

CERTIFICATE

on Product Conformity (QAL1)

Number of Certificate: 0000036943

Certified AMS: Dusthunter SB100 for dust

Manufacturer: SICK Engineering GmbH
Bergener Ring 27
01458 Ottendorf-Okrilla
Germany

Test Institute: TÜV Rheinland Energie und Umwelt GmbH

This is to certify that the AMS has been tested
and found to comply with:

EN 15267-1: 2009, EN 15267-2: 2009, EN 15267-3: 2007
and EN 14181: 2004

Certification is awarded in respect of the conditions stated in this certificate
(see also the following pages).



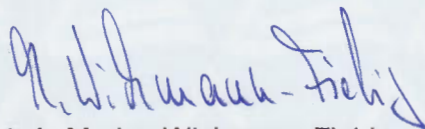
- EN 15267-3 tested
- QAL1 certified
- TUV approved
- Annual inspection

Publication in the German Federal Gazette
(BAnz.) of 20 July 2012

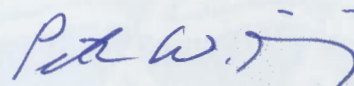
The certificate is valid until:
19 July 2017

Umweltbundesamt
Dessau, 20 August 2012

TÜV Rheinland Energie und Umwelt GmbH
Köln, 17 August 2012



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51105 Köln

Accreditation according to EN ISO/IEC 17025 and certified according to ISO 9001:2008.

| | |
|-----------------------------|---|
| Test report: | 936/21208609/A of 24 October 2008 |
| First certification: | 20 July 2012 |
| Validity ends: | 19 July 2017 |
| Publication: | BAnz AT 20 July 2012 B11, chapter IV, Notification 19 |

Approved application

The tested AMS is suitable for use at combustion plants according to EC directive 2001-80-EC, at waste incineration plants according to EC directive 2000-76-EC and other plants requiring official approval. The tested ranges have been chosen with respect to 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 a nine months field test at lignite fluidised bed combustion.

The AMS is approved for an ambient temperature range of -20 °C to +50 °C.

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 936/21208609/A of 24 October 2008 of TÜV Rheinland Immissionsschutz und Energiesysteme GmbH
- suitability announced by the German Environmental Agency (UBA) as the relevant body
- the ongoing surveillance of the product and the manufacturing process
- publication in the German Federal Gazette: BAnz AT 20 July 2012 B11, chapter IV, Notification 19
- publication in the German Federal Gazette: BAnz 11 March 2009, No. 38, p. 899, chapter I, No. 1.3
- publication in the German Federal Gazette: BAnz 26 January 2011, No. 14, p. 294, chapter IV, notification 10 and 30

AMS name:

Dusthunter SB100

Manufacturer:

SICK Engineering GmbH, Ottendorf-Okrilla

Approval:

For measurement at plants requiring official permission (i.e. plants in 2000-76-EC, waste incineration directive and 2001-80-EC, large combustion plants directive)

Measuring ranges during the suitability test:

Certification range (CR):

| Component | CR | Unit |
|-----------|---------|------|
| Dust | 0 - 100 | SE |

100 SE \pm 15 mg/m³ dust

Supplementary ranges (SR):

| Component | SR | Unit |
|-----------|---------|------|
| Dust | 0 - 15 | SE |
| Dust | 0 - 50 | SE |
| Dust | 0 - 200 | SE |

Software versions:

MCU: 1.0.40,
Sender/Receiver unit: 01.03.04,
Operating software: SOPAS ET: 02.18

Restriction:

The measuring system shall only be employed if a fall below the dew point can be excluded.

Remarks:

1. A three-month period has been specified as maintenance interval.
2. Dust concentrations are measured in wet stack gas under operating conditions.
3. The minimum requirements of EN 15267-3 concerning the determination coefficient R^2 of the calibration function were not fulfilled during suitability testing.

