



CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000025929_04

Certified AMS:

MCA 04 for N₂O, NO₂, H₂O, HCl, CO, NO, SO₂ and O₂

Manufacturer:

Dr. Födisch Umweltmesstechnik AG

Zwenkauer Straße 159 04420 Markranstädt

Germany

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 (2004).

Certification is awarded in respect of the conditions stated in this certificate (this certificate contains 14 pages).

The present certificate replaces certificate 0000025929_03 of 02 February 2015.



Suitability Tested EN 15267 QAL1 Certified Regular Surveillance

www.tuv.com ID 0000025929

Publication in the German Federal Gazette (BAnz.) of 05 August 2014

This certificate will expire on: 11 February 2025

German Federal Environment Agency Dessau, 12 February 2020 TÜV Rheinland Energy GmbH Cologne, 11 February 2020

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Test institute accredited to EN ISO/IEC 17025:2005 by DAkkS (German Accreditation Body). This accreditation is limited to the accreditation scope defined in the enclosure to the certificate D-PL-11120-02-00.

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Test report: 936/2122199/B of 3 April 2014

Initial certification: 12 February 2010 Expiry date: 11 February 2025

Certificate: renewal (previous 0000025929_03 dated 02 February 2015

with validity up to the 11 February 2020)

Publication: BAnz AT 05.08.2014 B11, chapter I no. 4.5

Approved application

The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III, at waste incineration plants according to Directive 2010/75/EU, chapter IV and other plants requiring official approval. The measured ranges have been selected considering the wide application range of the AMS.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and of several field tests. A six-month field test has been performed at a municipal waste incineration plant and a six-month field test has been performed at a nitric acid plant. Also findings of investigations at a further municipal waste incineration plant and at a combustion plant for industrial residues have been used for the assessment of the emission monitoring system.

The AMS is approved for an ambient temperature range of +5 °C to +40 °C.

The notification of suitability of the AMS, performance testing, and the uncertainty calculation have been effected on the basis of the regulations valid at the time of performance testing. As changes in legal regulations are possible, any potential user should ensure that this AMS is suitable for monitoring the limit values relevant to the application.

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

Basis of the certification

This certification is based on:

- test report 936/2122199/B of 3 April 2014 of TÜV Rheinland Energie und Umwelt GmbH
- suitability announced by the German Federal Environment Agency (UBA) as the relevant body
- the ongoing surveillance of the product and the manufacturing process



0000025929_04 / 12 February 2020



Publication in the German Federal Gazette: BAnz AT 05.08.2014 B11, chapter I number 4.5, Announcement by UBA from 17 July 2014:

AMS designation:

MCA 04 for N₂O, NO₂, H₂O, HCl, CO, NO, SO₂ and O₂

Manufacturer:

Dr. Födisch Umweltmesstechnik AG, Markranstädt

Field of application:

For measurements at plants requiring official approval (e.g. Directive 2010/75/EU on industrial emissions, chapters III and IV)

Measuring ranges during the performance test:

Components	Certification ranges	Supplementary ranges	Unit
H ₂ O	0 - 40		Vol%
HCI	0 - 15	0 - 90	mg/m³
СО	0 - 75	0 - 300	mg/m³
NO	0 - 200	0 - 395	mg/m³
SO ₂	0 - 75	0 - 300	mg/m³
O ₂	0 - 25		Vol%
N ₂ O	0 - 50	0 - 1000	mg/m³
NO ₂	0 - 50	0 - 1000	mg/m³

Software version:

MC3 Firmware V 1.83

Restrictions:

- 1. For SO_2 in the measuring range 0 75 mg/m³ the minimum requirements for the cross-sensitivity of CH_4 concentrations > 30 mg/m³ are not fulfilled.
- 2. The measuring system is not suitable for monitoring the component HCl at plants with NO_2 -concentrations > 10 mg/m³ and N_2O concentrations > 20 mg/m³.
- 3. The component CO₂ is not tested for suitability in accordance with EN 15267-3. Nevertheless, it must be used in the measuring system for the purpose of interference compensation and it shall be maintained as described in the manual.
- 4. Requirements with regard to the determination coefficient R² in accordance with EN 15267-3 were not satisfied for the component HCl during performance testing.

