

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000051691_01

AMS designation: FWE200DH for dust

Manufacturer: SICK Engineering GmbH
Bergener Ring 27
01458 Ottendorf-Okrilla
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 EN 14181 (2014).**

Certification is awarded in respect of the conditions stated in this certificate
(this certificate contains 8 pages).

The present certificate replaces certificate 0000051691 of 19 August 2016.



Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

www.tuv.com
ID 0000051691

Publication in the German Federal Gazette
(BAnz) of 01 August 2016

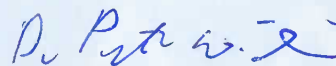
This certificate will expire on:
31 July 2026

German Federal Environment Agency
Dessau, 31 July 2021

TÜV Rheinland Energy GmbH
Cologne, 30 July 2021



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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 certificate D-PL-11120-02-00.

Certificate:
0000051691_01 / 31 July 2021

Test Report: 936/21225956/A of 25 February 2016
Initial certification: 01 August 2016
Expiry date: 31 July 2026
Certificate: Renewal (of previous certificate 0000051691 of 19 August 2016 valid until 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 (13th BImSchV), chapter IV (17th BImSchV), 30th BImSchV, plants in compliance with TA Luft and plants according to the 27th BImSchV. 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 an eight-month field test at a lignite-fired power 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 intended purpose.

Basis of the certification

This certification is based on:

- Test report 936/21225956/A of 25 February 2016 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 01.08.2016 B11, chapter I number 1.2, UBA announcement dated 14 July 2016:

AMS designation:

FWE200DH for dust

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 measuring ranges					Unit
Dust	0 - 7.5	0 - 10	0 - 15	0 - 50	0 - 100	0 - 500	mg/m ³

Software versions:

FWE200DH (control): V 01.02.06
 DHSP100/SP200 (measuring cell): V 01.06.04
 MCU: V 01.12.02

Restrictions:

None

Notes:

1. The maintenance interval is three months.
2. During performance testing in accordance with EN 15267-3, the requirement for the determination coefficient R^2 of the calibration function was not fulfilled.
3. The sampling line (length during the test 1.2 m) must always be laid descending towards the sampling probe.
4. The measuring device also meets the minimum requirements in the mains voltage range 126 V to 98 V.

Test Report:

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

Publication in the German Federal Gazette: BAnz AT 15.03.2017 B6, chapter V 23rd notification, UBA announcement dated 22 February 2017:

23 Notification as regards Federal Environment Agency (UBA) notice of 14 July 2016 (BAnz AT 01.08.2016 B11, chapter I number 1.2)

The FWE200DH measuring system for dust from SICK Engineering GmbH can be optionally equipped with a valve for backwashing the sampling line. The results of the tests are presented in test report 936/21232260/A of 10 October 2016 by TÜV Rheinland Energy GmbH.

Statement issued by TÜV Rheinland Energy GmbH dated 10 October 2016

Publication in the German Federal Gazette: BAnz AT 26.03.2018 B8, chapter V 39th notification, UBA announcement dated 21 February 2018:

39 Notification as regards Federal Environmental Agency (UBA) notices of 14 July 2016 (BAnz AT 01.08.2016 B11, chapter I number 1.2) and of 22 February 2017 (BAnz AT 15.03.2017 B6, chapter V 23rd notification)

The latest software versions of the FWE200DH dust monitor manufactured by SICK Engineering GmbH are:

FWE200DH (control):	01.02.06
DHSP100/SP200 (measuring cell):	01.06.04
MCU:	01.12.03

Statement issued by TÜV Rheinland Energy GmbH dated 28 September 2017

Publication in the German Federal Gazette: BAnz AT 17.07.2018 B9, chapter III 17th notification, UBA announcement dated 3 July 2018:

17 Notification as regards Federal Environmental Agency (UBA) notices of 14 July 2016 (BAnz AT 01.08.2016 B11, chapter I number 1.2) and of 21 February 2018 (BAnz AT 26.03.2018 B8, chapter V 39th notification)

The latest software versions of the FWE200DH dust monitor manufactured by SICK Engineering GmbH are:

FWE200DH (control):	01.02.08
DHSP100/SP200 (measuring cell):	01.06.06
MCU:	01.12.03

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 2 May 2018

Publication in the German Federal Gazette: BAnz AT 24.03.2020 B7, chapter IV 63rd notification, UBA announcement dated 24 February 2020:

63 Notification as regards Federal Environmental Agency notices of 14 July 2016 (BAnz AT 01.08.2016 B11, chapter I number 1.2) and of 03 July 2018 (BAnz AT 17.07.2019, chapter III 17th notification)

The latest software versions of the FWE200DH dust monitor manufactured by SICK Engineering GmbH are:

FWE200DH (control):	01.02.12
DHSP100/SP200 (measuring cell):	01.06.06
MCU:	01.12.04

Software version 01.02.10 may also be used for the controller of the FWE200DH measuring system.

