Umwelt Bundesamt

TÜVRheinland®
Precisely Right.

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000039321

Certified AMS:	MGA12 for CO, NO, SO_2, O_2 and CO_2
Manufacturer:	Dr. Födisch Umweltmesstechnik AG Zwenkauer Straße 159 04420 Markranstädt Germany
Test Institute:	TÜV Rheinland Energie und Umwelt GmbH

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

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

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

TÜVRheinland® CERTIFIED

Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

www.tuv.com
ID 0000039321

Publication in the German Federal Gazette (BAnz.) of 01 April 2014

This certificate will expire on:
31 March 2019

German Federal Environment Agency
Dessau, 29 April 2014

i. A. Dr. Marcel Langner

TÜV Rheinland Energie und Umwelt GmbH
Cologne, 28 April 2014

ppa. Dr. Peter Wilbring

www.umwelt-tuv.de / **www.eco-tuv.com** teu@umwelt-tuv.de Tel. +49 221 806-5200	TÜV Rheinland Energie und Umwelt GmbH Am Grauen Stein 51105 Cologne
Accreditation according to EN ISO/IEC 17025 and certified according to ISO 9001:2008.	

Test report:	936/21219366/A of 19 September 2013
Initial certification:	01 April 2014
Expiry date:	31 March 2019
Publication:	BAnz AT 01 April 2014 B12, chapter I, No. 3.4

Approved application
The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III and other plants requiring official approval. The tested ranges have been chosen with respect to the wide application range of the AMS.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a three-month field test at a lignite-fired power plant.

The AMS is approved for an ambient temperature range of +5 °C to +30 °C.

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 936/21219366/A of 19 September 2013 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
- publication in the German Federal Gazette (BAnz AT 01 April 2014 B12, chapter I, No. 3.4, Announcement by UBA from 27 February 2014)

AMS designation:
MGA12 for CO, NO, SO_2, O_2 and CO_2

Manufacturer:
Dr. Födisch Umweltmesstechnik AG, Markranstädt

Field of application:
For measurements at plants requiring official approval (Directive 2010/75/EU, chapter III combustion plants)

Measuring ranges during the performance test:

Components	Certification range	Supplementary range	Units
CO	0 - 125	0 - 1000	mg/m³
NO	0 - 300	0 - 1000	mg/m³
SO_2	0 - 200	0 - 1000	mg/m³
O_2	0 - 25	-	Vol.-%
CO_2	0 - 20	-	Vol.-%

Software version:
1.47

Restrictions:
1. The ambient temperature must not exceed +30 °C.
2. The performance criterion as related to the expanded uncertainty according to EN 15267-3 was not fulfilled for the component CO.

Note:
The maintenance interval is four weeks.

Test report:
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Report No.: 936/21219366/A of 19 September 2013

Certified product

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

The multi-component MGA12 AMS is a measuring system for continuous monitoring of CO, NO, SO_2, O_2 and CO_2 in exhaust gases.

The components CO, NO, SO_2 and CO_2 are monitored using infrared absorption; O_2 is measured with an electrochemical cell.

The tested AMS comprises the gas analyser which is positioned in a 19“ rack housing. The analyser is located in a heated and ventilated system cabinet with the dimensions 2100 x 800 x 600 mm, which also houses the sample gas pump (MGP 12), the sample gas cooler (GCU 12), the connections for measurement values and signals, and other electronic parts for electricity supply. A pump supplies the sample gas cooler with 15 % concentration phosphoric acid in order to prevent SO_2 absorption.

The sample gas is fed to gas preparation via a heated sample gas probe (HSP 12) and a heated sample gas pipe (25 m). The sample gas probe is fitted with a ceramic filter which, like the sample gas pipe, is heated to 180 °C.

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 Energie und Umwelt 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 can be applied to the product or used in publicity material for the certified product.

This document as well as the certification mark remains property of TÜV Rheinland Energie und Umwelt GmbH. With revocation of the publication the certificate loses its validity. After the expiration of the certificate and on requests of the TÜV Rheinland Energie und Umwelt 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**.

Certification of MGA12 for CO, NO, SO_2, O_2 and CO_2 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. 0000039321: 29 April 2014

Expiry date of the certificate: 31 March 2019

Test report: 936/21219366/A of 19 September 2013
TÜV Rheinland Energie und Umwelt GmbH, Cologne

Publication: BAnz AT 01 April 2014 B12, chapter I, No. 3.4
Announcement by UBA from 27 February 2014

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

Measuring system			
Manufacturer		Dr. Födisch Umweltmesstechnik AG	
AMS designation		MGA 12	
Serial number of units under test		12002 / 12003	
Measuring principle		IR	
Test report		936/21219366/A	
Test laboratory		TÜV Rheinland	
Date of report		2013-09-19	
Measured component		CO	
Certification range		0 - 125	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		3.70	mg/m³
Sum of negative CS at span point		-2.50	mg/m³
Maximum sum of cross-sensitivities		3.70	mg/m³
Uncertainty of cross-sensitivity	u_i	2.140	mg/m³