Notes:

- 1. The measuring system uses wet sample gas.
- 2. The maintenance interval is three months.
- 3. Supplementary testing (transition to EN 15267) as regards Federal Environmental Agency notices of 28 July 2010 (BAnz p. 2597, chapter I no. 1.1) and of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter V, notification 27).

Test report:

TÜV Rheinland Energie und Umwelt GmbH, Cologne Report No.: 936/2122199/B of 3 April 2014



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Certified product

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

The MCA 04 multi component gas analyser is a measuring system for the continuous measurement of gas components in waste gases. It can measure up to eight components quasi-simultaneously.

The optical bench for measuring the infrared-active components consists of an infrared source with a chopper, a test cell, a rotating filter disk and a detector.

For the measurement of the infrared-active components two different measuring principles are used:

- bi-frequency method (SO₂, H₂O, NO₂) and
- gas filter correlation (CO, NO, HCl, N₂O)

For the measurement of the oxygen content in the sample gas an extractive zirconium dioxide cell is used.

The MCA 04 analyser system consists of a temperature-controlled, vented steel cabinet with partial pivoting frame and a clear door. The complete electrical equipment/electronics (electric feeding, power distribution, signal processing and SPS) as well as the gas treatment system are mounted on the mounting board and on further assembly rails.

The tested AMS consists of the following single components:

- sampling probe SP 2000 H with heated filter element
- heated sample gas line (length during supplementary testing: 15 m)
- analyser cabinet MCA 04
- software MC3 Firmware V 1.83.

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**.



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History of documents

Certification of MCA 04 is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

First performance test

Test report: 936/21203173/A of 13 July 2005

TÜV Immissionsschutz und Energiesysteme GmbH, Cologne

Publication: BAnz. 29 October 2005, no. 206, p. 15700, chapter I no. 2.2

UBA announcement of 25 July 2005

Supplementary testing

Test report: 936/21203173/B of 23 December 2005

TÜV Immissionsschutz und Energiesysteme GmbH, Cologne Publication: BAnz. 8 April 2006, no. 70, p. 2653, chapter I no. 3.4

UBA announcement of 21 February 2006

Initial certification according to EN 15267*

Certificate No. 0000025929_00: 12 February 2010

Expiry date of the certificate: 11 February 2015

Test report 936/21211571/A dated 28 October 2009

TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Cologne Publication: BAnz. 12 February 2010, No. 24, p. 553, chapter I no. 1.4

Announcement by UBA dated 25 January 2010

Supplementary testing according to EN 15267

Certificate No. 0000025929_01:

28 July 2010

Expiry date of the certificate:

11 February 2015

Test report 936/21211571/B dated 25 March 2009

TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Cologne

Publication: BAnz. 28 July 2010, no. 111, p. 2597, chapter I no. 1.1

Announcement by UBA dated 12 July 2010

Notifications according to EN 15267

Statement of TÜV Rheinland Energy GmbH dated 11 October 2012 Publication: BAnz AT 05.03.2013 B10, chapter V notification 27 Announcement by UBA dated 12 February 2013 (new enclosure)

Supplementary testing according to EN 15267**

Certificate No. 0000025929_02:

09 September 2014

Expiry date of the certificate:

11 February 2015

Test report 936/21221599/B dated 03 April 2014

TÜV Rheinland Energie und Umwelt GmbH, Cologne

Publication: BAnz AT 05.04.2014 B11, chapter I no. 4.5

Announcement by UBA dated 17 July 2014

* Only the components N₂O and NO₂ were tested and certified.

