

CERTIFICATE

on Product Conformity (QAL1)

Number of Certificate: 0000036945

Certified AMS: Dusthunter SP100 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).



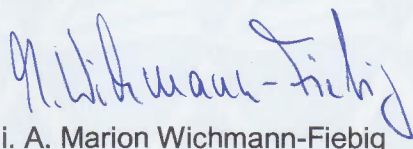
- EN 15267-3 tested
- QAL1 certified
- TUV approved
- Annual inspection

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

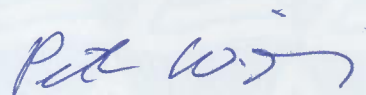
The certificate is valid until:
19 July 2017

Umweltbundesamt
Dessau, 20 August 2012

TÜV Rheinland Energie und Umwelt GmbH
Köln, 17 August 2012



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Am Grauen Stein
51105 Köln

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

Test report:	936/21208609/B of 20 October 2008
First certification:	20 July 2012
Validity ends:	19 July 2017
Publication:	BAnz AT 20 July 2012 B11, chapter IV, Notification 18

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 six months field test at waste incineration 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 936/21208609/B of 20 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 11 March 2009, No. 38, p. 899, chapter I, No. 1.2
- publication in the German Federal Gazette: BAnz 26 January 2011, No. 14, p. 294, chapter IV, notification 12 and 30
- publication in the German Federal Gazette: BAnz AT 20 July 2012 B11, chapter IV, Notification 18

AMS name:
Dusthunter SP100

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 - 15	SE

15 SE \triangleq 18 mg/m³ dust

Supplementary ranges (SR):

Component	SR	Unit
Dust	0 - 5	SE
Dust	0 - 20	SE
Dust	0 - 50	SE
Dust	0 - 100	SE
Dust	0 - 200	SE

Software versions:

MCU: 1.0.40,
Sensor: 1.3.04,
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/B of 20 October 2008

12 Notification to the announcement of the German Federal Environmental Agency of 3 August 2009 (BAnz. p. 2929, Chapter I No. 2.3)

The current software versions of the dust concentration measuring system DUSTHUNTER SP100 by SICK Engineering GmbH are:

MCU Firmware:	01.04.00
MCU Hardware:	1.8
Software Sensor (measuring head):	01.03.06

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

Statement of TÜV Rheinland Energie und Umwelt GmbH dated 5 October 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
...
4	DUSTHUNTER SP100/ Sick Engineering GmbH	to announcement 12 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
...

18 Notification to the announcement of the German Federal Environmental Agency of 19 February 2009 (BAnz. p. 899, Chapter I No. 1.2) and 10 January 2011 (BAnz. p. 294, Chapter IV, notification 12 and 30)

The measuring system DUSTHUNTER SP100 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 works under the principle of scattered light measurement (forward scattering).

The measured scattered light intensity [SI] is proportional to the dust concentration [c]. However, since the scattered light intensity depends not only on the number and size of the particles but also on their optical properties, the measuring system must be calibrated through gravimetric parallel measurements in order to guarantee an exact measurement of dust concentrations. The determined calibration coefficients can be entered directly into the measuring system according to the following formula:

$$c = cc2 \cdot SI^2 + cc1 \cdot SI + cc0$$

(Default configuration ex-works: cc2 = 0, cc1 = 1, cc0 = 0).

The hereby tested measuring system DUSTHUNTER SP100 comprises the following parts:

- DHSP-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 (external purge air unit 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 comprises two main modules:

- Electronics unit

It contains the optical and electronic modules for sending and receiving the light beam. It also holds the modules for processing and evaluating signals.

- Measuring probe

The measuring probe is available in various designs, materials and nominal lengths, as well as for different gas temperature ranges. The used type defines the device version.

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.

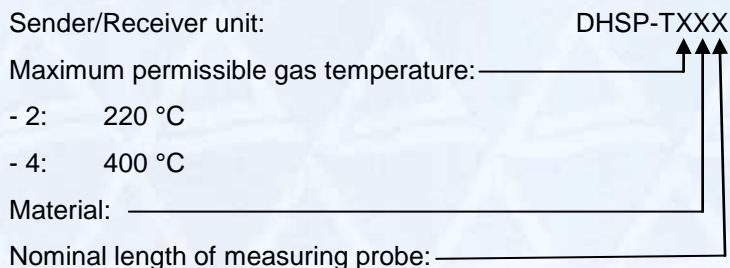
The sender/receiver unit is mounted to the duct by a flange with tube.

Remarks

- Sender/Receiver units with nominal lengths greater than 735 mm are intended solely for installation at thick-walled or double-walled ducts
- The distance between inner duct wall and measuring opening shall not exceed 450 mm

Versions

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



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. 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.

Standard interfaces

Analogue outputs:

3 outputs 0/2/4 - 22 mA (galvanically isolated, active) for output of: scattered light intensity, dust concentration (uncalibrated), dust concentration (calibrated), 12 bit resolution

Relay outputs:

5 changeover contacts (120 V, AC, 1A, 30 V DC 2A) for output of status signals:

- Operation/Malfunction • Maintenance • Function check • Service requirement • Limit value

Analogue inputs:

2 inputs 0 ... 20 mA (standard; without galvanic isolation) or 0 ... 5/10 V, 10 bit resolution

Digital inputs:

4 inputs for connecting potential-free contacts, e.g. for connecting a maintenance switch or triggering control cycle

Communication:

- USB 1.1 and RS232 (on grips) for measured value enquiry, parameterisation and software update
- RS485 for sensor connection

Versions

- MCU-N control unit without integrated purge air supply
- MCU-P control unit 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. The purge air hose is a separate component of the measuring system.

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 SP100 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/B of 20 October 2008
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Köln

Publication: BAnz. 11 March 2009, No. 38, p. 899, chapter I, No. 1.2
Announcement by UBA from 19 February 2009

Notifications

Publication: BAnz. 26 January 2011, No. 14, p. 294, chapter IV, notification 12 and 30
Announcement by UBA from 10 January 2011 (change of software versions)

Initial certification according to EN 15267

Certificate No. 0000036945: 20 August 2012

Validity of the certificate: 19 July 2017

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

Publication: BAnz AT 20 July 2012 B11, chapter IV, Notification 18
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	DH SP100
Serial Number	7478637 / 7478638
Measuring Principle	scattered light

TÜV Data

Approval Report	936 / 21208609/B
Date	20.10.2008
Editor	Kerpa

Measurement Component

certificated range	Dust
	15 mg/m ³

Calculation of the combined standard uncertainty

Test Value		$\Delta X_{max, j}$	u^2
Standard deviation from paired measurements under field conditions	u_{inf}	0.09 mg/m ³	0.008
Lack of fit	$u_{rl, z}$	0.21 mg/m ³	0.015
Zero drift from field test	$u_{rl, s}$	0.03 mg/m ³	0.000
Span drift from field test	u_t	0.18 mg/m ³	0.011
Influence of ambient temperature at span	u_n	-0.11 mg/m ³	0.004
Influence of supply voltage	u_f	0.09 mg/m ³	0.003
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)	$u_c = \sqrt{\sum (u_{max, j})^2}$	0.264
Total expanded uncertainty	$U = u_c * k = u_c * 1,96$	0.518
Relative total expanded uncertainty	U in % of the ELV 10 mg/m ³	5.2
Requirement	U in % of the ELV 10 mg/m ³	22.5