

# CERTIFICATE

## of Product Conformity (QAL1)

Certificate number: 0000051691

**Certified AMS:** FWE200DH for dust  
**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 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 6 pages).



Suitability Tested  
EN 15267  
QAL1 Certified  
Regular  
Surveillance

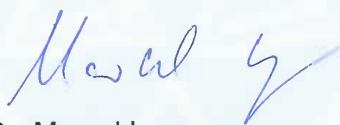
www.tuv.com  
ID 0000051691


Publication in the German Federal Gazette  
(BAnz.) of 1 August 2016

This certificate will expire on:  
31 July 2021

German Federal Environment Agency  
Dessau, 19 August 2016

TÜV Rheinland Energy GmbH  
Cologne, 18 August 2016

  
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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

**Certificate:**  
0000051691 / 19 August 2016

**Test report:** 936/21225956/A of 25 February 2016  
**Initial certification:** 1 August 2016  
**Expiry date:** 31 July 2021  
**Publication:** BAnz AT 01.08.2016 B11, chapter I number 1.2

### **Approved application**

The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13. BImSchV), at waste incineration plants according to Directive 2010/75/EU, chapter IV (17. BImSchV) and other plants requiring official approval. The measured ranges have been selected considering 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 an eight-month field test at a combustion 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 valid at the time of performance testing. As changes in legal regulations are possible, any potential user should ensure that this AMS is suitable for monitoring the limit value 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 936/21225956/A of 25 February 2016 der 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 01.08.2016 B11, chapter I number 1.2,  
Announcement by UBA from 14 July 2016:

**AMS designation:**

FWE200DH for dust

**Manufacturer:**

SICK Engineering GmbH, Ottendorf-Okrilla

**Field of application:**

For measurements at plants requiring official approval and plants according to 27th BImSchV

**Measuring ranges during the suitability test:**

Component	Certification range	Supplementary measurement ranges					Unit
		0 - 10	0 - 15	0 - 50	0 - 100	0 - 500	
Dust	0 - 7.5	0 - 10	0 - 15	0 - 50	0 - 100	0 - 500	mg/m <sup>3</sup>

**Software version:**

FWE200DH (Controller)	V 01.02.06
DHSP100/SP200 (Sensor)	V 01.06.04
MCU	V 01.12.02

**Restrictions:**

None

**Notes:**

1. The maintenance interval is three month.
2. During the suitability test the minimum requirement for the correlation coefficient according to EN 15267-3 is not fulfilled.
3. The sample line (length during the test 1.2 m) must descend towards the sampling probe.
4. The measurement system fulfils the minimum requirement for the supply voltage range 126 V to 98 V also.

**Test report:**

TÜV Rheinland Energie und Umwelt GmbH, Cologne  
Report No.: 936/21225956/A of 25 February 2016



### Certified product

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

The FWE200DH measuring system is a dust monitor which relies on the scattered light principle (forward scattering). The FWE200DH measuring system monitors dust concentrations up to 200 mg/m<sup>3</sup> in wet gases, too, with a resolution of up to 0.1 mg/m<sup>3</sup>. The instrument is an extractive AMS and is thus particularly appropriate for the measurement in wet gases.

A laser diode radiates modulated light in the visible range (wavelength apx. 650 nm) through the dust particles in the measuring path. A highly sensitive receiver detects light reflected by the particles and amplifies it. A microprocessor in the electronics unit of the sensor ("DHSP200") processes the signal. The measured volume is defined with the help of the intersection of the sensor beam and the receiving aperture.

Minute changes in light intensity of the transmitted light beam are detected by continuously monitoring the sensor output. These are taken into consideration when establishing the measured signal.

The FWE200DH operates as a by-pass system. A partial flow is taken from the gas duct with the help of a sample gas probe. It is then overheated in a thermocyclone to vaporize water and aerosols before being transported to a measurement cell. A light beam illuminates the sample gas inside the measurement cell and the light scattered by the particles present in the gas flow is detected by a receiver. The measured intensity of the scattered light forms the basis for establishing the dust concentration. In the end, the sample gas is transported to the sample gas probe which directs it back into the duct.

An ejector produces the gas flow for the measuring system and blowers operate this ejector. A partial flow inside the measurement cell serves to purge and cool the optical components.

The major components of the measuring system include:

- The sampling probe with the waste gas recirculation and a replaceable suction hose
- The sampling line
- The thermocyclone
- The measurement cell
- The control unit
- And the recirculation line

A PC with a performance tested version of the SOPAS ET software (most recent version approved in accordance with EN 15267: 2.38) may optionally be used to parameterize and control the AMS.

#### 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 can be applied to the product or used in publicity material 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).

Certification of FWE200DH for dust 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. 0000051691: 19 August 2016  
Expiry date of the certificate: 31 July 2021

Test report: 936/21225956/A of 25 February 2016  
TÜV Rheinland Energie und Umwelt GmbH, Cologne,

Publication: BAnz AT 01.08.2016 B11, chapter I number 1.2  
Announcement by UBA from 14 July 2016

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

**Measuring system**

Manufacturer	SICK Engineering GmbH
AMS designation	FWE200DH
Serial number of units under test	14258515/14258516
Measuring principle	Vorwärtsstreuung extraktiv

**Test report**

Test laboratory	936/21225956/A
Date of report	TÜV Rheinland
	2016-02-25

**Measured component**

Certification range	Dust
	0 - 7.5 mg/m <sup>3</sup>

**Calculation of the combined standard uncertainty**

**Tested parameter**

			U <sup>2</sup>
Standard deviation from paired measurements under field conditions *	u <sub>D</sub>	0.094 mg/m <sup>3</sup>	0.009 (mg/m <sup>3</sup> ) <sup>2</sup>
Lack of fit	u <sub>lof</sub>	0.052 mg/m <sup>3</sup>	0.003 (mg/m <sup>3</sup> ) <sup>2</sup>
Zero drift from field test	u <sub>d,z</sub>	0.022 mg/m <sup>3</sup>	0.000 (mg/m <sup>3</sup> ) <sup>2</sup>
Span drift from field test	u <sub>d,s</sub>	-0.108 mg/m <sup>3</sup>	0.012 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of ambient temperature at span	u <sub>t</sub>	0.058 mg/m <sup>3</sup>	0.003 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of supply voltage	u <sub>v</sub>	0.035 mg/m <sup>3</sup>	0.001 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of sample gas flow	u <sub>p</sub>	-0.043 mg/m <sup>3</sup>	0.002 (mg/m <sup>3</sup> ) <sup>2</sup>
Uncertainty of reference material at 70% of certification range	u <sub>rm</sub>	0.061 mg/m <sup>3</sup>	0.004 (mg/m <sup>3</sup> ) <sup>2</sup>

\* The larger value is used :

"Repeatability standard deviation at set point" or

"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u<sub>c</sub>)

$$u_c = \sqrt{\sum (u_{\max, j})^2} \quad 0.18 \text{ mg/m}^3$$

Total expanded uncertainty

$$U = u_c * k = u_c * 1.96 \quad 0.36 \text{ mg/m}^3$$

**Relative total expanded uncertainty**

**U in % of the ELV 5 mg/m<sup>3</sup> 7.2**

**Requirement of 2010/75/EU**

**U in % of the ELV 5 mg/m<sup>3</sup> 30.0**

Requirement of EN 15267-3

U in % of the ELV 5 mg/m<sup>3</sup> 22.5