

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000039321_02

AMS designation: MGA12 for CO, NO, SO₂, O₂ und CO₂

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

Test Laboratory: 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 11 pages).
The present certificate replaces certificate 0000039321_01 of 01 April 2019.



Suitability Tested
EN 15267
QAL1 Certified
Regular Surveillance

www.tuv.com
ID 0000039321

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

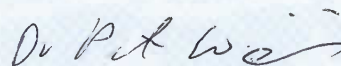
This certificate will expire on:
30 June 2025

German Federal Environment Agency
Dessau, 01 July 2020

TÜV Rheinland Energy GmbH
Cologne, 30 June 2020



Dr. Marcel Langner
Head of Section II 4.1



ppa. Dr. Peter Wilbring

www.umwelt-tuv.eu
tre@umwelt-tuv.eu
Phone: + 49 221 806-5200

TÜV Rheinland Energy GmbH
Am Grauen Stein
51105 Köln

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 certificate D-PL-11120-02-00.

Test Report:	936/21219366/A dated 19 September 2013
Initial certification:	01 April 2014
Expiry date:	30 June 2025
Certificate:	Renewal (of previous certificate 0000039321_01 dated 01 April 2019 valid until 30 June 2020)
Publication:	BAnz AT 01.04.2014 B12, chapter I number 3.4

Approved application

The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13th BImSchV), plants in compliance with TA Luft and plants according to the 27th BImSchV. The measured ranges have been selected so as to ensure as broad a field of application as possible.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a three-months field test at a waste incineration plant.

The AMS is approved for an ambient temperature range of +5 °C to +30 °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 limit values and oxygen concentrations relevant to the application.

Any potential user should ensure, in consultation with the manufacturer, that this AMS is suitable for the intended purpose.

Basis of the certification

This certification is based on:

- Test report no. 936/21219366/A dated 19 September 2013 issued by 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 01.04.2014 B12, chapter I number 3.4, UBA announcement dated 27 February 2014 :

AMS designation:

MGA12 for CO, NO, SO₂, O₂ und CO₂

Manufacturer:

Dr. Födisch Umweltmesstechnik AG, Markranstädt

Field of application:

For plants according to the 13th BImSchV and other plants requiring official approval

Measuring ranges during performance testing:

Component	Certification range	supplementary Measuring range	Unit
CO	0–125	0–1 000	mg/m ³
NO	0–300	0–1 000	mg/m ³
SO ₂	0–200	0–1 000	mg/m ³
O ₂	0–25	-	Vol.-%
CO ₂	0–20	-	Vol.-%

Software version:

1.47

Restrictions:

1. Ambient temperature must not exceed +30 °C.
2. The measuring system did not meet the requirement for total uncertainty as defined in EN 15267-3 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 dated 19 September 2013

Publication in the German Federal Gazette: BAnz AT 26.08.2015 B4, chapter V notification 31, UBA announcement dated 22 July 2015:

31 Notification as regards Federal Environment Agency (UBA) notice of 27 February 2014 (BAnz AT 01.04.2014 B12, chapter I number 3.4)

The current software version of the MGA12 measuring system for CO, NO, SO₂, O₂, and CO₂ manufactured by Dr. Födisch Umweltmesstechnik AG is:
1.50.

Statement issued by TÜV Rheinland Energie und Umwelt GmbH
dated 18 February 2015

Publication in the German Federal Gazette: BAnz AT 01.08.2016 B11, chapter V notification 5, UBA announcement dated 14 July 2016:

5 Notification as regards Federal Environment 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 31st notification)

The GCU12 test gas cooler, which is used for the MGA12 measuring system for CO, NO, SO₂, O₂ and CO₂ manufactured by Dr. Födisch Umweltmesstechnik AG, has been equipped with new electronics and display units. 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

Certified product

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

The MGA12 multi-component AMS is a measuring system for continuous monitoring of CO, NO, SO₂, O₂ and CO₂ in waste gases.

The components CO, NO, SO₂ and CO₂ are monitored using infrared absorption; O₂ is measured with an electrochemical cell.

