

# CERTIFICATE

## of Product Conformity (QAL1)

Certificate No: 0000038499\_02

**Certified AMS:** FLOWSIC100 for waste gas velocity

**Manufacturer:** SICK Engineering GmbH  
Bergener Ring 27  
01458 Ottendorf-Okrilla  
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),  
EN ISO 16911-2 (2013) and EN 14181 (2014).**

Certification is awarded in respect of the conditions stated in this certificate  
(this certificate contains 12 pages).

The present certificate replaces certificate 0000038499\_01 dated 05 March 2018.



Suitability Tested  
EN 15267  
QAL1 Certified  
Regular  
Surveillance

www.tuv.com  
ID0000038499

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


German Environment Agency  
Dessau, 02 March 2023

This certificate will expire on:  
04 March 2028

TÜV Rheinland Energy GmbH  
Cologne, 01 March 2023



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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.

<b>Test report:</b>	936/21220596/A dated 28 September 2012
<b>Initial certification:</b>	05 March 2013
<b>Expiry date:</b>	04 March 2028
<b>Certificate:</b>	Renewal (of previous certificate 0000038499_01 of 05 March 2018 valid until 04 March 2023)
<b>Publication:</b>	BAnz AT 05.03.2013 B10, chapter II No. 2.2

### Approved application

The tested AMS is suitable for use at combustion plants according to EC Directive 2001/80/EC (13th BImSchV:2012), at waste incineration plants according to EC Directive 2000/76/EC (17th BImSchV:2009), Directive 2015/2193/EC (44th BImSchV:2021), the 27th BImSchV:1997, the 30th BImSchV:2009 and TA Luft:2002. The measured ranges have been selected so as to cater for 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 waste incineration plant.

The AMS is approved for an ambient temperature range of -40° to +60°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 flue gas velocity 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 936/21220596/A dated 28 September 2012 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 AT 05.03.2013 B10, chapter II No. 2.2,  
Announcement by UBA dated 12 February 2013:

**AMS designation:**

FLAWSIC 100 for waste gas velocity

**Manufacturer:**

SICK Engineering GmbH, Ottendorf-Okrilla

**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 range	Unit
Flow velocity	0 – 20	0 – 40	m/s

**Software versions:**

Sensor (Version 1–3): 21.4.14  
 Sensor (Version 4–10): 1.4.14  
 MCU: 1.08.01  
 SOPAS ET: 02.32

**Restrictions:**

None

**Notes:**

- The following versions were tested as part of the performance test:

1	FLAWSIC100 PR	6	FLAWSIC100 H
2	FLAWSIC100 PR-AC	7	FLAWSIC100 H-AC
3	FLAWSIC100 S	8	FLAWSIC100 PM
4	FLAWSIC100 M	9	FLAWSIC100 PH
5	FLAWSIC100 M-AC	10	FLAWSIC100 PH-S

- The maintenance interval is six months.
- Supplementary testing (migration to standard EN 15267) as regards Federal Environment Agency (UBA) notices of 19 February 2009 (BAnz p. 899, chapter II no. 1.1) and of 10 January 2011 (BAnz p. 294, chapter IV notifications 15 and 30).

**Test Report:**

TÜV Rheinland Energie und Umwelt GmbH, Cologne  
 Report no.: 936/21220596/A dated 28 September 2012

Publication in the German Federal Gazette: BAnz AT 23.07.2013 B4, chap. IV correction 3,  
Announcement by UBA dated 03 July 2013:

**3 Correction of Federal Environment Agency (UBA) notice of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter II number 2.2)**

The current MCU Firmware version of the Flowsic 100 measuring system for flow velocity manufactured by SICK Engineering GmbH should read as follows:

MCU Firmware: 01.08.00 (instead of 01.08.01)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 28 May 2013

Publication in the German Federal Gazette: BAnz AT 23.07.2013 B4, chapter V notification 13,  
Announcement by UBA dated 03 July 2013:

**13 Notification as regards Federal Environment Agency notices regarding performance tested AMS manufactured by SICK Engineering GmbH and by SICK AG (excerpt)**

Item no.	AMS designation/ Manufacturer	Notice	Notification	Statement test laboratory
7	FLAWSIC100/ SICK Engineering GmbH	as regards notification 14 of this notice	The current software version of the SOPAS ET platform for AMS control is: SOPAS ET 2.38.	TUV Rheinland Energie und Umwelt GmbH of 25 March 2013
...	...	...	...	...

