Umwelt Bundesamt

TÜVRheinland®
Precisely Right.

CERTIFICATE

of Product Conformity (QAL1)

Certificate number: 0000001012_02

Certified AMS:	GMS810-FIDOR for TOC
Manufacturer:	SICK AG Poppenbütteler Bogen 9 b 22399 Hamburg Germany
Test Institute:	TÜV Rheinland Energy GmbH

This is to certify that the AMS has been tested and certified according to 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 7 pages).

TÜVRheinland® CERTIFIED

Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

www.tuv.com
ID 0000001012

Publication in the German Federal Gazette (BAnz.) of 02 March 2012

German Federal Environment Agency
Dessau, 22 July 2016

Dr. Marcel Langner
Head of Section II 4.1

This certificate will expire on:
28 July 2021

TÜV Rheinland Energy GmbH
Cologne, 21 July 2016

ppa. Dr. Peter Wilbring

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TÜV Rheinland Energy GmbH
Am Grauen Stein
51105 Köln

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

Test report:	936/21216085/B of 10 October 2011
Initial certification:	29 July 2011
Expiry date:	28 July 2021
Certificate	renewal (previous certificate 0000001012_01 dated from 16 March 2012 with validity up to the 28 July 2016)
Publication:	BAnz. 02 March 2012, no. 36, p. 920, chap. I, no. 2.1 and chap. V, notice 24

Approved application
The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13. BImSchV), at waste incineration plants according to Directive 2010/75/EU, chapter IV (17. BImSchV) 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 a seven-month field test at a waste incineration plant.

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 value 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 936/21216085/B of 10 October 2011 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. 02 March 2012, no. 36, p. 920, chap. I no 2.1
Announcement by UBA from 23 February 2012:

AMS name:
GMS810-FIDOR for TOC

Manufacturer:
SICK MAIHAK GmbH, Hamburg

Field of application:
For measurements at plants requiring official approval and plants according to 27th BImSchV

Measuring ranges during the suitability test:

Component	Certification range	Supplementary measurement ranges			Unit
TOC	0 - 15	0 - 50	0 - 150	0 – 500	mg/m³

Software version:
2.00a

Restrictions:
None

Notes:

1. The measurement system may be operated at supply voltages of 230 V as well as 110 V.
2. A three months period has been specified as maintenance interval.
3. In addition to the operation via an internal control and operating unit the AMS can also be operated by an external control and operating unit and is than labelled GMS811-FIDOR.
4. As an alternative probe type SFU-BF SPB can be used.
5. As an alternative gas cleaner type 6027504 for air conditioning can be used.
6. The AMS carries out a zero adjustment every 24 hours.
7. Additional testing (extension of maintenance interval, optional use of external control and operating units, optional probe and an optional gas cleaner) publication of Umweltbundesamt from 15 July 2011 (BAnz. p. 2725, chapter I, No. 2.1).

Test report:
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Report No.: 936/21216085/B of 10 October 2011

Publication in the German Federal Gazette: BAnz. 02 March 2012, no. 36, p. 920, chapter V notice 24, Announcement by UBA from 23 February 2012:

24 Notification on announcements of the Federal Environment Agency (UBA) of 15 July 2011 (BAnz. p. 2725, chapter I, number 2.1) and with regard to chapter I, number 2.1 of this publication

The construction of the FI-detector of the GMS810-FIDOR measuring system for TOC manufactured by SICK MAIHAK GmbH was optimised. The ceramic insulation is now coated with Teflon.

Statement of TÜV Rheinland Energie und Umwelt GmbH of 26 September 2011

Publication in the German Federal Gazette: BAnz AT 23.07.2013 B4, chapter V notice 12 [number 13], Announcement by UBA from 03 July 2013:

12 Notification on announcements of the Federal Environment Agency (UBA) regarding performance tested AMS manufactured by SICK MAIHAK GmbH

Lfd. Nr.	Measuring device / manufacturer;	Announcement	Notification	Statement test institute
…				
13	GMS810-FIDOR/ SICK MAIHAK GmbH	of 23 February 2012 (BAnz. p. 920, chapter I, number 2.1) and chapter V, notice 24	SICK MAIHAK GmbH merged with its parent company SICK AG as of 1 January 2013. The manufacturer is now registered as SICK AG.	TÜV Rheinland Energie und Umwelt GmbH vom 25 March 2013
…				

Publication in the German Federal Gazette: BAnz AT 14.03.2016 B7, chapter V notice 41, Announcement by UBA from 18 February 2016:

41 Notification on announcements of the Federal Environment Agency (UBA) of 23 February 2012 (BAnz. p. 920, chapter I number 2.1) and of 3 July 2013 (BAnz AT 23.07.2013 B4, chapter V 12. notice [No. 13])

The GMS810-FIDOR measuring system for TOC manufactured by SICK AG is marketed under the name GMS810-FIDORi with an internal catalyst for purging the instrument air. This instrument version does not require the use of an external catalyst. The maintenance interval of the measuring system GMS810-FIDORi is four weeks.
The measuring systems GMS810-FIDOR and GMS810-FIDORi may alternatively use the SP 180-H sampling probe manufactured by M&C TechGroup Germany GmbH.

