Umwelt Bundesamt

TÜVRheinland®
Precisely Right.

CERTIFICATE

of Product Conformity (QAL1)

Certificate No: 0000056507_02

Certified AMS:	GM32 LowNOx GMP for NO and SO_2
Manufacturer:	SICK AG Gisela Sick Straße 1 79276 Reute Germany
Test Institute:	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 9 pages).
The present certificate replaces certificate 0000056507_01 dated 04 September 2018.

TÜVRheinland® CERTIFIED

Suitability Tested
EN 15267
QAL1 Certified
Regular Surveillance

www.tuv.com
ID 0000056507

Publication in the German Federal Gazette (BAnz) of 17 July 2018

German Environment Agency
Dessau, 22 March 2023

This certificate will expire on:
25 March 2028

TÜV Rheinland Energy GmbH
Cologne, 21 March 2023

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

10/221.2.08

Test report:	936/21239647/B dated 04 March 2018
Initial certification:	26 March 2018
Expiry date:	25 March 2028
Certificate:	Renewal (of previous certificate 0000056507_01 of 04 September 2018 valid until 25 March 2023)
Publication:	BAnz AT 17.07.2018 B9, chapter I No. 4.1

Approved application
The tested AMS is suitable for use at plants according to Directive 2010/75/EC, chapter III (13th BImSchV:2017), chapter IV (17th BImSchV:2013), Directive 2015/2193/EC (44th BImSchV:2021), 30th BImSchV:2017, TA-Luft:2002 and 27th BImSchV:2013. 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 waste incineration.

The AMS is approved for an ambient temperature range of -20° to +50°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 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 936/21239647/B dated 04 March 2018 of TÜV Rheinland Energy 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 17.07.2018 B9, chapter I No. 4.1, Announcement by UBA dated 03 July 2018:

AMS designation:
GM32 LowNO$_x$ GMP for NO and SO_2

Manufacturer:
SICK AG, Reute

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
SO_2	0 – 75	0 – 1000 *	0 – 2500	mg/m³·m
NO	0 – 70	0 – 700 *	0 – 1302	mg/m³·m

* at 1 m measurement path length

Software versions:
9246548_YXI6_160914

Operating software:
SOPAS ET 3.2.4

Restrictions:
none

Notes:
1. The maintenance interval is three months.
2. The vibration test was performed with a two-meter long GMP measuring probe.
3. Supplementary testing (extension of the maintenance interval) as regards Federal Environment Agency (UBA) notice of 21 February 2018 (BAnz AT 26.03.2018 B8, chapter I number 3.3).

Test Report:
TÜV Rheinland Energy GmbH, Cologne
Report no.: 936/21239647/B dated 4 March 2018

Publication in the German Federal Gazette: BAnz AT 26.03.2019 B7, chap. IV notification 56, Announcement by UBA dated 27 February 2019:

56 Notification as regards Federal Environment Agency (UBA) notice of 3 July 2018 (BAnz AT 17.07.2018 B9, chapter I number 4.1)

The current software version of the GM32 LowNO_x GMP for NO and SO_2 manufactured by SICK AG is
9246548_PI10

In addition, the following software versions have been approved for this instrument version:
9246548_Z827, 9246548_ZIF4 and 9246548_ZL44

Statement issued by TÜV Rheinland Energy GmbH dated 8 October 2018

Publication in the German Federal Gazette: BAnz AT 22.07.2019 B8, chap. VI correction 3, Announcement by UBA dated 28 June 2019:

3 Correction as regards Federal Environment Agency (UBA) notice of 27 February 2019 (BAnz AT 26.03.2019 B7, chapter IV correction 56)

The information on the latest software version of the GM32 Low NO_x GMP measuring system for NO and SO_2 manufactured by SICK AG given in the notice cited above is incorrect. The latest software version of the measuring system is:
9245976_10PI
The software version 9246548_PI10 incorrectly published is not relevant.