Publication in the German Federal Gazette: BAnz AT 23.07.2013 B4, chap. V notification 14,  
Announcement by UBA dated 03 July 2013:

**14 Notification as regards Federal Environment Agency (UBA) notices of 14 February 2008 (BAnz p. 901, chapter II number 1.1) and of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter II number 2.2)**

The current software versions of the FLOWSIC 100 measuring the gas flow velocity manufactured by SICK Engineering GmbH are:

MCU Firmware: 01.08.00

Software Sensor:

- Type PR, PR-AC and S: 21.04.16
- Type M, M-AC, H, H-AC, PM, PH, PH-S: 1.04.16

To ensure full functionality of the AMS, the use of the SOPAS ET software platform in one of its notified versions is required.

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 26 March 2013

Publication in the German Federal Gazette: BAnz AT 26.08.2015 B4, chap. V notification 3,  
Announcement by UBA dated 22 July 2015:

**3 Notification as regards Federal Environment Agency notices  
of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter II number 2.2) and  
of 3 July 2013 (BAnz AT 23.07.2013 B10 chapter IV notification 14)**

The current software versions of the Flowsic 100 measuring system for flow velocity  
manufactured by SICK Engineering GmbH are:

MCU Firmware:	01.12.00
Software Sensor	
Type PR, PR-AC and S:	1.06.00
Type M, M-AC, H, H-AC, PM, PH, PH-S:	21.06.00

To ensure full functionality of the AMS, the use of the SOPAS ET software platform in  
one of its notified versions is required. The version most recently announced is  
SOPAS ET 2.38. The Flowsic 100 velocity measuring system also meets the  
requirements of EN ISO 16911-2 (Issue: June 2013).

Statement issued by TÜV Rheinland Energie und Umwelt GmbH  
dated 24 March 2015

Publication in the German Federal Gazette: BAnz AT 01.08.2016 B11, chap. V notification 14,  
Announcement by UBA dated 14 July 2016:

**14 Notification as regards Federal Environment Agency notices  
of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter II number 2.2) and  
of 22 July 2015 (BAnz AT 26.08.2015 B4 chapter V notification 3)**

The current software versions of the FLOWSIC 100 measuring the gas flow velocity  
manufactured by SICK Engineering GmbH are:

MCU Firmware:	01.12.02
Software Sensor:	
Type PR, PR-AC and S:	1.06.00
Type M, M-AC, H, H-AC, PM, PH, PH-S:	21.06.00

For the control of the measuring system the SOPAS ET software platform is required  
in a publically notified version. The most recent publically notified version is:  
SOPAS ET 2.38

Statement issued by TÜV Rheinland Energy GmbH dated 25 April 2016

Publication in the German Federal Gazette: BAnz AT 15.03.2017 B6, chap. IV correction 4,  
Announcement by UBA dated 22 February 2017:

**4 Correction of Federal Environment Agency notice  
of 22 July 2015 (BAnz AT 26.08.2015 B4, chapter V notification 3)**

In the above-mentioned notice regarding the FLOWSIC 100 measuring system for velocity manufactured by SICK Engineering GmbH, the assignment of the software versions to the instrument types is as follows:

Software Sensor:

Type PR, PR-AC and S:	21.06.00
Type M, M-AC, H, H-AC, PM, PH, PH-S:	1.06.00

Statement issued by TÜV Rheinland Energy GmbH dated 10 October 2016

Publication in the German Federal Gazette: BAnz AT 15.03.2017 B6, chap. IV correction 5,  
Announcement by UBA dated 22 February 2017:

**5 Correction of Federal Environment Agency notice  
of 14 July 2016 (BAnz AT 01.08.2016 B11, chapter V notification 14)**

In the above-mentioned notice regarding the FLOWSIC 100 measuring system for velocity manufactured by SICK Engineering GmbH, the assignment of the software versions to the instrument types is as follows:

Software Sensor:

Type PR, PR-AC and S:	21.06.00
Type M, M-AC, H, H-AC, PM, PH, PH-S:	1.06.00

Statement issued by TÜV Rheinland Energy GmbH dated 10 October 2016

Publication in the German Federal Gazette: BAnz AT 22.07.2019 B8, chap. V notification 19,  
Announcement by UBA dated 28 June 2019:

**19 Notification as regards Federal Environment Agency (UBA) notices  
of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter II number 2.2) and  
of 22 February 2017 (BAnz AT 15.03.2017 B6, chapter IV correction 4)**

Instead of the MCU used so far, the Flowsic100 measuring system for velocity manufactured by SICK Engineering GmbH may also be operated with the new MCU100 control unit. The latest software versions of the measuring system are:

Flowsic100 (Type PR, PR-AC, S):	21.08.00
Flowsic100 (Type M, M-AC, H, H-AC, PM, PH, PH-S):	1.08.00
MCU:	01.12.04
MCU100:	r2.3.6

Statement issued by TÜV Rheinland Energy GmbH dated 28 February 2019

Publication in the German Federal Gazette: BAnz AT 31.07.2020 B10, chap. II notification 18,  
Announcement by UBA dated 27 May 2020:

**18 Notification as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter II number 2.2) and of 28 June 2019 (BAnz AT 22.07.2019 B8, chapter V, notification 19)**

The latest software versions of the FLOWSIC100 measuring the gas flow velocity manufactured by SICK Engineering GmbH are:

Flowsic100 (Type PR, PR-AC, S):	21.08.00
Flowsic100 (Type M, M-AC, H, H-AC, PM, PH, PH-S):	01.08.00
MCU:	01.12.05.

Statement issued by TÜV Rheinland Energy GmbH dated 10 March 2020

Publication in the German Federal Gazette: BAnz AT 05.08.2021 B5, chap. IV notification 43,  
Announcement by UBA dated 29 June 2021:

**43 Notification as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter II number 2.2) and of 27 May 2020 (BAnz AT 31.07.2020 B10, chapter II notification 18)**

The latest software versions of the FLOWSIC 100 measuring system for waste gas velocity manufactured by SICK Engineering GmbH are:

Software Sensor:	
Type PR, PR-AC, S:	21.08.00,
Type M, M-AC, H, H-AC, PM, PH, PH-S:	01.08.00,
MCU:	01.14.00

Statement issued by TÜV Rheinland Energy GmbH dated 16 February 2021

Publication in the German Federal Gazette: BAnz AT 28.07.2022 B4, chap. III notification 23,  
Announcement by UBA dated 28 June 2022:

**23 Notification as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter II number 2.2) and of 29 June 2021 (BAnz AT 05.08.2021 B5, chapter IV notification 43)**

The current software versions of the FLOWSIC 100 measuring device for exhaust gas velocity from SICK Engineering GmbH are:

Software Sensor:	
Type PR, PR-AC, S:	21.08.00
Type M, M-AC, H, H-AC, PM, PH, PH-S:	01.08.00
MCU:	01.16.00

Statement issued by TÜV Rheinland Energy GmbH dated 12 February 2022

### Certified product

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

The FLOWSIC100 measuring system continuously monitors the flow velocity.