The tested AMS comprises the gas analyser which is positioned in a 19"-rack housing. The analyser is placed 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 transmitting measured values and signals, and other electronic parts for voltage supply. A pump supplies the sample gas cooler with 15% concentration phosphoric acid in order to prevent SO₂ 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 remarks

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 manufacturing process for 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 document as well as the certification mark remains property of TÜV Rheinland Energy GmbH. Upon revocation of the publication the certificate loses its validity. After the expiration of the certificate and on request of TÜV Rheinland Energy GmbH this document shall be returned and the certificate mark must no longer be used.

The relevant version of this certificate and its expiration date are also accessible on the internet at qal1.de.

Document history

Certification of the MGA12 measuring system is based on the documents listed below and the regular, continuous surveillance of the manufacturer's quality management system:

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 dated 19 September 2013
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Publication: BAnz AT 01.04.2014 B12, chapter I number 3.4
UBA announcement dated 24 February 2014

Notifications in accordance with EN 15267

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 18 February 2015
Publication: BAnz AT 26.08.2015 B4, chapter V notification 31
UBA announcement dated 22 July 2015
(New software version)

Statement issued by TÜV Rheinland Energy GmbH dated 27 April 2016
Publication: BAnz AT 01.08.2016 B11, chapter V notification 5
UBA announcement dated 14 July 2016
(replacement of test gas cooler)

Renewal of the certificate

Certificate no. 0000039321_01: 01 April 2019
Expiry date of the certificate: 30 June 2020

Renewal of the certificate

Certificate no. 0000039321_02: 01 July 2020
Expiry date of the certificate: 30 June 2025

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

Test laboratory	TÜV Rheinland
Date of report	2013-09-19

Measured component

	CO
Certification range	0 - 125 mg/m ³

Evaluation of the cross-sensitivity (CS)

(system with largest CS)

Sum of positive CS at zero point	0.00 mg/m ³
Sum of negative CS at zero point	0.00 mg/m ³
Sum of positive CS at span point	3.70 mg/m ³
Sum of negative CS at span point	-2.50 mg/m ³
Maximum sum of cross-sensitivities	3.70 mg/m ³
Uncertainty of cross-sensitivity	u_i 2.140 mg/m ³

Calculation of the combined standard uncertainty

Tested parameter

			u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.690 mg/m ³	0.476	(mg/m ³) ²
Lack of fit	u_{lof}	-0.577 mg/m ³	0.333	(mg/m ³) ²
Zero drift from field test	$u_{d,z}$	-0.144 mg/m ³	0.021	(mg/m ³) ²
Span drift from field test	$u_{d,s}$	-1.588 mg/m ³	2.522	(mg/m ³) ²
Influence of ambient temperature at span	u_t	1.510 mg/m ³	2.280	(mg/m ³) ²
Influence of supply voltage	u_v	0.537 mg/m ³	0.288	(mg/m ³) ²
Cross-sensitivity (interference)	u_i	2.140 mg/m ³	4.580	(mg/m ³) ²
Influence of sample gas flow	u_p	0.346 mg/m ³	0.120	(mg/m ³) ²
Uncertainty of reference material at 70% of certification range	u_{rm}	1.010 mg/m ³	1.021	(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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	3.41 mg/m ³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	6.69 mg/m ³

Relative total expanded uncertainty

Requirement of 2010/75/EU

Requirement of EN 15267-3

U in % of the ELV 80 mg/m³	8.4
U in % of the ELV 80 mg/m³	10.0
U in % of the ELV 80 mg/m ³	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

Test laboratory	TÜV Rheinland
Date of report	2013-09-19

Measured component

	NO
Certification range	0 - 250 mg/m ³

Evaluation of the cross sensitivity (CS)

(system with largest CS)

Sum of positive CS at zero point	0.00 mg/m ³
Sum of negative CS at zero point	0.00 mg/m ³
Sum of positive CS at reference point	6.30 mg/m ³
Sum of negative CS at reference point	0.00 mg/m ³
Maximum sum of cross sensitivities	6.30 mg/m ³
Uncertainty of cross sensitivity	3.637 mg/m ³