The results of the verification for the new probe type and the instrument version GMS810-FIDORi with internal catalyst are presented in test report 936/21229847/B dated 21 January 2016, TÜV Rheinland Energie und Umwelt GmbH.

Statement of TÜV Rheinland Energie und Umwelt GmbH of 21 January 2016

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

The GMS810-FIDOR is used to determine TOC. For the determination of the concentration a flame ionisation detector is used. The FIDOR works extractive; this means the measuring gas is taken from the stack through a probe and carried to the AMS through a heated line.

The measuring system consists of:

1. Probe type M&C SP2000-H
2. Heated line, length 2 - 70 m (for a length of > 35 m two control units for the heating have to be used). The length of the heated line during field test was 35 m, in the laboratory test the t_{90} time was determined for a length of 2 m and 70 m.
3. Gas cleaner GR 3010 E
4. GMS810-FIDOR Analyzer

The following options are available for the AMS as well:

1. Probe type SFU-BF SPB and SP 180-H,
2. Catalyzer 6027504 for gas cleaning,
3. Operation via external BCU (labeling in this case GMS 811-FIDOR),
4. Operation via external SCU (labeling in this case GMS 811-FIDOR).
5. Operation with internal catalyzer (labeling in this case GMS 810-FIDORi).

The system operates with a 24 hour zero point adjustment.

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 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 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**.

Certification of GMS810-FIDOR for TOC 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. 0000001012: 19 August 2011
Expiry date of the certificate: 28 July 2016

Test report: 936/21216085/A of 25 March 2011
TÜV Rheinland Energie und Umwelt GmbH, Cologne

Publication: BAnz. 29 July 2011, No. 113, p. 2725, Chapter I No. 2.1

Announcement by UBA from 15 July 2011

Supplementary testing according to EN 15267

Certificate No. 0000001012_01: 16 March 2012
Expiry date of the certificate: 28 July 2016

Test report: 936/21216085/B of 10 October 2011
TÜV Rheinland Energie und Umwelt GmbH, Köln
Publication: BAnz. 02 March 2012, No. 36, p. 920, chapter I, No. 2.1 and
chapter V, notification 24
Announcement by UBA from 23 February 2012

Notifications according to EN 15267

Statement of TÜV Rheinland Energie und Umwelt GmbH of 26 September 2011
Publication: BAnz. page 920, chapter V notification 24
Announcement by UBA from 23 February 2012
(hardware changes)

Statement of TÜV Rheinland Energie und Umwelt GmbH of 25 March 2013
Publication: BAnz. AT 23.07.2013 B4, chapter V notification 12 [number 13]
Announcement by UBA from 03 July 2013
(renaming of manufacturer)

Statement and test report 936/21229847/B
of TÜV Rheinland Energie und Umwelt GmbH of 21 January 2016
Publication in the German Federal Gazette: BAnz AT 14.03.2016 B7, chapter V notice 41
Announcement by UBA from 18 February 2016

Renewal of the certificate

Certificate No. 0000001012_02: 22 July 2016
Expiry date of the certificate: 28 July 2021

Calculation of overall uncertainty for QAL1 in EN 14181 and EN 15267-3

Manufacturer data

Manufacturer	SICK MAIHAK GmbH
Name of measuring system	GMS810-FIDOR
Serial Number	00823523 / 00823524
Measuring Principle	FID

TÜV Data

Approval Report	936/21216085/B / 2011-08-12
Editor	Steinhagen
Date	2011-08-03

Measurement Component	TOC
Certificated range	15 mg/m³

Evaluation of the cross sensitivity (CS)

Sum of positive CS at zero point	0.17 mg/m³
Sum of negative CS at zero point	0.00 mg/m³
Sum of postive CS at reference point	0.00 mg/m³
Sum of negative CS at reference point	-0.44 mg/m³
Maximum sum of cross sensitivities	-0.44 mg/m³
Uncertainty of cross sensitivity	-0.25 mg/m³

Calculation of the combined standard uncertainty

Test Value		u	u²
Standard deviation from paired measurements under field conditions *	u_D	0.033 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	$u_{d,z}$	-0.190 mg/m³	0.036 (mg/m³)²
Span drift from field test	$u_{d,s}$	-0.249 mg/m³	0.062 (mg/m³)²
Influence of ambient temperature at span	u_t	0.046 mg/m³	0.002 (mg/m³)²
Influence of supply voltage	u_v	0.083 mg/m³	0.007 (mg/m³)²
Cross sensitivity (interference)	u_i	-0.254 mg/m³	0.064 (mg/m³)²
Influence of sample gas flow	u_p	-0.047 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
Variation of response factors (TOC)	u_{rf}	0.000 mg/m³	0.000 (mg/m³)²

* The bigger value of: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.44 mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.86 mg/m³

Relative total expanded uncertainty	**U in % of the ELV 10 mg/m³**	**8.6**
Requirement of 2000/76/EC and 2001/80/EC	**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