

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000056507_01

AMS designation: GM32 LowNO_x GMP for NO and SO₂

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 certified
according to 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 7 pages).

The present certificate replaces certificate 0000056507 of 13 April 2018.



Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

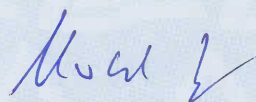
www.tuv.com
ID 0000056507

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

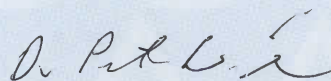
This certificate will expire on:
25 March 2023

German Federal Environment Agency
Dessau, 4 September 2018

TÜV Rheinland Energy GmbH
Cologne, 3 September 2018



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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:	936/21239647/B dated 4 March 2018
Initial certification:	26 March 2018
Expiry date:	25 March 2023
Publication:	BAnz AT 17.07.2018 B9, chapter I number 4.1

Approved application

The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13th BImSchV), at waste incineration plants according to Directive 2010/75/EU, chapter IV (17th BImSchV), the 27th and 30th BImSchV and TA Luft. 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 six-months field test at a waste incineration plant.

The AMS is approved for an ambient temperature range of -20 °C 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 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.

Basis of the certification

This certification is based on:

- Test report 936/21239647/B dated 4 March 2018 issued by 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 number 4.1,
UBA announcement dated 3 July 2018:

AMS designation:

GM32 LowNO_x GMP for NO and SO₂

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*	0–1 000*	0–2 500*	mg/m ³ .m
NO	0–70*	0–700*	0–1 302*	mg/m ³ .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

Certified product

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

The GM32 LowNO_x GMP In-Situ gas analyser continuously measures the concentration of NO and SO₂ in gas ducts.

The GM32 LowNO_x 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

The current software version is:

9246548_YXI6_160914

Operating software: SOPAS ET 3.2.4

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.

Certification of the GM32 LowNO_x GMP 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.:0000056507: 13 April 2018
Expiry date of the certificate: 25 March 2023
Test report: 936/21239647/A dated 4 October 2017
TÜV Rheinland Energy GmbH, Cologne
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: 4 September 2018
Expiry date of the certificate: 25 March 2023
Test report: 936/21239647/B dated 4 March 2018
TÜV Rheinland Energy GmbH, Cologne
Publication: BAnz AT 17.07.2018 B9, chapter I number 4.1
UBA announcement dated 3 July 2018

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

Test laboratory	936/21239647/B
Date of report	TÜV Rheinland
	2018-03-04

Measured component

Certification range	NO	0 - 70 mg/m ³
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Evaluation of the cross-sensitivity (CS)

(system with largest CS)

Sum of positive CS at zero point	0.45 mg/m ³
Sum of negative CS at zero point	0.00 mg/m ³
Sum of positive CS at span point	1.69 mg/m ³
Sum of negative CS at span point	-1.97 mg/m ³
Maximum sum of cross-sensitivities	-1.97 mg/m ³
Uncertainty of cross-sensitivity	u_i -1.136 mg/m ³

Calculation of the combined standard uncertainty

Tested parameter

			u^2
Standard deviation from paired measurements under field conditions *	u_D	0.476 mg/m ³	0.227 (mg/m ³) ²
Lack of fit	u_{lof}	-0.287 mg/m ³	0.082 (mg/m ³) ²
Zero drift from field test	$u_{d,z}$	-0.121 mg/m ³	0.015 (mg/m ³) ²
Span drift from field test	$u_{d,s}$	-0.687 mg/m ³	0.472 (mg/m ³) ²
Influence of ambient temperature at span	u_t	0.153 mg/m ³	0.023 (mg/m ³) ²
Influence of supply voltage	u_v	0.074 mg/m ³	0.005 (mg/m ³) ²
Cross-sensitivity (interference)	u_i	-1.136 mg/m ³	1.290 (mg/m ³) ²
Influence of sample gas pressure	u_p	0.785 mg/m ³	0.616 (mg/m ³) ²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.566 mg/m ³	0.320 (mg/m ³) ²
Excursion of measurement beam	u_{mb}	0.370 mg/m ³	0.137 (mg/m ³) 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)	$u_c = \sqrt{\sum (u_{max, j})^2}$	1.79 mg/m ³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	3.50 mg/m ³

Relative total expanded uncertainty

Requirement of 2010/75/EU	U in % of the ELV 50 mg/m³	7.0
Requirement of EN 15267-3	U in % of the ELV 50 mg/m³	20.0
	U in % of the ELV 50 mg/m³	15.0

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

Measuring system

Manufacturer	Sick AG
AMS designation	GM32 LowNOx
Serial number of units under test	16308009 / 16308010 / 16278029 / 16278030
Measuring principle	DOAS

Test report

Test laboratory	936/21239647/B
Date of report	TÜV Rheinland
	2018-03-04

Measured component

Certification range	SO ₂	0 - 75 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	1.66 mg/m ³
Sum of negative CS at span point	0.00 mg/m ³
Maximum sum of cross-sensitivities	1.66 mg/m ³
Uncertainty of cross-sensitivity	u _i 0.957 mg/m ³

Calculation of the combined standard uncertainty

Tested parameter

			u ²
Standard deviation from paired measurements under field conditions *	u _D	0.417 mg/m ³	0.174 (mg/m ³) ²
Lack of fit	u _{lof}	-0.342 mg/m ³	0.117 (mg/m ³) ²
Zero drift from field test	u _{d,z}	0.173 mg/m ³	0.030 (mg/m ³) ²
Span drift from field test	u _{d,s}	-0.433 mg/m ³	0.187 (mg/m ³) ²
Influence of ambient temperature at span	u _t	0.473 mg/m ³	0.224 (mg/m ³) ²
Influence of supply voltage	u _v	0.139 mg/m ³	0.019 (mg/m ³) ²
Cross-sensitivity (interference)	u _i	0.957 mg/m ³	0.916 (mg/m ³) ²
Influence of sample gas pressure	u _p	0.853 mg/m ³	0.728 (mg/m ³) ²
Uncertainty of reference material at 70% of certification range	u _{rm}	0.606 mg/m ³	0.368 (mg/m ³) ²
Excursion of measurement beam	u _{mb}	0.337 mg/m ³	0.114 (mg/m ³) 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)	$u_c = \sqrt{\sum (u_{max, j})^2}$	1.70 mg/m ³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	3.32 mg/m ³

Relative total expanded uncertainty

Requirement of 2010/75/EU	U in % of the ELV 50 mg/m³	6.6
Requirement of EN 15267-3	U in % of the ELV 50 mg/m³	20.0
	U in % of the ELV 50 mg/m³	15.0