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.690	mg/m³	0.476	(mg/m³)²
Lack of fit	u_{lof}	-0.577	mg/m³	0.333	(mg/m³)²
Zero drift from field test	$u_{d,z}$	-0.144	mg/m³	0.021	(mg/m³)²
Span drift from field test	$u_{d,s}$	-1.588	mg/m³	2.522	(mg/m³)²
Influence of ambient temperature at span	u_t	1.510	mg/m³	2.280	(mg/m³)²
Influence of supply voltage	u_v	0.537	mg/m³	0.288	(mg/m³)²
Cross-sensitivity (interference)	u_i	2.140	mg/m³	4.580	(mg/m³)²
Influence of sample gas flow	u_p	0.346	mg/m³	0.120	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	1.010	mg/m³	1.021	(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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	3.41	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	6.69	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 80 mg/m³**	**8.4**
Requirement of 2010/75/EU	**U in % of the ELV 80 mg/m³**	**10.0**
Requirement of EN 15267-3	U in % of the ELV 80 mg/m³	7.5

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

Measuring system			
Manufacturer		Dr. Födisch Umweltmesstechnik AG	
Name of measuring system		MGA 12	
Serial number of the candidates		12002 / 12003	
Measuring principle		IR	
Test report		936/21219366/A	
Test laboratory		TÜV Rheinland	
Date of report		2013-09-19	
Measured component		NO	
Certification range		0 - 250	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 reference point		6.30	mg/m³
Sum of negative CS at reference point		0.00	mg/m³
Maximum sum of cross sensitivities		6.30	mg/m³
Uncertainty of cross sensitivity		3.637	mg/m³

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	3.095	mg/m³	9.579	(mg/m³)²
Lack of fit	u_{lof}	1.155	mg/m³	1.334	(mg/m³)²
Zero drift from field test	$u_{d,z}$	3.320	mg/m³	11.022	(mg/m³)²
Span drift from field test	$u_{d,s}$	3.753	mg/m³	14.085	(mg/m³)²
Influence of ambient temperature at span	u_t	2.468	mg/m³	6.091	(mg/m³)²
Influence of supply voltage	u_v	1.208	mg/m³	1.459	(mg/m³)²
Cross sensitivity (interference)	u_i	3.640	mg/m³	13.250	(mg/m³)²
Influence of sample gas flow	u_b	1.383	mg/m³	1.913	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	2.021	mg/m³	4.083	(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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	7.93	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	15.53	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 120 mg/m³**	**12.9**
Requirement of 2010/75/EU	**U in % of the ELV 120 mg/m³**	**20.0**
Requirement of EN 15267-3	U in % of the ELV 120 mg/m³	15.0

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

Measuring system			
Manufacturer		Dr. Födisch Umweltmesstechnik AG	
AMS designation		MGA 12	
Serial number of units under test		12002 / 12003	
Measuring principle		IR	
Test report		936/21219366/A	
Test laboratory		TÜV Rheinland	
Date of report		2013-09-19	
Measured component		SO_2	
Certification range		0 - 200	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		-2.64	mg/m³
Sum of postive CS at span point		5.10	mg/m³
Sum of negative CS at span point		-8.00	mg/m³
Maximum sum of cross-sensitivities		-8.00	mg/m³
Uncertainty of cross-sensitivity	u_i	-4.619	mg/m³

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	3.291	mg/m³	10.831	(mg/m³)²
Lack of fit	u_{lof}	1.155	mg/m³	1.334	(mg/m³)²
Zero drift from field test	$u_{d,z}$	0.346	mg/m³	0.120	(mg/m³)²
Span drift from field test	$u_{d,s}$	-2.656	mg/m³	7.054	(mg/m³)²
Influence of ambient temperature at span	u_t	2.452	mg/m³	6.012	(mg/m³)²
Influence of supply voltage	u_v	0.947	mg/m³	0.897	(mg/m³)²
Cross-sensitivity (interference)	u_i	-4.619	mg/m³	21.333	(mg/m³)²
Influence of sample gas flow	u_p	0.722	mg/m³	0.521	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	1.617	mg/m³	2.613	(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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	7.12	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	13.96	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 130 mg/m³**	**10.7**
Requirement of 2010/75/EU	**U in % of the ELV 130 mg/m³**	**20.0**
Requirement of EN 15267-3	U in % of the ELV 130 mg/m³	15.0

Umwelt Bundesamt

Certificate:
0000039321 / 29 April 2014

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

Measuring system			
Manufacturer		Dr. Födisch Umweltmesstechnik AG	
AMS designation		MGA 12	
Serial number of units under test		12002 / 12003	
Measuring principle		electrochemical cell	
Test report		936/21219366/A	
Test laboratory		TÜV Rheinland	
Date of report		2013-09-19	
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	0.091	Vol.-%	0.008	(Vol.-%)²
Lack of fit	u_{lof}	0.014	Vol.-%	0.000	(Vol.-%)²
Zero drift from field test	$u_{d,z}$	-0.064	Vol.-%	0.004	(Vol.-%)²
Span drift from field test	$u_{d,s}$	-0.110	Vol.-%	0.012	(Vol.-%)²
Influence of ambient temperature at span	u_t	0.070	Vol.-%	0.005	(Vol.-%)²
Influence of supply voltage	u_v	0.059	Vol.-%	0.003	(Vol.-%)²
Cross-sensitivity (interference)	u_i	0.000	Vol.-%	0.000	(Vol.-%)²
Influence of sample gas flow	u_p	-0.018	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 span" or
"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.27	Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.53	Vol.-%

Relative total expanded uncertainty	**U in % of the range 25 Vol.-%**	**2.1**
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

** For this component no requirements in the EC-directives 2010/75/EU on industrial emissions are given.
The chosen value is recommended by the certification body.