** Testing and certification for the components CO, NO, SO₂, NO₂, N₂O, HCl, H₂O and O₂.



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Renewal of the certificate

Certificate No .0000025929_03:

02 February 2015

Expiry date of the certificate:

11 February 202011 February 2025

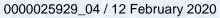
Renewal of the certificate

Certificate No. 0000025929_04: Expiry date of the certificate:

12 February 2020

11 February 2025

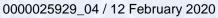






Measuring system						
Manufacturer	Dr. F	ödisch Uı	chnik AG			
AMS designation	MCA					
Serial number of units under test	150 /	152 / 128	368 / 155 /	154		
Measuring principle	gas f	ilter corre	lation			
Test report	936/2	21221599				
Test laboratory	TÜV	Rheinlan	d			
Date of report	2014	-04-03				
Measured component	CO	7.5				
Certification range	0 -	75	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			mg/m³			
Sum of postive CS at span point			mg/m³			
Sum of negative CS at span point			mg/m³			
Maximum sum of cross-sensitivities			mg/m³			
Uncertainty of cross-sensitivity			mg/m³			
Calculation of the combined standard uncertainty Tested parameter				u²		
Standard deviation from paired measurements under field conditions 3	* u _D	0.467	mg/m³	0.218	(mg/m³) ²	
Lack of fit	u _{lof}	-0.389	mg/m³	0.151	$(mg/m^3)^2$	
Zero drift from field test	$u_{d,z}$	0.090	mg/m³	0.008	(mg/m³)2	
Span drift from field test	$u_{d,s}$		mg/m³	0.476	$(mg/m^3)^2$	
Influence of ambient temperature at span	u _t		mg/m³	0.364	(mg/m³)2	
Influence of supply voltage	u_v		mg/m³	0.114	(mg/m³)²	
Cross-sensitivity (interference)	ui	-1.386	mg/m³	1.920	$(mg/m^3)^2$	
Influence of sample gas flow	u _p	-0.298	mg/m³	0.089	(mg/m³)²	
Uncertainty of reference material at 70% of certification range * The larger value is used: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions"	u _m	0.606	mg/m³	0.368	(mg/m³)²	
		$\sqrt{\sum (u_m)}$	72			
Combined standard uncertainty (u _c)					mg/m³	
Total expanded uncertainty	U = U	u _c * k = u	° 1.96	3.77	mg/m³	
Relative total expanded uncertainty	U in	% of the	ELV 50 mg/n	1 ³	7.5	
Requirement of 2010/75/EU	Uin	% of the	ELV 50 mg/n	n³	10.0	
Requirement of EN 15267-3	U in ^o	% of the B	3	7.5		



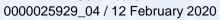




Management							
Measuring system Manufacturer	Dr. Fö	dio ob I I n	hnik AG				
AMS designation	MCA 0		IIIIK AG				
Serial number of units under test			260 / 155 / 1	15.4			
		150 / 152 / 128 / 116 / 355 / 368 / 155 / bi-frequency method					
Measuring principle	рытер	uency m	etnoa				
Toot moort	026/24	221599	/D				
Test report	_						
Test laboratory		heinland	1				
Date of report	2014-0	14-03					
Measured component	H ₂ O						
Certification range	0 -	40	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		0.40	Vol%				
Sum of negative CS at span point		0.00	Vol%				
Maximum sum of cross-sensitivities		0.40	Vol%				
Uncertainty of cross-sensitivity		0.231	Vol%				
Calculation of the combined standard uncertainty							
Tested parameter				U ²			
Repeatability standard deviation at set point *	ur		Vol%		(Vol%) ²		
Lack of fit	u _{lof}		Vol%		(Vol%) ²		
Zero drift from field test	$u_{d,z}$		Vol%		(Vol%) ²		
Span drift from field test	$u_{d,s}$		Vol%		(Vol%) ²		
Influence of ambient temperature at span	u _t		Vol%		(Vol%) ²		
Influence of supply voltage	u_v		Vol%		(Vol%) ²		
Cross-sensitivity (interference)	ui		Vol%		(Vol%) ²		
Influence of sample gas flow	up	-0.226		0.051	,		
Uncertainty of reference material at 70% of certification range	u _m	0.323	Vol%	0.105	(Vol%) ²		
The larger value is used : "Repeatability standard deviation at span" or							
"Standard deviation from paired measurements under field condition	ne"						
Standard deviation from paired measurements under neid conditio							
Combined standard uncertainty (u _c)	$u_c = $	$\sum (u_{ms})$)²	0.61	Vol%		
Total expanded uncertainty		* k = u _c		1.20	Vol%		
Relative total expanded uncertainty	U in %	of the	range 40 Vol.	-%	3.0		
Requirement of 2010/75/EU	U in %	of the	range 40 Vol.	-%	10.0 **		
Requirement of EN 15267-3	U in %	of the ra	ange 40 Vol9	%	7.5		