Test report:

TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Cologne
Report No: 936/21208609/A vom 24 October 2008

10 Notification to the announcement of the German Federal Environmental Agency of 19 February 2009 (BAnz. p. 899, Chapter I No. 1.3)

The current software versions of the dust concentration measuring system DUSTHUNTER SB100 by SICK Engineering GmbH are:

| | |
|-----------------------------------|----------|
| MCU Firmware: | 01.04.00 |
| MCU Hardware: | 1.8 |
| Software Sensor (measuring head): | 01.03.10 |

A notified version of the software platform SOPAS ET is necessary to ensure a full operation of the measuring system.

The measurement distance between the measuring system and the duct wall can also be set to either 400 mm or 800 mm.

Statement of TÜV Rheinland Energie und Umwelt GmbH dated 5 Oktober 2010

Excerpt from:

30 Notification to the announcement of the German Federal Environmental Agency concerning suitability-tested measuring systems by SICK Engineering GmbH and SICK MAIHAK GmbH (Excerpt)

| Ser. no. | Measuring system/ Manufacturer | Notification | Announcement | Statement of testing body |
|----------|---|---|--|--|
| ... | ... | ... | ... | ... |
| 2 | DUSTHUNTER SB100/ Sick Engineering GmbH | to announcement 10 of this notification | The current software version of the platform SOPAS ET for operating the measuring system is: SOPAS ET 2.32 | TÜV Rheinland Energie und Umwelt GmbH of 8 November 2010 |
| ... | ... | ... | ... | ... |

19 Notification to the announcement of the German Federal Environmental Agency of 19 February 2009 (BAnz. p. 899, Chapter I No. 1.3) and 10 January 2011 (BAnz. p. 294, Chapter IV, notification 10 and 30)

The measuring system DUSTHUNTER SB100 for dust by SICK Engineering GmbH as well as its manufacture and quality management system fulfil the requirements of Directive EN 15267.

Statement of TÜV Rheinland Energie und Umwelt GmbH dated 20 March 2012

Certified product

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

The measuring system functions under the principle of scattered light measurement (backward scattering). A laser diode irradiates dust particles in the gas flow with modulated light in a visible range (wavelength: approx. 650 nm). The light scattered by the particles is captured by a highly sensitive detector, which amplifies it electrically and conducts it to the measurement channel of a microprocessor as central part of the electronic measurement, control and evaluation system. The measuring volume at the gas duct is defined by the overlapping of the transmitted beam and receiver aperture.

The smallest changes in brightness of the transmitted light beam are detected through continuous monitoring of the transmission performance and taken into account when determining the measurement signal.

The tested measuring system SICK DUSTHUNTER SB100 comprises the following parts:

- DHSB-T sender/receiver unit
- Signal cable for connecting the sender/receiver unit to the control unit (lengths: 5 m, 10 m)
- Flange with tube
- MCU control unit for control, evaluation and output of data from the sender/receiver unit(s) connected via a RS485 interface
 - MCU-P with integrated purge air supply, for internal duct pressure of -50 ... +2 mbar
 - MCU-N without integrated purge air supply, in this case the following is required:
- external purge air unit, for internal duct pressure of -50 ... +30 mbar

Communication between sender/receiver unit and MCU

By default, every sender/receiver unit is connected via signal cable to an individual control unit. Nevertheless, more than one sender/receiver units can be optionally connected to a single MCU-N control unit. In this case, every sender/receiver unit must be supplied with purge air separately.

Sender/Receiver unit

The sender/receiver unit contains the optical and electronic modules for sending and receiving the light beam. It also holds the modules for processing and evaluating signals. Data transfer to the control unit, as well as voltage supply from it (24V DC) is carried out with a 7 pole cable with plug-type connector. A RS485 interface is available for service purposes. A purge air nozzle provides clean air for cooling the probe and avoiding contamination of the optical surfaces.

The sender/receiver unit is mounted to the duct by a flange with tube.

Flange with tube

The flange with tube serves the purpose of mounting the sender/receiver unit to the duct wall. It is available in different steel grades and nominal lengths (NL). The selection depends on the insulation and wall thickness of the duct wall (→ nominal length), as well as on the duct material.

