Umwelt Bundesamt

TÜVRheinland®
Precisely Right.

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000035015_04

AMS designation:	MERCEM 300Z for Hg
Manufacturer:	SICK AG Nimburger Straße 11 79276 Reute 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 EN14181 (2014).

Certification is awarded in respect of the conditions stated in this certificate (this certificate contains 13 pages).
The present certificate replaces certificate 0000035015_03 of 28 February 2017.

TÜVRheinland® CERTIFIED

Suitability Tested
EN 15267
QAL1 Certified
Regular Surveillance

www.tuv.com
ID 0000035015

Publication in the German Federal Gazette (BAnz) of 05 March 2013

This certificate will expire on:
01 March 2027

German Federal Environment Agency
Dessau, 16 February 2022

TÜV Rheinland Energy GmbH
Cologne, 15 February 2022

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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:	936/21216054/C of 30 June 2012
Initial certification:	16 March 2012
Expiry date:	01 March 2027
Certificate	Renewal (of previous certificate 0000035015_03 of 28 February 2017 valid until 01 March 2022)
Publication:	BAnz AT 05.03.2013 B10, chapter I number 2.3

Approved application

The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13th BImSchV), chapter IV (17th BImSchV), 30th BImSchV, plants in compliance with TA Luft, plants according to the 27th BImSchV and other plants requiring official approval. 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 twelve-month field test at a municipal waste incinerator, a three-month field test at a mineral coal power plant with use of derived fuels and a one-month field test at a cement kiln with use of secondary fuel.

The AMS MERCEM 300Z is approved for an ambient temperature range of: -20° to +50°C and the the MERCEM300Z Indoor is approved for an ambient temperature range of +5° 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 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 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 936/21216054/C of 30 June 2012
  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 05.03.2013 B10, chapter I number 2.3, UBA announcement dated 12 February 2013:

AMS designation:
MERCEM300Z for Hg

Manufacturer:
SICK MAIHAK GmbH, Meersburg

Field of application:
For plants requiring official approval and for plants according to the 27th BImSchV

Measuring ranges during performance testing:

Component	Certification range	Supplementary measuring ranges			Unit
Hg	0 - 10	0 - 45	0 - 100	0 - 1000	µg/m³

Software version:
9162140 VL27

Restrictions:
None

Notes:

1. Wet test gas is to be used when testing the measuring equipment.
2. The maintenance interval is three months.
3. A suitable Hg test gas generator, e.g. of the HovaCal type, must be used for span point control of Hg. Optionally, the measuring system can also be operated with an internal test gas generator; an external test gas generator can then be dispensed with. An internal Hg cuvette is available for short-term system checks, but its data cannot be used for QAL3 purposes.
4. The length of the sample gas line in the field test was between 5 and 35 m.
5. Supplementary testing (approval of an additional plant of application) to Federal Environmental Agency notice of 06 July 2012 (Federal Gazette (BAnz.) AT 20 July 2012 B11, chapter I number 2.3).

Test Report:
TÜV Rheinland Energy GmbH, Cologne
Report no.: 936/21216054/C of 30 June 2012

Publication in the German Federal Gazette: BAnz AT 23.07.2013 B4, chapter V
12th notification, UBA announcement dated 03 July 2013:

12 Notification as regards Federal Environment Agency (UBA) notices regarding performance tested measuring system manufactured by SICK SICK MAIHAK GmbH

Serial No.	Measuring system/ manufacturer	Announcement	Notification	Statement test institute
…				
4	MERCEM 300Z/ SICK MAIHAK GmbH	of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter I number 2.3)	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 of 25 March 2013
…				

Publication in the German Federal Gazette: BAnz AT 05.08.2014 B11, chapter V
14th notification, UBA announcement dated 17 July 2014:

14 Notification as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter I number 2.3) and of 03 July 2013 (BAnz AT 23.07.2013 B4, chapter V 12th notification [Number 4])

For the MERCEM300Z measuring system for monitoring Hg manufactured by SICK AG an additional type designated as MERCEM300Z Indoor has been approved. This type may be used in the temperature range +5 °C to 40 °C

The current software version for both types is: 9162140 XS73

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 28 March 2014

Publication in the German Federal Gazette: BAnz AT 26.08.2015 B4, chapter V
5th notification, UBA announcement dated 22 July 2015:

5 Notification as regards Federal Environment Agency (UBA) notice of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter I number 2.3) and of 17 July 2014 (BAnz AT 05.08.2014 B11, chapter V 14th notification)

The current software version for the MERCEM300Z measuring system for Hg manufactured by SICK AG is: 9162140 YDU4.