^{**} The EU-directive 2010/75/EU on industrial emissions provides no requirements for this component. The value used was 10 %.

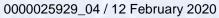






Measuring system						
Manufacturer	Dr. F	ödisch Ur	ik AG			
AMS designation	MCA	04				
Serial number of units under test	150 /	152 / 128	8 / 116 / 355 / 36	8 / 155 /	154	
Measuring principle	gas fi	lter corre	lation			
Test report		1221599				
Test laboratory		Rheinlan	d			
Date of report	2014-	-04-03				
Measured component	HCI					
Certification range	0 -	15	mg/m³			
Evaluation of the cross-sensitivity (CS)						
(system with largest CS)		0.04	nn a /nn 3			
Sum of positive CS at zero point			mg/m³			
Sum of negative CS at zero point			mg/m³			
Sum of postive CS at span point Sum of negative CS at span point			mg/m³ mg/m³			
Maximum sum of cross-sensitivities			0			
Maximum sum of cross-sensitivities		-0.00	mg/m³			
Uncertainty of cross-sensitivity		-0.346	mg/m³			
	u _D u _{lof} u _{d,z} u _{d,s}	0.239 -0.167 -0.160	mg/m³ mg/m³ mg/m³ mg/m³ mg/m³	u ² 0.057 0.028 0.026 0.063	(mg/m³)² (mg/m³)² (mg/m³)²	
Uncertainty of cross-sensitivity Calculation of the combined standard uncertainty Tested parameter Standard deviation from paired measurements under field conditions * Lack of fit Zero drift from field test	u _{lof} u _{d,z}	0.239 -0.167 -0.160 0.250	mg/m³ mg/m³ mg/m³	0.057 0.028 0.026	(mg/m³)² (mg/m³)²	
Uncertainty of cross-sensitivity Calculation of the combined standard uncertainty Tested parameter Standard deviation from paired measurements under field conditions * Lack of fit Zero drift from field test Span drift from field test	u _{lof} u _{d,z} u _{d,s}	0.239 -0.167 -0.160 0.250 0.289	mg/m³ mg/m³ mg/m³ mg/m³	0.057 0.028 0.026 0.063	(mg/m³)² (mg/m³)² (mg/m³)²	
Uncertainty of cross-sensitivity Calculation of the combined standard uncertainty Tested parameter Standard deviation from paired measurements under field conditions * Lack of fit Zero drift from field test Span drift from field test Influence of ambient temperature at span	u _{lof} u _{d,z} u _{d,s} u _t	0.239 -0.167 -0.160 0.250 0.289 0.097	mg/m³ mg/m³ mg/m³ mg/m³ mg/m³	0.057 0.028 0.026 0.063 0.084	(mg/m ³) ² (mg/m ³) ² (mg/m ³) ² (mg/m ³) ²	
Uncertainty of cross-sensitivity Calculation of the combined standard uncertainty Tested parameter Standard deviation from paired measurements under field conditions * Lack of fit Zero drift from field test Span drift from field test Influence of ambient temperature at span Influence of supply voltage	u _{lof} u _{d,z} u _{d,s} u _t u _v	0.239 -0.167 -0.160 0.250 0.289 0.097	mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³	0.057 0.028 0.026 0.063 0.084 0.009	(mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)²	
Uncertainty of cross-sensitivity Calculation of the combined standard uncertainty Tested parameter Standard deviation from paired measurements under field conditions * Lack of fit Zero drift from field test Span drift from field test Influence of ambient temperature at span Influence of supply voltage Cross-sensitivity (interference)	u _{lof} u _{d,z} u _{d,s} u _t u _v	0.239 -0.167 -0.160 0.250 0.289 0.097 -0.346	mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³	0.057 0.028 0.026 0.063 0.084 0.009 0.119	(mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)²	
