

CERTIFICATE

on Product Conformity (QAL1)

Certificate No.: 0000036943_01

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).

The present certificate replaces Certificate No. 0000036943 of 20 August 2012



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

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

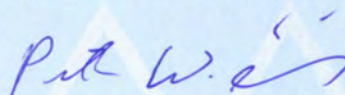
German Federal Environment Agency
Dessau, 22 March 2013



i. A. Dr. Marcel Langner

This certificate will expire on:
19 July 2017

TÜV Rheinland Energie und Umwelt GmbH
Cologne, 21 March 2013



ppa. Dr. Peter Wilbring

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Am Grauen Stein
51105 Cologne

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

Test report: 936/21219384/A of 27 September 2012
Initial certification: 20 July 2012
Expiry date: 19 July 2017
Publication: BAnz AT 05 March 2013 B10, chapter I, No. 1.6

Approved application

The tested AMS is suitable for use at combustion plants according to EC Directive 2001/80/EC and at waste incineration plants according to EC Directive 2000/76/EC. 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 twelvemonth field test at a lignite fluidised bed combustion plant.

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 936/21219384/A of 27 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 March 2013 B10, chapter I, No. 1.6

AMS name:

Dusthunter SB100 for dust

Manufacturer:

SICK Engineering GmbH, Ottendorf-Okrilla

Field of application:

Measurement at plants requiring official approval as well as plants within the scope of 2000/76/EC (waste incineration directive) and 2001/80/EC (large combustion plants directive)

Measuring ranges during the suitability test:

Component	Certification range	Supplementary ranges			Unit
dust	0 - 100	0 - 15	0 - 50	0 - 200	SE

100 SE (*scattered light units*) $\hat{=}$ 15 mg/m³ dust

Software versions:

MCU Firmware version: 01.08.00

Sender and receiver unit: 01.03.10

Control software: SOPAS ET: 02.32

Restrictions:

None

Remarks:

1. The maintenance interval is six months.
2. Dust concentration is determined in wet exhaust gas under operating conditions.
3. Requirements with regard to the determination coefficient R² of the calibration function in accordance with DIN EN 15267-3 were not satisfied during performance testing.
4. Supplementary testing (extension of the maintenance interval) as regards Federal Environmental Agency notices of 19 February 2009 (Federal Gazette (*BAnz.*) p. 899, chapter I no. 1.3) and of 6 July 2012 (Federal Gazette (*BAnz.*) AT 20.07.2012 B11, chapter IV notification 19).

Test report:

TÜV Rheinland Energie und Umwelt GmbH, Cologne

Report No.: 936/21219384/A dated 27 September 2012

Certified product

This certificate applies to automated measurement systems conforming 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 (24 V 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 an 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

The different versions of the sender/receiver unit are labelled with a type code:

Sender/Receiver unit: DHSP-TX

Contamination measurement: _____↑

- 0: without

- 1: with

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 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 its expiration is also accessible on the internet: qal1.de.

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

Initial test:

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

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

Notification:

Publication: BAnz. 26 January 2011, No. 14, p. 294, chapter IV, notification 10 and notification 30
Announcement by UBA from 10 January 2011

Initial certification according to EN 15267:

Certificate No. 0000036943: 20 August 2012

Expiry date of the certificate: 19. Juli 2017

Opinion of TÜV Rheinland Energie und Umwelt GmbH of 20 March 2012

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

Supplementary testing according to EN 15267:

Certificate No. 0000036943_01: 22 March 2013

Expiry date of the certificate: 19 July 2017

Test report: 936/21219384/A dated 27 September 2012
TÜV Rheinland Energie und Umwelt GmbH, Cologne

Publication: BAnz AT 05 March 2013 B10, chapter I, No. 1.6
Announcement by UBA from 12 February 2013

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	936/21219384/A
Date	27.09.2012
Editor	Baum

Measurement Component

certificated range	Dust 15 mg/m ³
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Calculation of the combined standard uncertainty

Test Value		$D X_{max,j}$	u^2
Repeatability standard deviation at span *	u_{inf}	0.11 mg/m ³	0.012
Lack of fit	u_{rlz}	0.09 mg/m ³	0.003
Zero drift from field test	u_{rls}	-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
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)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.320
Total expanded uncertainty	$U = u_c * k = u_c * 1,96$	0.627
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