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 27 March 2015

Publication in the German Federal Gazette: BAnz AT 14.03.2016 B7, chapter V
33rd notification, UBA announcement dated 18 February 2016:

33 Notification as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter I number 2.3) and of 22 July 2015 (BAnz AT 26.08.2015 B4, chapter V 5th notification)

The current software version for the MERCEM300Z measuring system for Hg manufactured by SICK AG is:

2061514 – YBR3.

Statement issued by TÜV Rheinland Energie und Umwelt GmbH
dated 21 October 2015

Publication in the German Federal Gazette: BAnz AT 01.08.2016 B11, chapter IV
2nd correction, UBA announcement dated 14 July 2016:

2 Correction of Federal Environmental Agency (UBA) notice of 17 July 2014 (BAnz AT 05.08.2014 B11, chapter V 14th notification)

The aforementioned notice related to the MERCEM300Z and the MERCEM300Z Indoor measuring system for the determination of Hg manufactured by SICK AG states an incorrect date for the statement issued by TÜV Rheinland Energie und Umwelt GmbH; the correct date is 26 May 2014 (instead of 28 March 2014).

Publication in the German Federal Gazette: BAnz AT 01.08.2016 B11, chapter V
17th notification, UBA announcement dated 14 July 2016:

17 Notification as regards Federal Environmental Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter I number 2.3) and of 18 February 2016 (BAnz AT 14.03.2016 B7 chapter V 33rd notification)

The current software version of the MERCEM300Z and MERCEM300Z Indoor measuring systems for Hg manufactured by SICK AG is:
9162140 YOT8.

Statement issued by TÜV Rheinland Energy GmbH dated 17 May 2016

Publication in the German Federal Gazette: BAnz AT 31.07.2017 B12, chapter II
23rd notification, UBA announcement dated 13 July 2017:

23 Notification as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter I number 2.3) and of 14 July 2016 (BAnz AT 01.08.2016 B11, chapter V 17th notification)

The current software version of the MERCEM300Z and MERCEM300Z Indoor measuring systems for Hg manufactured by SICK AG is: 9191790 0000.

The new display software has the number 2061514 YZV0.

The production site for the measuring system is now:

SICK AG, Rengoldshauser Str. 17a, 88662 Überlingen, Germany

Statement issued by TÜV Rheinland Energy GmbH dated 8 March 2017

Publication in the German Federal Gazette: BAnz AT 26.03.2018 B8, chapter V
41st notification, UBA announcement dated 21 February 2018:

41 Notification as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter I number 2.3) and of 13 July 2017 (BAnz AT 31.07.2017 B12, chapter II 23rd notification)

The current software version of the MERCEM300Z and MERCEM300Z Indoor measuring systems for Hg manufactured by SICK AG is:

9191790 YXF0.

The new display software has the number 2061514 YZV0.

Statement issued by TÜV Rheinland Energy GmbH dated 26 January 2018

Publication in the German Federal Gazette: BAnz AT 17.07.2018 B9, chapter III
24th notification, UBA announcement dated 3 July 2018:

24 Notification as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter I number 2.3) and of 13 July 2017 (BAnz AT 31.07.2017 B12, chapter II 23rd notification)

The measuring systems MERCEM300Z and MERCEM300Z Indoor for Hg manufactured by SICK AG are equipped with the digital interface Modbus (TCP/IP) according to VDI 4201 parts 1 and 3 starting with the software version 9191789_ZS08.

The results of the tests are presented in test report 936/21242227/B of 2nd May, 2018 by TÜV Rheinland Energy GmbH.

The current software version is 9191789_ZS08.

The following software versions can also be used:

9191789_YXF0 und 9159349_YZE7.