Calculation of the combined standard uncertainty Tested parameter Standard deviation from paired measurements under field conditions * Lack of fit Zero drift from field test Span drift from field test Influence of ambient temperature at span Influence of supply voltage Cross-sensitivity (interference) Influence of sample gas flow Uncertainty of reference material at 70% of certification range * The larger value is used: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions"	u _{lof} u _{d,z} u _{d,s} u _t u _y u _i u _m	0.239 -0.167 -0.160 0.250 0.289 0.097 -0.346 -0.083 0.121	mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³	0.057 0.028 0.026 0.063 0.084 0.009 0.119 0.007 0.015	(mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)²	
Calculation of the combined standard uncertainty Tested parameter Standard deviation from paired measurements under field conditions * Lack of fit Zero drift from field test Span drift from field test Influence of ambient temperature at span Influence of supply voltage Cross-sensitivity (interference) Influence of sample gas flow Uncertainty of reference material at 70% of certification range * The larger value is used: "Repeatability standard deviation at span" or	$\begin{array}{c} u_{lof} \\ u_{d,z} \\ u_{d,s} \\ u_{t} \\ u_{v} \\ u_{i} \\ u_{p} \\ u_{m} \end{array}$	0.239 -0.167 -0.160 0.250 0.289 0.097 -0.346 -0.083	mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³	0.057 0.028 0.026 0.063 0.084 0.009 0.119 0.007 0.015	(mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)²	
Calculation of the combined standard uncertainty Tested parameter Standard deviation from paired measurements under field conditions * Lack of fit Zero drift from field test Span drift from field test Influence of ambient temperature at span Influence of supply voltage Cross-sensitivity (interference) Influence of sample gas flow Uncertainty of reference material at 70% of certification range * The larger value is used: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions" Combined standard uncertainty (u _C)	$\begin{array}{c} u_{lof} \\ u_{d,z} \\ u_{d,s} \\ u_{t} \\ u_{v} \\ u_{i} \\ u_{p} \\ u_{m} \end{array}$	0.239 -0.167 -0.160 0.250 0.289 0.097 -0.346 -0.083 0.121	mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³	0.057 0.028 0.026 0.063 0.084 0.009 0.119 0.007 0.015	(mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)²	
Calculation of the combined standard uncertainty Tested parameter Standard deviation from paired measurements under field conditions * Lack of fit Zero drift from field test Span drift from field test Influence of ambient temperature at span Influence of supply voltage Cross-sensitivity (interference) Influence of sample gas flow Uncertainty of reference material at 70% of certification range * 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 _{lof} u _{d,z} u _{d,s} u _t u _v u _i u _p u _m	0.239 -0.167 -0.160 0.250 0.289 0.097 -0.346 -0.083 0.121 $\sqrt{\sum_{c} (u_{m})}$	mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³	0.057 0.028 0.026 0.063 0.084 0.009 0.119 0.007 0.015	(mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)²	
Calculation of the combined standard uncertainty Tested parameter Standard deviation from paired measurements under field conditions * Lack of fit Zero drift from field test Span drift from field test Influence of ambient temperature at span Influence of supply voltage Cross-sensitivity (interference) Influence of sample gas flow Uncertainty of reference material at 70% of certification range * The larger value is used: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions" Combined standard uncertainty (u _C) Total expanded uncertainty	Ulof Ud.z Ud.s Ut Uv Ui Up Um Um	0.239 -0.167 -0.160 0.250 0.289 0.097 -0.346 -0.083 0.121 $\sqrt{\sum_{c} (u_{m})}$ % of the % of the	mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³	0.057 0.028 0.026 0.063 0.084 0.009 0.119 0.007 0.015	(mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)² (mg/m³)²	



