

CERTIFICATE

of Product Conformity (QAL1)

Certificate No: 0000043103_02

Certified AMS: MGA 12 HR for CO, NO, SO₂ and O₂

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

Test Institute: TÜV Rheinland Energy & Environment 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 (2023), EN 15267-3 (2007)
as well as EN 14181 (2015).**

Certification is awarded in respect of the conditions stated in this certificate
(this certificate contains 10 pages).
The present certificate replaces certificate 0000043103_01 dated 5 August 2019.



Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

www.tuv.com
ID 0000043103

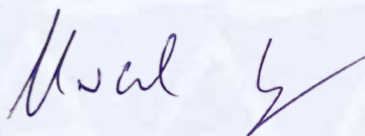
Publication in the German Federal Gazette
(BAnz) of 5 August 2014

German Environment Agency

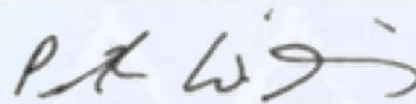
Dessau, 3 July 2024

This certificate will expire on:
4 August 2029

TÜV Rheinland Energy &
Environment GmbH
Cologne, 2 July 2024



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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 the certificate D-PL-11120-02-00.

Test report:	936/21219366/B dated 1 April 2014
Initial certification:	5 August 2014
Expiry date:	4 August 2029
Certificate:	Renewal (of previous certificate 0000043103_01 of 5 August 2019 valid until 4 August 2024)
Publication:	BAnz AT 05.08.2014 B11, chapter I No. 4.4

Approved application

The tested AMS is suitable for use at plants according to Directive 2010/75/EC, chapter III (combustion plants / 13th BImSchV:2013), Directive 2015/2193/EC (44th BImSchV:2019) 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 AMS for this application was assessed on the basis of a laboratory test and a 6 month field test at a power 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 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 936/21219366/B dated 1 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

Publication in the German Federal Gazette: BAnz AT 05.08.2014 B11, chapter I No. 4.4,
Announcement by UBA dated 17 July 2014:

AMS designation:

MGA12 HR for CO, NO, SO₂ and O₂

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 the performance test:

Component	Certification range	supplementary 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.-%

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 three months.

Test Institute:

TÜV Rheinland Energie und Umwelt GmbH, Cologne
Report No.: 936/21219366/B dated 1 April 2014

Publication in the German Federal Gazette: BAnz AT 26.08.2015 B4, Chap. V notification 32,
Announcement by UBA dated 22 July 2015:

**32 Notification as regards Federal Environment Agency (UBA) notice
of 17 July 2014 (BAnz AT 05.08.2014 B11, chapter I number 4.4)**

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

1.50.

Statement issued by TÜV Rheinland Energie und Umwelt GmbH
dated 18 February 201

Publication in the German Federal Gazette: BAnz AT 01.08.2016 B11, Chap. V notification 6,
Announcement by UBA dated 14 July 2016:

**6 Notification as regards Federal Environment Agency (UBA) notices
of 17 July 2014 (BAnz AT 05.08.2014 B11, chapter I number 4.4) and
of 22 July 2015 (BAnz AT 26.08.2015 B4, B11, chapter V notification 32)**

The GCU12 test gas cooler, which is used for the MGA12 HR measuring system
for CO, NO, SO₂ and O₂ manufactured by Dr. Födisch Umweltmesstechnik AG,
has been equipped with new electronics and display units. The new version of the
test gas cooler is called GCU16 (from S/N 17xxx) and may be used instead of the
previous version.

Statement issued by TÜV Rheinland Energy GmbH dated 27 April 2016

Certified product

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

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

The components CO, NO and SO₂ 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 a 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 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 & Environment 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 & Environment 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 & Environment 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 MGA 12 HR 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. 0000043103_00: 9 September 2014
Expiry date of the certificate: 4 August 2019
Test report: 936/21219366/B dated 1 April 2014
TÜV Rheinland Energie und Umwelt GmbH
Publication: BAnz AT 05.08.2014 B11, chapter I number 4.4
UBA announcement dated 17 July 2014

Notifications

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 18 February 2015
Publication: BAnz AT 26.08.2015 B4, chapter V notification 32
UBA announcement dated 22 July 2015
(Software changes)

Statement issued by TÜV Rheinland Energy GmbH dated 27 April 2016
Publication: BAnz AT 01.08.2016 B11, chapter V notification 6
UBA announcement dated 14 July 2016
(Design changes)

Renewal of certificates

Certificate No. 0000043103_01: 5 August 2019
Expiry date of the certificate: 4 August 2024

Renewal of certificates

Certificate No. 0000043103_02: 3. Juli 2024
Expiry date of the certificate: 4 August 2029

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

Measuring system

Manufacturer	Dr. Födisch Umweltmesstechnik AG
AMS designation	MGA 12 HR **
Serial number of units under test	12002 / 12003
Measuring principle	IR

Test report

Test laboratory	TÜV Rheinland
Date of report	2014-04-01

Measured component

Certification range	CO	0 - 125 mg/m ³
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Evaluation of the cross-sensitivity (CS)

(system with largest CS)

Sum of positive CS at zero point	0.00 mg/m 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	U in % of the ELV 80 mg/m ³	8.4
Requirement of EN 15267-3	U in % of the ELV 80 mg/m ³	10.0
	U in % of the ELV 80 mg/m ³	7.5

** During performance testing, the tests were carried out with the MGA12 measuring system.

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

Measuring system

Manufacturer	Dr. Födisch Umweltmesstechnik AG
AMS designation	MGA 12 HR **
Serial number of the candidates	12002 / 12003
Measuring principle	IR

Test report

Test laboratory	936/21219366/B TÜV Rheinland
Date of report	2014-04-01

Measured component

Certification range	NO 0 - 250 mg/m ³
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Evaluation of the cross sensitivity (CS)

(system with largest CS)

Sum of positive CS at zero point	0.00 mg/m 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_p	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)

$$u_c = \sqrt{\sum (u_{max, j})^2} \quad 7.93 \text{ mg/m}^3$$

Total expanded uncertainty

$$U = u_c * k = u_c * 1.96 \quad 15.53 \text{ mg/m}^3$$

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

** During performance testing, the tests were carried out with the MGA12 measuring system.

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

Measuring system

Manufacturer	Dr. Födisch Umweltmesstechnik AG
AMS designation	MGA 12 HR **
Serial number of units under test	12002 / 12003
Measuring principle	electrochemical cell

Test report

Test laboratory	936/21219366/B TÜV Rheinland
Date of report	2014-04-01

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

** During performance testing, the tests were carried out with the MGA12 measuring system.

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

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 HR **
Serial number of units under test	12002 / 12003
Measuring principle	IR

Test report

Test laboratory	936/21219366/B TÜV Rheinland
Date of report	2014-04-01

Measured component

Certification range	SO ₂ 0 - 200 mg/m ³
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Evaluation of the cross-sensitivity (CS)

(system with largest CS)

Sum of positive CS at zero point	0.00 mg/m 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	U in % of the ELV 130 mg/m ³	10.7
Requirement of EN 15267-3	U in % of the ELV 130 mg/m ³	20.0
	U in % of the ELV 130 mg/m ³	15.0

** During performance testing, the tests were carried out with the MGA12 measuring system.