Statement issued by TÜV Rheinland Energy GmbH dated 2 May 2018

Publication in the German Federal Gazette: BAnz AT 31.07.2020 B10, chapter II
19th notification, UBA announcement of 27 May 2020

19 Notification as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter I number 2.3) and of 21 February 2018 (BAnz AT 26.03.2018 B8, chapter V 40th notification)

The current software version of the MERCEM300Z and MERCEM300Z Indoor measuring systems for Hg manufactured by SICK AG is now:

9191789_13PW

Furthermore, software version 9159349_ZSJ4 may be used for this instrument.

Statement issued by TÜV Rheinland Energy GmbH dated 10 March 2020

Publication in the German Federal Gazette: BAnz AT 03.05.2021 B9, chapter III
55th notification, UBA announcement dated 31 March 2021:

55 Notification as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter I number 2.3) and of 27 May 2020 (BAnz AT 31.07.2020 B10, chapter II 19th notification)

The current software version of the MERCEM300Z and MERCEM300Z Indoor measuring systems for Hg manufactured by SICK AG is now:

9159349_14TH

Statement issued by TÜV Rheinland Energy GmbH dated 18 September 2020

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

The test gas of the MERCEM300Z measuring system is taken from the waste gas duct by means of a special sampling probe heated to 200 °C. The heated sample gas line has two inner cores. Waste gas is transported to the analyser by means of the first inner core. The second inner core is used to feed zero and test gas - the feed into the system takes place in the gas sampling probe.

The Hg analysis is carried out in a UV photometer. The conversion of all mercury present in the waste gas takes place thermally directly in the analysis cell at approx. 1000 °C. The Zeeman effect is used for cross-sensitivity compensation. The gas is pumped according to the ejector pump principle.

The MERCEM300Z measuring system has an integrated air conditioning unit and is suitable for outdoor installation at temperatures from -20 °C to 50 °C. The operating unit of the measuring system is integrated in the door and has an Ethernet interface for data communication.

The MERCEM300Z measuring system consists of:

- the sampling probe heated to 200 °C with heated filter element and test gas feed options,
- the sampling line heated to 200 °C with two inner cores (line lengths of 5 to 35 m were used in the field test, 5 m in the laboratory test),
- the analysis cabinet with photometer unit including adjustment cuvette, optional test gas generator, the control electronics and data output and the software 9162140 YOT8.

The measuring system is also available without an integrated air conditioning unit under the designation MERCEM300Z Indoor and is suitable for the ambient temperature range from 5 °C to 40 °C. The design of the MERCEM300Z Indoor measuring system inside the cabinet does not change due to the different housing variant, and the operation via the display also remains unchanged. The protection class of the housing for the MERCEM 300Z Indoor measuring system is IP 43 (MERCEM300Z: IP55).

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 MERCEM 300Z / indoor 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. 0000035015_00: 16 March 2012
Expiry date of the certificate: 01 March 2017
Test report: 936/21216054/A of 19 October 2011
TÜV Rheinland Energie und Umwelt GmbH
Publication: BAnz. 02 March 2012, no. 36, p. 920, chapter I number 3.2
UBA announcement dated 23 February 2012

Supplementary testing according to EN 15267

Certificate no. 0000035015_01: 20 August 2012
Expiry date of the certificate: 01 March 2017
Test report: 936/21216054/B of 19 March 2012
TÜV Rheinland Energie und Umwelt GmbH
Publication: BAnz AT 20.07.2012 B11, chapter I number 2.3
UBA announcement dated 06 July 2012

Certificate no. 0000035015_02: 22 March 2013
Expiry date of the certificate: 01 March 2017
Test report: 936/21216054/C of 30 September 2012
TÜV Rheinland Energie und Umwelt GmbH
Publication: BAnz AT 05.03.2013 B10, chapter I number 2.3
UBA announcement dated 12 February 2013