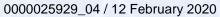




Measuring system							
Manufacturer	Dr. Födisch Umweltmesstechnik AG						
AMS designation	MCA 04						
Serial number of units under test	355 /	368					
Measuring principle	bi-fre	quency m					
Test report	936/2	1221599					
Test laboratory	TÜVI	Rheinlan	d				
Date of report	2014-	-04-03					
Measured component	N ₂ O						
Certification range	0 -	50	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		-1.74	mg/m³				
Sum of postive CS at span point		1.40	mg/m³				
Sum of negative CS at span point		-0.70	mg/m³				
Maximum sum of cross-sensitivities		-1.74	mg/m³				
Uncertainty of cross-sensitivity		1.005	mg/m³				
Calculation of the combined standard uncertainty							
Tested parameter				U ²			
Standard deviation from paired measurements under field conditions *	u _D	2.746	mg/m³	7.541	(mg/m³) ²		
Lack of fit	u _{lof}	-0.115	mg/m³	0.013	(mg/m³) ²		
Zero drift from field test	$u_{d,z}$	0.400	mg/m³	0.160	(mg/m³)2		
Span drift from field test	u _{d.s}	0.580	mg/m³	0.336	(mg/m³) ²		
Influence of ambient temperature at span	u _t	0.361	mg/m³	0.130	(mg/m³) ²		
Influence of supply voltage	u _v	0.276	mg/m³	0.076	(mg/m³) ²		
Cross-sensitivity (interference)	ui	1.005	mg/m³	1.010	(mg/m³)2		
Influence of sample gas flow	u _p	-0.066	mg/m³	0.004	(mg/m³)²		
Uncertainty of reference material at 70% of certification range	u _m	0.404	mg/m³	0.163	$(mg/m^3)^2$		
* 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 =	$\sqrt{\sum (u_m)}$.)2	2.07	mg/m³		
2 . 0	11 - 11	$c^* k = u_0$	* 1 06		mg/m³		
Total expanded uncertainty	0 – u	c K – U	1.50	0.02	my/m-		
Relative total expanded uncertainty	II in G	% of the	range 50 mg/m³		12.0		
Requirement of 2010/75/EU			range 50 mg/m³		20.0 **		
			range 50 mg/m ³		15.0		
Requirement of EN 15267-3	0 111 9	o oi tile i	ange 50 mg/m		15.0		

^{**} The EU-directive 2010/75/EU on industrial emissions provides no requirements for this component. The value used was 20 %.