Statement issued by TÜV Rheinland Energy GmbH dated 1 March 2019

Publication in the German Federal Gazette: BAnz AT 03.05.2021 B9, chap. III notification 51, Announcement by UBA dated 31 March 2021:

51 Notification as regards Federal Environment Agency (UBA) notices of 3 July 2018 (BAnz AT 17.07.2018, chapter I number 4.1) and of 28 June 2019 (BAnz AT 22.07.2019 B8, chapter IV correction 3)

The latest software version of the GM32 LowNO_x GMP measuring system for NO and SO_2 manufactured by SICK AG is:
9245976_Z180.

Statement issued by TÜV Rheinland Energy GmbH dated 18 September 2020

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

The GM32 LowNOx GMP In-Situ gas analyser continuously measures the concentration of NO and SO_2 in gas ducts.
The GM32 LowNOx in-situ gas analyser, GMP measuring probe version, relies on the in-situ technology with direct opto-electronic measurement. Measured values are collected directly and contactless in the gas flow via an open measurement path of the GMP measuring probe which extends into the duct.

The AMS tested here comprises the following components:
- Sender/receiver unit (SR unit)
- GMP measuring probe
- Purge air attachment for SR unit and reflector
- SLV4 purge air unit for SR unit and reflector
- Connection unit c/w I/O modules
- SICK SOPAS ET parameterisation software
- Heated filter box

Active measurement path length, measuring gap and factors

Measuring gap in mm	Factor for the upper limit of measurement (ULM)	Probe lengths available in mm (nominal)
250	ULM * 4	900, 1500, 2000, 2500
500	ULM * 2	1500, 2000, 2500
750	ULM * 1.333	1500, 2000, 2500
1000	ULM * 1	1500, 2000, 2500
1250	ULM * 0.8	2000, 2500
1500	ULM * 0.666	2000, 2500
1750	ULM * 0.571	2500

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 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 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**.

History of documents
Certification of GM32 LowNO$_x$ GMP 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. 0000056507_00: 13 April 2018
Expiry date of the certificate: 25 March 2023
Test report 936/21239647/A dated 4 October 2017
TÜV Rheinland Energy GmbH
Publication BAnz AT 26.03.2018 B8, chapter I number 3.3
UBA announcement dated 21 February 2018

Supplementary testing according to EN 15267
Certificate No. 0000056507_01: 04 September 2018
Expiry date of the certificate: 25 March 2023
Test report 936/21239647/B dated 4 March 2018
TÜV Rheinland Energy GmbH
Publication BAnz AT 17.07.2018 B9, chapter I number 4.1
UBA announcement dated 3 July 2018

Notifications
Statement issued by TÜV Rheinland Energy GmbH dated 8 October 2018
Publication BAnz AT 26.03.2019 B7, chapter IV notification 56
UBA announcement dated 27 February 2019
(Software changes)

Correction
Statement issued by TÜV Rheinland Energy GmbH dated 1 March 2019
Publication BAnz AT 22.07.2019 B8, chapter VI correction 3
UBA announcement dated 28 June 2019
(Correction software version)

Notifications
Statement issued by TÜV Rheinland Energy GmbH dated 18 September 2020
Publication BAnz AT 03.05.2021 B9, chapter III notification 51
UBA announcement dated 31 March 2021
(Software changes)

Renewal of certificate
Certificate No. 0000056507_02: 22 March 2023
Expiry date of the certificate: 25 March 2028

Umwelt Bundesamt

Certificate:
0000056507_02 / 22 March 2023

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

Measuring system			
Manufacturer		Sick AG	
AMS designation		GM32 LowNOx GMP	
Serial number of units under test		16308009 / 16308010 / 16278029 / 16278030	
Measuring principle		DOAS	
Test report		936/21239647/A	
Test laboratory		TÜV Rheinland	
Date of report		2017-10-04	
Measured component		NO	
Certification range		0 - 70	mg/m³

Evaluation of the cross-sensitivity (CS)
(system with largest CS)