Calculation of the combined standard uncertainty

Tested parameter

			u ²	
Standard deviation from paired measurements under field conditions *	u _D	3.095 mg/m ³	9.579	(mg/m ³) ²
Lack of fit	u _{lof}	1.155 mg/m ³	1.334	(mg/m ³) ²
Zero drift from field test	u _{d,z}	3.320 mg/m ³	11.022	(mg/m ³) ²
Span drift from field test	u _{d,s}	3.753 mg/m ³	14.085	(mg/m ³) ²
Influence of ambient temperature at span	u _t	2.468 mg/m ³	6.091	(mg/m ³) ²
Influence of supply voltage	u _v	1.208 mg/m ³	1.459	(mg/m ³) ²
Cross sensitivity (interference)	u _i	3.640 mg/m ³	13.250	(mg/m ³) ²
Influence of sample gas flow	u _b	1.383 mg/m ³	1.913	(mg/m ³) ²
Uncertainty of reference material at 70% of certification range	u _{rm}	2.021 mg/m ³	4.083	(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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	7.93 mg/m ³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	15.53 mg/m ³

Relative total expanded uncertainty

Requirement of 2010/75/EU	U in % of the ELV 120 mg/m ³	12.9
Requirement of EN 15267-3	U in % of the ELV 120 mg/m ³	20.0
	U in % of the ELV 120 mg/m ³	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

Test laboratory	936/21219366/A TÜV Rheinland
Date of report	2013-09-19

Measured component

	SO ₂
Certification range	0 - 200 mg/m ³

Evaluation of the cross-sensitivity (CS)

(system with largest CS)

Sum of positive CS at zero point	0.00 mg/m ³
Sum of negative CS at zero point	-2.64 mg/m ³
Sum of positive CS at span point	5.10 mg/m ³
Sum of negative CS at span point	-8.00 mg/m ³
Maximum sum of cross-sensitivities	-8.00 mg/m ³
Uncertainty of cross-sensitivity	u _i -4.619 mg/m ³

Calculation of the combined standard uncertainty

Tested parameter

			u ²
Standard deviation from paired measurements under field conditions *	u _D	3.291 mg/m ³	10.831 (mg/m ³) ²
Lack of fit	u _{lof}	1.155 mg/m ³	1.334 (mg/m ³) ²
Zero drift from field test	u _{d,z}	0.346 mg/m ³	0.120 (mg/m ³) ²
Span drift from field test	u _{d,s}	-2.656 mg/m ³	7.054 (mg/m ³) ²
Influence of ambient temperature at span	u _t	2.452 mg/m ³	6.012 (mg/m ³) ²
Influence of supply voltage	u _v	0.947 mg/m ³	0.897 (mg/m ³) ²
Cross-sensitivity (interference)	u _i	-4.619 mg/m ³	21.333 (mg/m ³) ²
Influence of sample gas flow	u _p	0.722 mg/m ³	0.521 (mg/m ³) ²
Uncertainty of reference material at 70% of certification range	u _{rm}	1.617 mg/m ³	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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	7.12 mg/m ³
Total expanded uncertainty	U = u _c * k = u _c * 1.96	13.96 mg/m ³

Relative total expanded uncertainty

Requirement of 2010/75/EU

Requirement of EN 15267-3

U in % of the ELV 130 mg/m³	10.7
U in % of the ELV 130 mg/m³	20.0
U in % of the ELV 130 mg/m ³	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	electrochemical cell

Test report

Test laboratory	936/21219366/A TÜV Rheinland
Date of report	2013-09-19

Measured component

Certification range	O ₂ 0 - 25 Vol.-%
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Evaluation of the cross-sensitivity (CS)

(system with largest CS)

Sum of positive CS at zero point	0.00 Vol.-%
Sum of negative CS at zero point	0.00 Vol.-%
Sum of positive CS at span point	0.00 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 _b	-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

Requirement of 2010/75/EU	U in % of the range 25 Vol.-%	2.1
Requirement of EN 15267-3	U in % of the range 25 Vol.-%	10.0 **
	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.

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

Test laboratory	TÜV Rheinland
Date of report	2013-09-19

Measured component

Certification range	CO ₂	0 - 20 Vol.-%
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Evaluation of the cross-sensitivity (CS)

(system with largest CS)

Sum of positive CS at zero point	0.00	Vol.-%
Sum of negative CS at zero point	0.00	Vol.-%
Sum of positive CS at span point	0.60	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)

$$u_c = \sqrt{\sum (u_{max, j})^2} \quad 0.60 \text{ Vol.-%}$$

Total expanded uncertainty

$$U = u_c * k = u_c * 1.96 \quad 1.17 \text{ Vol.-%}$$

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**