Measuring system						
Manufacturer	Dr. F	ödisch Ur	mweltmesste	chnik AG		
AMS designation	MCA	04				
Serial number of units under test	150 /	152 / 128	8 / 116 / 355	/ 368 / 155 /	154	
Measuring principle	gas fi	lter corre	lation			
			11/2			
Test report	936/2	1221599	/B			
Test laboratory	TÜVI	Rheinlan	d			
Date of report	2014-	-04-03				
Measured component	NO					
Certification range	0 -	200	mg/m³			
Certification range	0 -	200	IIIg/III			
Evaluation of the cross-sensitivity (CS)						
(system with largest CS)						
Sum of positive CS at zero point		3.76	mg/m³			
Sum of negative CS at zero point		-6.26	mg/m³			
Sum of postive CS at span point		4.70	mg/m³			
Sum of negative CS at span point		-7.90	mg/m³			
Maximum sum of cross-sensitivities		-7.90	mg/m³			
Uncertainty of cross-sensitivity		-4.561	mg/m³			
Calculation of the combined standard uncertainty						
Tested parameter				U ²		
Standard deviation from paired measurements under field conditions *	u _D	1.925	mg/m³	3.706	(mg/m³)2	
Lack of fit	u _{lof}		mg/m³	0.120	(mg/m³)²	
Zero drift from field test	u _{d.z}		mg/m³	0.336	(mg/m³)²	
Span drift from field test	U _{d.s}		mg/m³	1.932		
Influence of ambient temperature at span	U _t		mg/m³	1.583	(mg/m³)²	
Influence of supply voltage	u _v		mg/m³	0.224	(mg/m³)²	
Cross-sensitivity (interference)	ui	-4.561	mg/m³	20.803	(mg/m³)2	
Influence of sample gas flow	u _p	1.155	mg/m³	1.334	$(mg/m^3)^2$	
Uncertainty of reference material at 70% of certification range	u _m	1.617	mg/m³	2.613	$(mg/m^3)^2$	
* 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 . =	$\sqrt{\sum (u_m)}$	ax i)2	5.71	mg/m³	
Total expanded uncertainty		* k = u			mg/m³	
				20		
Relative total expanded uncertainty			ELV 98 mg/		11.4	
Requirement of 2010/75/EU	Uin	% of the	ELV 98 mg/	m³	20.0	
Requirement of EN 15267-3	U in 9	6 of the E	ELV 98 mg/m	13	15.0	

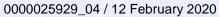


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Measuring system						
Manufacturer	Dr. F	ödisch Uı	mweltmesstechn	ik AG		
AMS designation	MCA	04				
Serial number of units under test	355 /	368				
Measuring principle	bi-fre	quencyn	nethod			
Test report	936/2	21221599	/B			
Test laboratory	TÜV	Rheinlan				
Date of report	2014	-04-03				
Measured component	NO ₂					
Certification range	0 -	50	mg/m³			
Evaluation of the cross-sensitivity (CS)						
(system with largest CS)		4.00	(3			
Sum of positive CS at zero point			mg/m³			
Sum of negative CS at zero point			mg/m³			
Sum of postive CS at span point			mg/m³			
Sum of negative CS at span point			mg/m³			
Maximum sum of cross-sensitivities			mg/m³			
Uncertainty of cross-sensitivity		1.010	mg/m³			
Calculation of the combined standard uncertainty Tested parameter				U ²		
		0.070	mg/m³	0.006	(m a/m 3)2	
Standard deviation from paired measurements under field conditions * Lack of fit	u _D		mg/m³	0.000	,	
Zero drift from field test	u _{lof}		mg/m³	0.270	, ,	
Span drift from field test	u _{d,z}		mg/m³	0.014		
Influence of ambient temperature at span	u _{d,s} u _t		mg/m³	0.003		
Influence of supply voltage	u _t		mg/m³	0.043	(3)	
Cross-sensitivity (interference)	u _v U _i		mg/m³	1.020		
Influence of sample gas flow	u _p		mg/m³	0.010	(mg/m³)²	
Uncertainty of reference material at 70% of certification range	u _m	0.404	0	0.163	(mg/m³)²	
* The larger value is used : "Repeatability standard deviation at span" or	um	0.404	mg/m	0.103	(mg/m/)	
"Standard deviation from paired measurements under field conditions"						
Combined standard uncertainty (u _c)	u. =	$\sqrt{\sum (u_m)}$)2	1 27	mg/m³	
Total expanded uncertainty		_ * k = u			mg/m³	
Total expanded differently	0 - 0	c K – u	c 1.50	2.40	ilig/ili	
Deleting total amounted amounts's to		0/ -54	FI 1/ 00 t °		40.4	
Relative total expanded uncertainty			ELV 20 mg/m ³		12.4	
Requirement of 2010/75/EU			ELV 20 mg/m ³		20.0	
Requirement of EN 15267-3	Uin	% of the b	ELV 20 mg/m ³		15.0	