Sum of positive CS at zero point		0.45	mg/m³
Sum of negative CS at zero point		0.00	mg/m³
Sum of postive CS at span point		1.69	mg/m³
Sum of negative CS at span point		-1.97	mg/m³
Maximum sum of cross-sensitivities		-1.97	mg/m³
Uncertainty of cross-sensitivity	u_i	-1.136	mg/m³

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.476	mg/m³	0.227	(mg/m³)²
Lack of fit	u_{lof}	-0.287	mg/m³	0.082	(mg/m³)²
Zero drift from field test	$u_{d,z}$	-0.121	mg/m³	0.015	(mg/m³)²
Span drift from field test	$u_{d,s}$	-0.606	mg/m³	0.367	(mg/m³)²
Influence of ambient temperature at span	u_t	0.153	mg/m³	0.023	(mg/m³)²
Influence of supply voltage	u_v	0.074	mg/m³	0.005	(mg/m³)²
Cross-sensitivity (interference)	u_i	-1.136	mg/m³	1.290	(mg/m³)²
Influence of sample gas pressure	u_p	0.785	mg/m³	0.616	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.566	mg/m³	0.320	(mg/m³)²
Excursion of measurement beam	u_{mb}	0.370	mg/m³	0.137	(mg/m³)²

* The larger value is used :
"Repeatability standard deviation at set point" or
"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max,j})^2}$	1.76	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	3.44	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 50 mg/m³**	**6.9**
Requirement of 2010/75/EU	**U in % of the ELV 50 mg/m³**	**20.0**
Requirement of EN 15267-3	U in % of the ELV 50 mg/m³	15.0

Certificate:
0000056507_02 / 22 March 2023

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

Measuring system			
Manufacturer		Sick AG	
AMS designation		GM32 LowNOx GMP	
Serial number of units under test		16308009 / 16308010 / 16278029 / 16278030	
Measuring principle		DOAS	
Test report		936/21239647/A	
Test laboratory		TÜV Rheinland	
Date of report		2017-10-04	
Measured component		SO_2	
Certification range		0 - 75	mg/m³
Evaluation of the cross-sensitivity (CS)			
(system with largest CS)			
Sum of positive CS at zero point		0.00	mg/m³
Sum of negative CS at zero point		0.00	mg/m³
Sum of postive CS at span point		1.66	mg/m³
Sum of negative CS at span point		0.00	mg/m³
Maximum sum of cross-sensitivities		1.66	mg/m³
Uncertainty of cross-sensitivity	u_i	0.957	mg/m³

Calculation of the combined standard uncertainty

Tested parameter				u^2	
Standard deviation from paired measurements under field conditions *	u_D	0.417	mg/m³	0.174	(mg/m³)²
Lack of fit	u_{lof}	-0.342	mg/m³	0.117	(mg/m³)²
Zero drift from field test	$u_{d,z}$	0.173	mg/m³	0.030	(mg/m³)²
Span drift from field test	$u_{d,s}$	-0.303	mg/m³	0.092	(mg/m³)²
Influence of ambient temperature at span	u_t	0.473	mg/m³	0.224	(mg/m³)²
Influence of supply voltage	u_v	0.139	mg/m³	0.019	(mg/m³)²
Cross-sensitivity (interference)	u_i	0.957	mg/m³	0.916	(mg/m³)²
Influence of sample gas pressure	u_p	0.853	mg/m³	0.728	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.606	mg/m³	0.368	(mg/m³)²
Excursion of measurement beam	u_{mb}	0.337	mg/m³	0.114	(mg/m³)²

* The larger value is used :
"Repeatability standard deviation at set point" or
"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_C)	$u_c = \sqrt{\sum (u_{max\ j})^2}$	1.67	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	3.27	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 50 mg/m³**	**6.5**
Requirement of 2010/75/EU	**U in % of the ELV 50 mg/m³**	**20.0**
Requirement of EN 15267-3	U in % of the ELV 50 mg/m³	15.0