MCU Control unit

The control unit has the following functions:

- Control of data traffic and processing of data from the unit(s) connected via RS485 interface
- Signal output via analogue output (measured value) and relay outputs (device status)
- Signal input via analogue and digital inputs
- Voltage supply to the connected units using a 24 V switching power supply with wide-range input
- Communication with supervisory control systems via optional modules

The control unit can be connected to external devices over a USB interface. In this way, the setup of plant and device parameters can be easily and comfortably carried out via laptop with the operating software (SOPAS). The parameters are efficiently saved in the MCU in the event of a power outage. By default, the control unit is housed in a sheet steel enclosure.

Versions

- MCU-N without integrated purge air supply.
- MCU-P with integrated purge air supply

This version also contains a purge air blower, an air filter, and purge air nozzles used for connecting the air hose to the sender/receiver unit.

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 Energie und Umwelt 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 Energie und Umwelt GmbH. With revocation of the publication the certificate loses its validity. After the expiration of the validity of the certificate and on requests of the TÜV Rheinland Energie und Umwelt GmbH this document shall be returned and the certificate mark must not be employed anymore.

The relevant version of this certificate and the validity is also accessible on the internet Address: **qal1.de**.

Certification of Dusthunter SB100 is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

First suitability test

Test report: 936/21208609/A of 24 October 2008
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Köln

Publication: BAnz. 11 March 2009, No. 38, p. 899, chapter I, No. 1.3
Announcement by UBA from 19 February 2009

Notifications

Publication: BAnz. 26 January 2011, No. 14, p. 294, chapter IV, notification 10 and 30
Announcement by UBA from 10 January 2011 (change of software versions)

Initial certification according to EN 15267

Certificate No. 0000036942: 20 August 2012

Validity of the certificate: 19 July 2017

Test report: 936/21208609/A vom 24 October 2008
TÜV Rheinland Energie und Umwelt GmbH, Köln

Publication: BAnz AT 20 July 2012 B11, chapter IV, Notification 19
Announcement by UBA from 06 July 2012

EN ISO 14956 and EN 15267-3 calculation for QAL1 in EN 14181

Manufacturer data

| | |
|--------------------------|------------------------------|
| Manufacturer | Sick Engineering GmbH |
| Name of measuring system | DUSTHUNTER SB100 |
| Serial Number | 07498579 / 07498578 |
| Measuring Principle | Scattering light (backwards) |

TÜV Data

| | |
|-----------------|----------------|
| Approval Report | 936/21208609/A |
| Date | 24.10.2008 |
| Editor | Baum |

Measurement Component

| | |
|--------------------|----------------------|
| certificated range | dust |
| | 15 mg/m ³ |

Calculation of the combined standard uncertainty

| Test Value | | $\Delta X_{max, j}$ | U^2 |
|--|-----------|-------------------------|-------|
| Repeatability standard deviation at span * | u_{lof} | 0.11 mg/m ³ | 0.012 |
| Lack of fit | $u_{d.z}$ | 0.09 mg/m ³ | 0.003 |
| Zero drift from field test | $u_{d.s}$ | -0.29 mg/m ³ | 0.027 |
| Span drift from field test | u_t | -0.28 mg/m ³ | 0.027 |
| Influence of ambient temperature at span | u_n | 0.00 mg/m ³ | 0.000 |
| Influence of supply voltage | u_f | 0.11 mg/m ³ | 0.004 |
| Influence of sample pressure | u_i | 0.00 mg/m ³ | 0.000 |
| Uncertainty of reference material | u_{rm} | 0.30 mg/m ³ | 0.030 |

* The greater value of: "Repeatability standard deviation at span" or "Standard deviation from paired measurements under field conditions"

| | | |
|---|--|-------|
| Combined standard uncertainty (u_c) | $u_c = \sqrt{\sum (u_{max, j})^2}$ | 0.319 |
| Total expanded uncertainty | $U = u_c * k = u_c * 1,96$ | 0.626 |
| Relative total expanded uncertainty | U in % of the ELV 10 mg/m ³ | 6.3 |
| Requirement | U in % of the ELV 10 mg/m ³ | 22.5 |