mg/m³
Maximum sum of cross-sensitivities		0.12	mg/m³
Uncertainty of cross-sensitivity	u_i	0.068	mg/m³

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.010	mg/m³	0.000	(mg/m³)²
Lack of fit	u_{lof}	0.032	mg/m³	0.001	(mg/m³)²
Zero drift from field test	$u_{d,z}$	0.002	mg/m³	0.000	(mg/m³)²
Span drift from field test	$u_{d,s}$	-0.040	mg/m³	0.002	(mg/m³)²
Influence of ambient temperature at span	u_t	0.040	mg/m³	0.002	(mg/m³)²
Influence of supply voltage	u_v	0.016	mg/m³	0.000	(mg/m³)²
Cross-sensitivity (interference)	u_i	0.068	mg/m³	0.005	(mg/m³)²
Influence of sample gas flow	u_p	-0.006	mg/m³	0.000	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.10	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.19	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 1 mg/m³**	**19.4**
Requirement of 2010/75/EU	**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

The values for the uncertainty calculation were taken from the test report on the CEMS II *e* measuring system.

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

Measuring system			
Manufacturer		Gasmet Technologies Oy	
AMS designation		CEMS II ef	
Serial number of units under test		14433 / 14434	
Measuring principle		FTIR	
Test report		936/21225866/D	
Test laboratory		TÜV Rheinland	
Date of report		2017-10-02	
Measured component		NH_3	
Certification range		0 - 15	mg/m³
Evaluation of the cross-sensitivity (CS)			
(system with largest CS)			
Sum of positive CS at zero point		0.06	mg/m³
Sum of negative CS at zero point		0.00	mg/m³
Sum of postive CS at span point		0.30	mg/m³
Sum of negative CS at span point		-0.60	mg/m³
Maximum sum of cross-sensitivities		-0.60	mg/m³
Uncertainty of cross-sensitivity	u_i	-0.346	mg/m³

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.074	mg/m³	0.005	(mg/m³)²
Lack of fit	u_{lof}	-0.139	mg/m³	0.019	(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	$u_{d,s}$	-0.199	mg/m³	0.040	(mg/m³)²
Influence of ambient temperature at span	u_t	0.115	mg/m³	0.013	(mg/m³)²
Influence of supply voltage	u_v	0.091	mg/m³	0.008	(mg/m³)²
Cross-sensitivity (interference)	u_i	-0.346	mg/m³	0.120	(mg/m³)²
Influence of sample gas flow	u_p	0.061	mg/m³	0.004	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.121	mg/m³	0.015	(mg/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)	$u_c = \sqrt{\sum (u_{max\ j})^2}$	0.47	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.93	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 10 mg/m³**	**9.3**
Requirement of 2010/75/EU	**U in % of the ELV 10 mg/m³**	**40.0 ****
Requirement of EN 15267-3	U in % of the ELV 10 mg/m³	30.0

** The EU-directive 2010/75/EU on industrial emissions provides no requirements for this component.
A value of 40.0 % was used for this.

The values for the uncertainty calculation were taken from the test report on the CEMS II *e* measuring system.

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

Measuring system			
Manufacturer		Gasmet Technologies Oy	
AMS designation		CEMS II ef	
Serial number of units under test		14433 / 14434	
Measuring principle		Zirconium dioxide	
Test report		936/21225866/D	
Test laboratory		TÜV Rheinland	
Date of report		2017-10-02	
Measured component		O_2	
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 postive 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_i	0.000	Vol.-%

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.047	Vol.-%	0.002	(Vol.-%)²
Lack of fit	u_{lof}	-0.104	Vol.-%	0.011	(Vol.-%)²
Zero drift from field test	$u_{d,z}$	0.069	Vol.-%	0.005	(Vol.-%)²
Span drift from field test	$u_{d,s}$	-0.098	Vol.-%	0.010	(Vol.-%)²
Influence of ambient temperature at span	u_t	0.165	Vol.-%	0.027	(Vol.-%)²
Influence of supply voltage	u_v	0.015	Vol.-%	0.000	(Vol.-%)²
Cross-sensitivity (interference)	u_i	0.000	Vol.-%	0.000	(Vol.-%)²
Influence of sample gas flow	u_p	-0.012	Vol.-%	0.000	(Vol.-%)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.202	Vol.-%	0.041	(Vol.-%)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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.31	Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.61	Vol.-%

Relative total expanded uncertainty	**U in % of the range 25 Vol.-%**	**2.4**
Requirement of 2010/75/EU	**U in % of the range 25 Vol.-%**	**10.0 ****
Requirement of EN 15267-3	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.

The values for the uncertainty calculation were taken from the test report on the CEMS II *e* measuring system.

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

Measuring system			
Manufacturer	Gasmet Technologies Oy		
AMS designation	CEMS II ef		
Serial number of units under test	14433 / 14434		
Measuring principle	FTIR		
Test report	936/21225866/D		
Test laboratory	TÜV Rheinland		
Date of report	2017-10-02		
Measured component	CO_2		
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 postive 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.-%)²
Lack of fit	u_{lof}	0.115	Vol.-%	0.013	(Vol.-%)²
Zero drift from field test	$u_{d,z}$	0.014	Vol.-%	0.000	(Vol.-%)²
Span drift from field test	$u_{d,s}$	-0.188	Vol.-%	0.035	(Vol.-%)²
Influence of ambient temperature at span	u_t	0.231	Vol.-%	0.053	(Vol.-%)²
Influence of supply voltage	u_v	0.099	Vol.-%	0.010	(Vol.-%)²
Cross-sensitivity (interference)	u_i	-0.520	Vol.-%	0.270	(Vol.-%)²
Influence of sample gas flow	u_p	-0.060	Vol.-%	0.004	(Vol.-%)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.202	Vol.-%	0.041	(Vol.-%)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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.66	Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	1.29	Vol.-%

Relative total expanded uncertainty	**U in % of the range 25 Vol.-%**	**5.2**
Requirement of 2010/75/EU	**U in % of the range 25 Vol.-%**	**10.0 ****
Requirement of EN 15267-3	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.