The measuring system consists of the following components:

- Sender/Receiver unit FLSE100 for emitting and detecting ultra sound pulses and for controlling system functions
- flange c/w tube
- MCU control unit: control, evaluation and output of data via sensors connected to the RS485 interface
- connecting cable and box
- purge air unit (optional): for use of certain E/R units at high gas temperatures and for cleaning the ultrasonic transducer

The FLOWSIC100 uses ultrasonic transit times to measure flow velocity. Emitter / receiver units are installed at both sides of the duct/tube at an inclination angle of 45° to 60° in relation to the gas flow.

The emitter/receiver units are made up of piezoelectric ultrasonic transducers which alternately function as emitter or as receiver. Sound pulses are emitted at an angle of "alpha" in relation to the flow direction. Depending on the angle "alpha" and the gas velocity  $v$ , the transit time of the respective sound direction varies as a result of "acceleration and braking effects". The difference in transit times of the sound pulses increases as a consequence of higher gas velocities and smaller angles in relation the flow direction of the gas.

The gas velocity  $v$  is calculated from the difference between both transit times regardless of the speed of sound. Therefore, changes in the speed of sound caused by pressure or temperature fluctuations do not affect the calculated gas velocity with this method of measurement.

Ultrasonic transducers are electromechanical oscillation devices whose essential properties are defined by geometry. A pair of piezoelectric rings is always used as impulse. During the transmission phase they transform electric energy into kinetic energy, or vice versa during the reception phase. Their resonance behaviour is characterised by the frequency-dependent transformer current and the frequency-dependent phase between impulse voltage and transformer current. The transformers are scaled according to the frequency of operation depending on the conditions of the application.



### 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](http://qal1.de).

### History of documents

Certification of FLOWSIC100 is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

#### Basic test

Test report 936/21206702/A dated 5 November 2007  
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH  
Publication BAnz. 07 March 2008, No. 38, p. 901, chapter II number 1.1  
UBA announcement dated 14 February 2008

#### Supplementary testing

Test report 936/21206702/B dated 28 February 2008  
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH  
Publication BAnz. 03 September 2008, No. 133, p. 3243, chapter II number 1.1  
UBA announcement dated 12 August 2008

#### Supplementary testing

Test report 936/21206702/E dated 5 October 2008  
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH  
Publication BAnz. 11 March 2009, No. 38, p. 899, chapter II number 1.1  
UBA announcement dated 19 February 2009

**Notifications**

Statement issued by TÜV Immissionsschutz und Energiesysteme GmbH dated 29 October 2009  
Publication: BAnz. 12 February 2010, No. 24, p. 552, chapter IV notification 7  
UBA announcement dated 25 January 2010  
(Software changes)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 5 October 2010  
Publication BAnz. 26 January 2011, No. 14, p. 294, chapter IV notification 15  
UBA announcement dated 10 January 2011  
(Software changes)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 8 November 2010  
Publication BAnz. 26 January 2011, No. 14, p. 294, chapter IV notification 30  
UBA announcement dated 10 January 2011  
(Software changes)

**Initial certification according to EN 15267**

Certificate No. 0000038499\_00: 22 March 2013  
Expiry date of the certificate: 04 March 2018  
Test report 936/21220596/A dated 28 September 2012  
TÜV Rheinland Energie und Umwelt GmbH  
Publication BAnz AT 05.03.2013 B10, chapter II number 2.2  
UBA announcement dated 12 February 2013

**Correction**

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 28 May 2013  
Publication BAnz AT 23.07.2013 B4, chapter IV notification 3  
UBA announcement dated 3 July 2013  
(Correction of software version)

**Notifications**

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 25 March 2013  
Publication BAnz AT 23.07.2013 B4, chapter V notification 13  
UBA announcement dated 3 July 2013  
(Software version SOPAS ET is 2.38.)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 26 March 2013  
Publication BAnz AT 23.07.2013 B4, chapter V notification 14  
UBA announcement dated 3 July 2013  
(Software changes)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 24 March 2015  
Publication BAnz AT 26.08.2015 B4, chapter V notification 3  
UBA announcement dated 22 July 2015  
(Software changes)