Umwelt Bundesamt

Certificate:
0000039321 / 29 April 2014

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

Measuring system			
Manufacturer	Dr. Födisch Umweltmesstechnik AG		
AMS designation	MGA 12		
Serial number of units under test	12002 / 12003		
Measuring principle	IR		
Test report	936/21219366/A		
Test laboratory	TÜV Rheinland		
Date of report	2013-09-19		
Measured component	CO_2		
Certification range	0 - 20	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	0.60	Vol.-%	
Sum of negative CS at span point	-0.20	Vol.-%	
Maximum sum of cross-sensitivities	0.60	Vol.-%	
Uncertainty of cross-sensitivity	u_i 0.346	Vol.-%	

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.142	Vol.-%	0.020	(Vol.-%)²
Lack of fit	u_{lof}	0.058	Vol.-%	0.003	(Vol.-%)²
Zero drift from field test	$u_{d,z}$	-0.012	Vol.-%	0.000	(Vol.-%)²
Span drift from field test	$u_{d,s}$	0.346	Vol.-%	0.120	(Vol.-%)²
Influence of ambient temperature at span	u_t	0.252	Vol.-%	0.064	(Vol.-%)²
Influence of supply voltage	u_v	0.060	Vol.-%	0.004	(Vol.-%)²
Cross-sensitivity (interference)	u_i	0.346	Vol.-%	0.120	(Vol.-%)²
Influence of sample gas flow	u_n	-0.041	Vol.-%	0.002	(Vol.-%)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.162	Vol.-%	0.026	(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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.60	Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	1.17	Vol.-%

Relative total expanded uncertainty	**U in % of the range 20 Vol.-%**	**5.9**
Requirement of 2010/75/EU	**U in % of the range 20 Vol.-%**	**10.0**
Requirement of EN 15267-3	U in % of the range 20 Vol.-%	7.5

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CONFIRMATION

Notification on changes according to EN 15267 regarding
certificate 0000039321 dated 29 April 2014

Measuring system:	MGA12
Manufacturer:	Dr. Födisch Umweltmesstechnik AG Zwenkauer Straße 159 04420 Markranstädt Germany

German Federal Environmental Agency (UBA)

Announcement about the uniform practice in monitoring emissions and ambient air.
22 July 2015
Federal Gazette: BAnz AT 26 August 2015 B4

V **Notifications to the uniform practice for the continuous monitoring of emission and ambient air:**

31 Notification as regards Federal Environment Agency (UBA) notice of 27 February 2014 (Federal Gazette (BAnz.) AT 1 April 2014 B12, chapter I number 3.4)

The current software version for the MGA12 measuring system for CO, NO, SO_2, O_2 and CO_2, manufactured by Dr. Födisch Umweltmesstechnik AG, is:
1.50.
Statement of TÜV Rheinland Energie und Umwelt GmbH of 18 February 2015

TÜV Rheinland Energie und Umwelt GmbH
Cologne, 04 November 2015

i. A. Dipl.-Ing. Ruth Steinhagen-Pinnow

i. A. Dipl. Ing. Carsten Röllig

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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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CONFIRMATION

Notification: 0000039321_00_02
on changes according to EN 15267 regarding certificate 0000039321_00 dated 29 April 2014

Measuring system:	MGA12 measuring system monitoring CO, NO, SO_2, and O_2
Manufacturer:	Dr. Födisch Umweltmesstechnik AG Zwemkauer Straße 159 04420 Markranstädt Germany

German Federal Environmental Agency (UBA)

Announcement about the uniform practice in monitoring emissions and ambient air dated 14 July 2016
Federal Gazette: BAnz AT 01.08.2016 B11

V. Notifications to the uniform practice for the continuous monitoring of emission and ambient air:

5 Notification as regards Federal Environmental Agency (UBA) notices of 27 February 2014 (BAnz AT 01.04.2014 B12, chapter I number 3.4) and of 22 July 2015 (BAnz AT 26.08.2015 B4 chapter V notification 31)

The GCU12 test gas cooler of the MGA12 measuring system monitoring CO, NO, SO_2, and O_2 manufactured by Dr. Födisch Umweltmesstechnik AG was equipped with new electronics and a new display unit. The name of the new test gas cooler is GCU16 (as of serial number 17xxx). This version serves as an alternative to its predecessor.

Statement issued by TÜV Rheinland Energy GmbH dated 27 April 2016.

TÜV Rheinland Energy GmbH
Cologne, 18 August 2016

i. V. Dipl.-Ing. Guido Baum

i. A. Dipl. Ing. Carsten Röllig

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