The values for the uncertainty calculation were taken from the test report on the CEMS II *e* measuring system.

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

Measuring system			
Manufacturer		Gasmet Technologies Oy	
AMS designation		CEMS II ef	
Serial number of units under test		14433 / 14434	
Measuring principle		FTIR	
Test report		936/21225866/D	
Test laboratory		TÜV Rheinland	
Date of report		2017-10-02	
Measured component		H_2O	
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 postive 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.-%)²
Lack of fit	u_{lof}	0.230	Vol.-%	0.053	(Vol.-%)²
Zero drift from field test	$u_{d,z}$	0.000	Vol.-%	0.000	(Vol.-%)²
Span drift from field test	$u_{d,s}$	-0.329	Vol.-%	0.108	(Vol.-%)²
Influence of ambient temperature at span	u_t	0.231	Vol.-%	0.053	(Vol.-%)²
Influence of supply voltage	u_v	0.262	Vol.-%	0.069	(Vol.-%)²
Cross-sensitivity (interference)	u_i	0.632	Vol.-%	0.400	(Vol.-%)²
Influence of sample gas flow	u_p	0.112	Vol.-%	0.013	(Vol.-%)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.242	Vol.-%	0.059	(Vol.-%)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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.92	Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	1.80	Vol.-%

Relative total expanded uncertainty	**U in % of the range 30 Vol.-%**	**6.0**
Requirement of 2010/75/EU	**U in % of the range 30 Vol.-%**	**10.0 ****
Requirement of EN 15267-3	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.

The values for the uncertainty calculation were taken from the test report on the CEMS II *e* measuring system.

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

Measuring system			
Manufacturer		Gasmet Technolgies Oy	
AMS designation		CEMS II ef	
Serial number of units under test		14433 / 14434	
Measuring principle		FTIR	
Test report		936/21225866/D	
Test laboratory		TÜV Rheinland	
Date of report		2017-10-02	
Measured component		CH_4	
Certification range		0 - 15	mg/m³
Evaluation of the cross-sensitivity (CS)			
(system with largest CS)			
Sum of positive CS at zero point		0.00	mg/m³
Sum of negative CS at zero point		0.00	mg/m³
Sum of postive CS at span point		0.08	mg/m³
Sum of negative CS at span point		-0.38	mg/m³
Maximum sum of cross-sensitivities		-0.38	mg/m³
Uncertainty of cross-sensitivity	u_i	-0.217	mg/m³

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.034	mg/m³	0.001	(mg/m³)²
Lack of fit	u_{lof}	0.035	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	$u_{d,s}$	0.156	mg/m³	0.024	(mg/m³)²
Influence of ambient temperature at span	u_t	0.057	mg/m³	0.003	(mg/m³)²
Influence of supply voltage	u_v	0.026	mg/m³	0.001	(mg/m³)²
Cross-sensitivity (interference)	u_i	-0.217	mg/m³	0.047	(mg/m³)²
Influence of sample gas flow	u_p	-0.069	mg/m³	0.005	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.121	mg/m³	0.015	(mg/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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.31	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.61	mg/m³

Relative total expanded uncertainty	**U in % of the range 15 mg/m³**	**4.1**
Requirement of 2010/75/EU	**U in % of the range 15 mg/m³**	**30.0 ****
Requirement of EN 15267-3	U in % of the range 15 mg/m³	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.

The values for the uncertainty calculation were taken from the test report on the CEMS II *e* measuring system.

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

Measuring system			
Manufacturer		Gasmet Technologies Oy	
AMS designation		CEMS II ef	
Serial number of units under test		14433 / 14434	
Measuring principle		FTIR	
Test report		936/21225866/D	
Test laboratory		TÜV Rheinland	
Date of report		2017-10-02	
Measured component		CH_2O	
Certification range		0 - 20	mg/m³
Evaluation of the cross-sensitivity (CS)			
(system with largest CS)			
Sum of positive CS at zero point		0.16	mg/m³
Sum of negative CS at zero point		0.00	mg/m³
Sum of postive CS at span point		0.36	mg/m³
Sum of negative CS at span point		-0.19	mg/m³
Maximum sum of cross-sensitivities		0.36	mg/m³
Uncertainty of cross-sensitivity	u_i	0.208	mg/m³

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.038	mg/m³	0.001	(mg/m³)²
Lack of fit	u_{lof}	-0.104	mg/m³	0.011	(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	$u_{d,s}$	-0.242	mg/m³	0.059	(mg/m³)²
Influence of ambient temperature at span	u_t	0.153	mg/m³	0.023	(mg/m³)²
Influence of supply voltage	u_v	0.047	mg/m³	0.002	(mg/m³)²
Cross-sensitivity (interference)	u_i	0.208	mg/m³	0.043	(mg/m³)²
Influence of sample gas flow	u_p	-0.051	mg/m³	0.003	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.162	mg/m³	0.026	(mg/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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.41	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.80	mg/m³

Relative total expanded uncertainty	**U in % of the range 20 mg/m³**	**4.0**
Requirement of 2010/75/EU	**U in % of the range 20 mg/m³**	**30.0 ****
Requirement of EN 15267-3	U in % of the range 20 mg/m³	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.

The values for the uncertainty calculation were taken from the test report on the CEMS II *e* measuring system.