Umwelt Bundes Amt
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CERTIFICATE

about Product Conformity (QAL1)

Number of Certificate: 0000001012

Certified AMS:	GMS810-FIDOR for TOC
Manufacturer:	SICK MAIHAK GmbH Poppenbütteler Bogen 9b 22399 Hamburg Germany
Test Institute:	TÜV Rheinland Energie und Umwelt GmbH

This is certifying 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).

www.tuv.com TÜVRheinland ID: 0000001012

- EN 15267-3 tested
- QAL1 certified
- TUV approved
- Annual inspection

Publication in the German Federal Gazette (BAnz.) of 29 July 2011

The certificate is valid until: 28 July 2016

Umweltbundesamt
Dessau, 19 August 2011

i. A. Dr. Hans-Joachim Hummel

TÜV Rheinland Energie und Umwelt GmbH
Köln, 17 August 2011

ppa. Dr. Peter Wilbring

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Accreditation according to EN ISO/IEC 17025 and certified according to ISO 9001:2008.	

Umwelt Bundes Amt
For our Environment

Certificate:
0000001012 / 19 August 2011

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Test report:	936/21216085/A of 25 March 2011
First certification:	29 July 2011
Run of validity until:	28 July 2016
Publication	BAnz. 29 July 2011, No 113, page 2725, chapter I, No 2.1

Authorised application
The tested AMS is suitable for the use at combustion plants according to EC directive 2001-80-EC, at waste incinerations plants according to EC directive 2000-76-EC and other plants requiring official permission. The tested measurement 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 municipal waste incinerator. The AMS is authorised for the ambient temperature range from +5 °C to +40 °C.

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

Basis of the certification
This certification is based on:

- test report 936/21216085/A of 25 March 2011 of TÜV Rheinland Energie und Umwelt GmbH
- suitability announced by the German Environmental Agency (UBA) as relevant body
- the ongoing surveillance of the product and the manufacturing process
- publication in the German Federal Gazette (BAnz. 29 July 2011, No 113, page 2725, chapter I, No 2.1: UBA publication from 15 July 2011)

AMS name:
GMS810-FIDOR for TOC

Manufacturer:
SICK MAIHAK GmbH, Hamburg

Suitability:
Measurements at plants requiring official permission (i. e. 2000-76-EC, waste incineration directive and 2001-80-EC, large combustion plants directive).

Measurement 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

Notices:
1. The measurement system may be operated at supply voltages of 230 V as well as 110 V.
2. A four weeks period has been specified as maintenance interval.

Test report:
TÜV Rheinland Energie und Umwelt GmbH, Köln
Report No.: 936/21216085/A of 25 March 2011

Certified product
This certificate applies to automatic measurement systems confirming 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 out 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 system operates with a 24 hour zero point adjustment.

General notes
This certificate is based upon the equipment tested. The manufacturer is responsible for a long-lasting compliance of the ongoing production process with the requirements of EN 15267. The manufacturer is obliged to maintain a certified quality management system to control the production of the certified product. Both product and quality management system 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 given address on page 1.

The certification mark with the product specific ID-Number that can be applied to the product or used in publicity material for the certified product is presented on page 1 of this certificate.

This document as well as the certification mark remain property of TÜV Rheinland Energie und Umwelt GmbH. Upon revocation of the announcement the certificate loses validity. After expiration of the validity of the certificate or on request of the TÜV Rheinland Energie und Umwelt GmbH this document shall be returned and the certification mark shall longer be used.

The current version of this certificate and its validity is also listed at the Internet Address: **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 of: 19 August 2011

Validity of the certificate: 28 July 2016

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

Publication: BAnz. 29 July 2011, No 113, p. 2725, chapter I No 2.1:
Announcement by UBA from 15 July 2011.

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/A / 2011-03-25
Editor	Steinhagen
Date	2011-03-25
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