

# CERTIFICATE

## of Product Conformity (QAL1)

Certificate No.: 0000036945\_03

**AMS designation:** DUSTHUNTER SP100 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 9 pages).  
The present certificate replaces certificate 0000036945\_02 of 18 July 2017.



Suitability Tested  
EN 15267  
QAL1 Certified  
Regular Surveillance  
  
www.tuv.com  
ID 0000036945

Publication in the German Federal Gazette  
(BAnz) of 31 July 2020

This certificate will expire on:  
30 July 2025

German Federal Environment Agency  
Dessau, 07 September 2020

TÜV Rheinland Energy GmbH  
Cologne, 06 September 2020



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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.

**Test Report:** 936/21246256/B dated 10 March 2020  
**Initial certification:** 20 July 2012  
**Expiry date:** 30 July 2025  
**Publication:** BAnz AT 31.07.2020 B10, 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<sup>th</sup> BImSchV), chapter IV (17<sup>th</sup> BImSchV), 30<sup>th</sup> BImSchV, plants in compliance with TA Luft and plants according to the 27<sup>th</sup> 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 eleven-months field test at a municipal waste incinerator.

The AMS is approved for an ambient temperature range of -40 °C to +60 °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 936/21246256/B dated 10 March 2020 issued by TÜV Rheinland Energy 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 31.07.2020 B10, chapter I number 1.2, UBA announcement of 27 May 2020:

**AMS designation:**

DUSTHUNTER SP100 for dust

**Manufacturer:**

SICK Engineering GmbH, Ottendorf Okrilla

**Field of application:**

For measurements at plants requiring official approval and plants according to 27<sup>th</sup> BIm-SchV

**Measuring ranges during performance testing:**

Component	Certification range	supplementary measuring ranges	Unit
Dust	0–7.5	0–10/ 0–15/ 0–50/0–100/ 0–200/ 0–500	mg/m <sup>3</sup>

**Software versions:**

Sensor: 01.06.06  
Sensor Ex: 01.06.12  
MCU: 01.12.05

**Restriction:**

During performance testing in accordance with EN 15267-3, the requirement for the determination coefficient  $R^2$  of the calibration function was not fulfilled.

**Notes:**

1. The maintenance interval is three months. The maintenance interval is six months for measuring ranges of or larger than 0 to 15 mg/m<sup>3</sup>.
2. The dust concentration is determined in wet flue gas under operational conditions.
3. Certification also covers the Ex version of the instrument.
4. A probe of 735 mm length was used for testing. Certification also covers shorter probes.
5. Supplementary testing as regards Federal Environment Agency (UBA) notices of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter I number 1.5) and of 28 June 2019 (BAnz AT 22.07.2019 B8, chapter V 16<sup>th</sup> notification)

**Test Report:**

TÜV Rheinland Energy GmbH, Cologne  
Report no.: 936/21246256/B dated 10 March 2020

### **Certified product**

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

The measuring system uses scattered light as its measuring principle (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 tested DUSTHUNTER SP100 measuring system 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 the control, evaluation and output of data provided by 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)
- Optional 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 unit 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:

- electronic 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.

- Measurement 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.

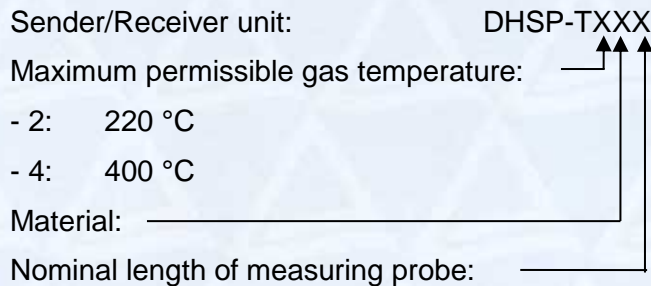
The measuring probe is available in various designs, nominal lengths, materials and for various gas temperature ranges. The probe defines the instrument version.

**Remarks:**

- Sender/Receiver units with nominal lengths greater than 735 mm are intended solely for installation at thick-walled or double-walled duct.
- 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 (instrument 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 via a USB port. This way, the setup of plant and instrument parameters can be easily and comfortably carried out via a laptop running 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 separation) 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 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](http://qal1.de).