Notifications according to EN 15267
Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 25 March 2013
Publication: BAnz AT 23.07.2013 B4, chapter V notification 12
UBA announcement dated 03 July 2013
(Manufacturer previously SICK MAY GmbH)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 26 May 2014
Publication: BAnz AT 05.08.2014 B11, chapter V notification 14
UBA announcement dated 17 July 2014
(new instrument version)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 27 March 2015
Publication: BAnz AT 26.08.2015 B4, chapter V notification 5
UBA announcement dated 22 July 2015
(New instrument version)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 21 October 2015
Publication: BAnz AT 14.03.2016 B7, chapter V notification 33
UBA announcement dated 18 February 2016
(Software updates)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 14 July 2016
Publication: BAnz AT 01.08.2016 B11, chapter IV notification 2
UBA announcement dated 14 July 2016
(Correction of date)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 17 May 2016
Publication: BAnz AT 01.08.2016 B11, chapter V notification 17
UBA announcement dated 14 July 2016
(Software updates)

Renewal of the certificate

Certificate no. 0000035015_03: 28 February 2017
Expiry date of the certificate: 01 March 2022

Notifications according to EN 15267
Statement issued by TÜV Rheinland Energy GmbH dated 08 March 2017
Publication: BAnz AT 31.07.2017 B12, chapter II notification 23
UBA announcement dated 13 July 2017
(Software updates)

Statement issued by TÜV Rheinland Energy GmbH dated 26 January 2018
Publication: BAnz AT 26.03.2018 B8, chapter V notification 41
UBA announcement dated 21 February 2018
(Software updates)

Statement issued by TÜV Rheinland Energy GmbH dated 02 May 2018
Test report: 936/21242227/B of 02 May 2018
Publication: BAnz AT 17.07.2018 B9, chapter III notification 24
UBA announcement dated 3 July 2018
(Software updates)

Statement issued by TÜV Rheinland Energy GmbH dated 10 March 2020
Publication: BAnz AT 31.07.2020 B10, chapter II notification 19
UBA announcement of 27 May 2020
(Software updates)

Statement issued by TÜV Rheinland Energy GmbH dated 18 September 2020
Publication: BAnz AT 03.05.2021 B9, chapter III notification 55
UBA announcement dated 31 March 2021
(Software updates)

Renewal of the certificate

Certificate no. 0000035015_04:	16 February 2022
Expiry date of the certificate:	01 March 2027

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

Measuring system			
Manufacturer	SICK Maihak GmbH		
Name of measuring system	MERCEM300Z		
Serial number of the candidates	TÜV 1 / TÜV 2		
Measuring principle	UV-Absorption / Zeemann Effect		
Test report	936/21216054/A		
Test laboratory	TÜV Rheinland		
Date of report	2011-10-19		
Measured component	Hg		
Certification range	0 - 10	µg/m³	

Evaluation of the cross sensitivity (CS)			
(system with largest CS)			
Sum of positive CS at zero point	0.00	µg/m³	
Sum of negative CS at zero point	-0.12	µg/m³	
Sum of postive CS at reference point	0.06	µg/m³	
Sum of negative CS at reference point	-0.22	µg/m³	
Maximum sum of cross sensitivities	-0.22	µg/m³	
Uncertainty of cross sensitivity	-0.127	µg/m³	

Calculation of the combined standard uncertainty

Tested parameter		u		u²	
Standard deviation from paired measurements under field conditions *	u_D	0.138	µg/m³	0.019	(µg/m³)²
Lack of fit	u_{lof}	-0.046	µg/m³	0.002	(µg/m³)²
Zero drift from field test	$u_{d,z}$	0.169	µg/m³	0.029	(µg/m³)²
Span drift from field test	$u_{d,s}$	0.173	µg/m³	0.030	(µg/m³)²
Influence of ambient temperature at span	u_t	0.101	µg/m³	0.010	(µg/m³)²
Influence of supply voltage	u_v	0.055	µg/m³	0.003	(µg/m³)²
Cross sensitivity (interference)	u_i	-0.127	µg/m³	0.016	(µg/m³)²
Influence of sample gas flow	u_p	-0.109	µg/m³	0.012	(µg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.081	µg/m³	0.007	(µg/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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.36	µg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.70	µg/m³

Relative total expanded uncertainty	**U in % of the ELV 30 µg/m³**	**2.3**
Requirement of 2000/76/EC and 2001/80/EC	**U in % of the ELV 30 µg/m³**	**40.0**
Requirement of EN 15267-3	U in % of the ELV 30 µg/m³	30.0