Statement issued by TÜV Rheinland Energy GmbH dated 25 April 2016  
Publication BAnz AT 01.08.2016 B11, chapter V notification 14  
UBA announcement dated 14 July 2016  
(Software changes)

**Corrections**

Statement issued by TÜV Rheinland Energy GmbH dated 10 October 2016  
Publication BAnz AT 15.03.2017 B6, chapter IV notification 4  
UBA announcement dated 22 February 2017  
(Correction for notification of 24 March 2015.)

Statement issued by TÜV Rheinland Energy GmbH dated 10 October 2016  
Publication BAnz AT 15.03.2017 B6, chapter IV notification 5  
UBA announcement dated 22 February 2017  
(Correction for notification 14 of 25 April 2016)

**Renewal of certificate**

Certificate No. 0000038499\_01: 05 March 2018  
Expiry date of the certificate: 04 March 2023

**Notifications**

Statement issued by TÜV Rheinland Energy GmbH dated 28 February 2019  
Publication BAnz AT 22.07.2019 B8, chapter V notification 19  
UBA announcement dated 28 June 2019  
(Soft- and hardware changes)

Statement issued by TÜV Rheinland Energy GmbH dated 10 March 2020  
Publication BAnz AT 31.07.2020 B10, chapter II notification 18  
UBA announcement dated 27 May 2020  
(Software changes)

Statement issued by TÜV Rheinland Energy GmbH dated 16 February 2021  
Publication BAnz AT 05.08.2021 B5, chapter IV notification 43  
UBA announcement dated 29 June 2021  
(Software change Softwareänderung)

Statement issued by TÜV Rheinland Energy GmbH dated 12 February 2022  
Publication BAnz AT 28.07.2022 B4, chapter III notification 23  
UBA announcement dated 28 June 2022  
(Software changes)

**Renewal of certificate**

Certificate No. 0000038499\_02: 02 March 2023  
Expiry date of the certificate: 04 March 2028

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

**Measuring system**

Manufacturer	SICK Engineering GmbH
Name of measuring system	FLAWSIC 100
Serial number of the candidates	06248850 / 06248851 / 07068737 / 07068738
Measuring principle	Ultrasonic

**Test report**

Test laboratory	936/21220596/A TÜV Rheinland
Date of report	2012-09-28

**Measured component**

Certification range	Velocity 0 - 20 m/s
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**Calculation of the combined standard uncertainty**

**Tested parameter**

			$u^2$
Standard deviation from paired measurements under field conditions *	$u_D$	0.119 m/s	0.014 (m/s) <sup>2</sup>
Lack of fit	$u_{lof}$	0.173 m/s	0.030 (m/s) <sup>2</sup>
Zero drift from field test	$u_{d,z}$	0.092 m/s	0.008 (m/s) <sup>2</sup>
Span drift from field test	$u_{d,s}$	0.092 m/s	0.008 (m/s) <sup>2</sup>
Influence of ambient temperature at span	$u_t$	0.000 m/s	0.000 (m/s) <sup>2</sup>
Influence of supply voltage	$u_v$	0.036 m/s	0.001 (m/s) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	$u_{rm}$	0.162 m/s	0.026 (m/s) <sup>2</sup>

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

Combined standard uncertainty ( $u_c$ )	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.30 m/s
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.58 m/s

**Relative total expanded uncertainty**

<b>Requirement of 2000/76/EC and 2001/80/EC</b>	<b>U in % of the range 20 m/s</b>	<b>2.9</b>
Requirement of EN 15267-3	U in % of the range 20 m/s	10.0 **
		7.5

\*\* EU Directives 2001/80/EG and 2000/76/EG do not define requirements for this component.  
A value of 10.0% was used for this.