### **Document history**

Certification of the DUSTHUNTER SP100 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. 0000036945: 20 August 2012  
Expiry date of the certificate: 19 July 2017

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 20 March 2012  
Publication: BAnz AT 20.07.2012 B11, chapter IV notification 18  
UBA announcement dated 06 July 2012

### **Supplementary testing according to EN 15267**

Certificate no. 0000036945\_01: 22 March 2013  
Expiry date of the certificate: 19 July 2017

Test Report: 936/21219384/B dated 27 September 2012  
TÜV Rheinland Energie und Umwelt GmbH, Cologne  
Publication: BAnz AT 05.03.2013 B10, chapter I number 1.5  
UBA announcement dated 12 February 2013

### **Notifications in accordance with EN 15267**

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 22 March 2013  
Publication: BAnz AT 23.07.2013 B4, chapter V notification 11  
UBA announcement dated 03 July 2013  
(New software version)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 25 March 2013  
Publication: BAnz AT 23.07.2013 B4, chapter V notification 13  
UBA announcement dated 03 July 2013  
(SOPAS ET software version)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 24 March 2015  
Publication: BAnz AT 26.08.2015 B4, chapter V notification 11  
UBA announcement dated 22 July 2015  
(New software version)

Statement issued by TÜV Rheinland Energy GmbH dated 25 April 2016  
Publication: BAnz AT 01.08.2016 B11, chapter V notification 12  
UBA announcement dated 14 July 2016  
(New software version)

Statement issued by TÜV Rheinland Energy GmbH dated 13 October 2016  
Publication: BAnz AT 15.03.2017 B6, chapter V notification 22  
UBA announcement dated 22 February 2017  
(New software version)

Statement issued by TÜV Rheinland Energy GmbH dated 28 September 2017  
Publication: BAnz AT 26.03.2018 B8, chapter V notification 44  
UBA announcement dated 21 February 2018  
(software updates)

Statement issued by TÜV Rheinland Energy GmbH dated 28 February 2019  
Publication: BAnz AT 22.07.2019 B8, chapter V notification 16  
UBA announcement dated 28 June 2019  
(Design and software changes)

**Supplementary testing according to EN 15267**

Certificate no.0000036945\_03: 07 September 2020  
Expiry date of the certificate: 30 July 2025  
Test report 936/21246256/B dated 10 March 2020  
TÜV Rheinland Energy GmbH, Cologne  
Publication: BAnz AT 31.07.2020 B10, chapter I number 1.2  
UBA announcement of 27 May 2020



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

**Measuring system**

Manufacturer	SICK Engineering GmbH
AMS designation	DUSTHUNTER SP100
Serial number of units under test	547 / 428
Measuring principle	forward scattering

**Test report**

Test laboratory	TÜV Rheinland
Date of report	2020-03-10

**Measured component**

Certification range	Dust 0 - 7.5 mg/m <sup>3</sup>
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**Calculation of the combined standard uncertainty**

**Tested parameter**

			u <sup>2</sup>
Standard deviation from paired measurements under field conditions *	u <sub>D</sub>	0.070 mg/m <sup>3</sup>	0.005 (mg/m <sup>3</sup> ) <sup>2</sup>
Lack of fit	u <sub>lof</sub>	0.040 mg/m <sup>3</sup>	0.002 (mg/m <sup>3</sup> ) <sup>2</sup>
Zero drift from field test	u <sub>d,z</sub>	-0.017 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>	-0.104 mg/m <sup>3</sup>	0.011 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of ambient temperature at span	u <sub>t</sub>	0.121 mg/m <sup>3</sup>	0.015 (mg/m <sup>3</sup> ) <sup>2</sup>
Influence of supply voltage	u <sub>v</sub>	0.015 mg/m <sup>3</sup>	0.000 (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> )	$u_c = \sqrt{\sum (u_{max,j})^2}$	0.19 mg/m <sup>3</sup>
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.37 mg/m <sup>3</sup>

**Relative total expanded uncertainty**

**Requirement of 2010/75/EU**

Requirement of EN 15267-3

<b>U in % of the ELV 5 mg/m<sup>3</sup></b>	<b>7.5</b>
<b>U in % of the ELV 5 mg/m<sup>3</sup></b>	<b>30.0</b>
U in % of the ELV 5 mg/m <sup>3</sup>	22.5