Statement issued by TÜV Rheinland Energy GmbH dated 4 October 2019

Publication in the German Federal Gazette: BAnz AT 31.07.2020 B10, chapter II 20th notification, UBA announcement dated 27 May 2020:

20 Notification as regards Federal Environmental Agency (UBA) notices of 14 July 2016 (BAnz AT 01.08.2016 B11, chapter I number 1.2) and of 24 February 2020 (BAnz AT 24.03.2020 B7, chapter IV 63rd notification)

The latest software versions of the FWE200DH dust monitor manufactured by SICK Engineering GmbH are:

FWE200DH (control):	01.02.12
DHSP100/SP200 (measuring cell):	01.06.06
MCU:	01.12.05

Statement issued by TÜV Rheinland Energy GmbH dated 10 March 2020

Certified product

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

The FWE200DH measuring system is a dust measuring device that works according to the scattered light principle (forward scattering). The FWE200DH measuring system monitors dust concentrations up to 200 mg/m³ in wet gases, too, with a resolution of up to 0.1 mg/m³. 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 approx. 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 by 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 bypass 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. Finally, the sample gas is transported to the sample gas probe which directs it back into the duct.

The gas flow through the measuring system is generated by an ejector. The ejector is operated with a blower. A partial flow inside the measurement cell serves to purge and cool the optical components.

The main components of the FWE200DH measuring system are:

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

A PC with a performance tested version of the SOPAS ET software may optionally be used to parameterize and control the AMS.

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 FWE200DH 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. 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
UBA announcement dated 14 July 2016

Notifications in accordance with EN 15267

Statement issued by TÜV Rheinland Energy GmbH dated 10 October 2016
Publication: BAnz AT 15.03.2017 B6, chapter V notification 23
UBA announcement dated 22 February 2017
(New backwash valve)

Statement issued by TÜV Rheinland Energy GmbH dated 28 September 2017
Publication: BAnz AT 26.03.2018 B8, chapter V notification 39
UBA announcement dated 21 February 2018
(New software version)

Statement issued by TÜV Rheinland Energy GmbH dated 02 May 2018
Publication: BAnz AT 17.07.2018 B9, chapter III notification 17
UBA announcement dated 03 July 2018
(New software version)

Statement issued by TÜV Rheinland Energy GmbH dated 04 October 2019
Publication: BAnz AT 24.03.2020 B7, chapter IV notification 63
UBA announcement dated 24 February 2020
(New software version)

Statement issued by TÜV Rheinland Energy GmbH dated 10 March 2020
Publication: BAnz AT 31.07.2020 B10, chapter II notification 20
UBA announcement dated 27 May 2020
(New software version)

Renewal of the certificate

Certificate no. 0000051691_01: 31 July 2021
Expiry date of the certificate: 31 July 2026

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 ³
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Calculation of the combined standard uncertainty

Tested parameter

			u^2
Standard deviation from paired measurements under field conditions *	u_D	0.094 mg/m ³	0.009 (mg/m ³) ²
Lack of fit	u_{lof}	0.052 mg/m ³	0.003 (mg/m ³) ²
Zero drift from field test	$u_{d,z}$	0.022 mg/m ³	0.000 (mg/m ³) ²
Span drift from field test	$u_{d,s}$	-0.108 mg/m ³	0.012 (mg/m ³) ²
Influence of ambient temperature at span	u_t	0.058 mg/m ³	0.003 (mg/m ³) ²
Influence of supply voltage	u_v	0.035 mg/m ³	0.001 (mg/m ³) ²
Influence of sample gas flow	u_p	-0.043 mg/m ³	0.002 (mg/m ³) ²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.061 mg/m ³	0.004 (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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.18 mg/m ³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.36 mg/m ³

Relative total expanded uncertainty

Requirement of 2010/75/EU	U in % of the ELV 5 mg/m³	7.2
Requirement of EN 15267-3	U in % of the ELV 5 mg/m³	30.0
	U in % of the ELV 5 mg/m³	22.5