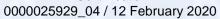




Measuring system					
Manufacturer	Dr. F	ödisch Ur	k AG		
AMS designation	MCA	04			
Serial number of units under test	150 /	152 / 128	3 / 116 / 355 / 368	3 / 155 /	154
Measuring principle	zircoi	nium diox	ide measuremen	t	
Test report	936/2	21221599			
Test laboratory	TÜV	Rheinlan	d		
Date of report	2014	-04-03			
Measured component	02				
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		0.000	Vol%		
Calculation of the combined standard uncertainty					
Tested parameter				U ²	
Standard deviation from paired measurements under field conditions *	u_D	0.074	Vol%	0.005	(Vol%) ²
Lack of fit	u _{lof}	0.058	Vol%	0.003	(Vol%) ²
Zero drift from field test	$u_{d,z}$	0.100	Vol%	0.010	(Vol%) ²
Span drift from field test	$u_{d,s}$	0.090	Vol%	0.008	(Vol%) ²
Influence of ambient temperature at span	u _t	0.047	Vol%	0.002	(Vol%) ²
Influence of supply voltage	u_v	0.071	Vol%	0.005	(Vol%) ²
Cross-sensitivity (interference)	ui	0.000	Vol%	0.000	(Vol%) ²
Influence of sample gas flow	u _p	-0.107	Vol%	0.011	(Vol%) ²
Uncertainty of reference material at 70% of certification range	u _m	0.202	Vol%	0.041	(Vol%) 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 . =	$\sqrt{\sum (u_m)}$		0.20	Vol%
Total expanded uncertainty		$u_c * k = u_c$			Vol%
Total expanded uncertainty	0 - 0	c K – u	1.50	0.50	V UI/U
Relative total expanded uncertainty	Hin	% of the	range 25 Vol%		2.3
Requirement of 2010/75/EU			range 25 Vol%		10.0 **
Requirement of EN 15267-3			ange 25 Vol%		7.5
Troquironibile of Liv 10201-3	O III	o or the r	unge 25 vol70		1.5

^{**} The EU-directive 2010/75/EU on industrial emissions provides no requirements for this component. The value used was 10 %.







Measuring system						
Manufacturer	Dr F	ödisch Ur	ik AG			
AMS designation	MCA					
Serial number of units under test			8 / 155 /	154		
Measuring principle		quency m	07 1007	.01		
moderally principle	Dillo	quonoyn	iotilou			
Test report	936/2	1221599	/B			
Test laboratory	TÜVI	Rheinlan	d			
Date of report		-04-03				
Date of report						
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		2.93	mg/m³			
Sum of negative CS at zero point			mg/m³			
Sum of postive CS at span point		3.00	mg/m³			
Sum of negative CS at span point		-2.60	mg/m³			
Maximum sum of cross-sensitivities		3.00	mg/m³			
Uncertainty of cross-sensitivity		1.732	mg/m³			
Calculation of the combined standard uncertainty Tested parameter Standard deviation from paired measurements under field conditions * Lack of fit Zero drift from field test Span drift from field test Influence of ambient temperature at span Influence of supply voltage Cross-sensitivity (interference) Influence of sample gas flow Uncertainty of reference material at 70% of certification range * The larger value is used: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions"	U _D U _{lof} U _{d,z} U _{d,s} U _t U _v U _i U _p	0.714 0.820 -1.000 1.106 0.515 1.732 0.126	mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³ mg/m³	u ² 1.430 0.510 0.672 1.000 1.223 0.265 3.000 0.016 0.368	(mg/m³)²	
		56.	<u> </u>			
Combined standard uncertainty (u _c)		$\sqrt{\sum_{m} (u_m)}$		2.91	mg/m³	
Total expanded uncertainty	U = u	c*k = u	* 1.96	5.71	mg/m³	
Relative total expanded uncertainty	Uin	% of the	ELV 50 mg/m³		11.4	
Requirement of 2010/75/EU	Uin	% of the	ELV 50 mg/m ³		20.0	
Requirement of EN 15267-3	U in 9	6 of the E	ELV 50 mg/m ³		15.0	