

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000056503

AMS designation: StackGuard 2 System for dust

Manufacturer: Sigrist-Photometer AG
Hofurlistr. 1
CH-6373 Ennetbürgen
Switzerland

Test Laboratory: TÜV Rheinland Energy GmbH

This is to certify that the AMS has been tested and certified
according to 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 6 pages).



Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

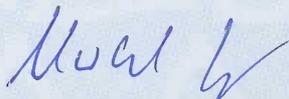
www.tuv.com
ID 0000056503

Publication in the German Federal Gazette
(BAnz) of 17 July 2018

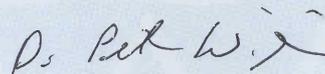
This certificate will expire on:
16 July 2023

German Federal Environment Agency
Dessau, 4 September 2018

TÜV Rheinland Energy GmbH
Cologne, 3 September 2018



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Test institute accredited to EN ISO/IEC 17025:2005 by DAkkS (German Accreditation Body).
This accreditation is limited to the accreditation scope defined in the enclosure to the certificate D-PL-11120-02-00.

Test Report:	936/21236286/C dated 2 March 2018
Initial certification:	17 July 2018
Expiry date:	16 July 2023
Publication:	BAnz AT 17.07.2018 B9, 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), at waste incineration plants according to Directive 2010/75/EU, chapter IV (17th BImSchV), 30th BImSchV and TA Luft. 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 a six-months 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 installation at which it will be installed.

Basis of the certification

This certification is based on:

- Test report 936/21236286/C dated 2 March 2018 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 17.07.2018 B9, chapter I number 1.2, UBA announcement dated 3 July 2018:

AMS designation:

StackGuard 2 System for dust

Manufacturer:

Sigrist Photometer AG, Ennetbürgen, Switzerland

Field of application:

For plants requiring official approval

Measuring ranges during performance testing:

Component	Certification range	Unit
Dust	0–7.5*	mg/m ³

* corresponded to 0–1 mg/m³ PLA during the field test (short for “polystyrene-latex aerosol”, consists of spherical particles with a diameter of 1 µm)

Component	Supplementary ranges		Unit
Dust	0–0.3	0–30	mg/m ³ PLA

Software version:

1.3

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 actual flow velocity at the installation determines which suction nozzle to use.

Test Report:

TÜV Rheinland Energy GmbH, Cologne
Report no.: 936/21236286/C dated 2 March 2018

Certified product

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

The extractive StackGuard 2 System continuously measures the dust content present in a flue gas sample. To this effect, a sample probe combined with a heated ring line continuously extracts sample gas from the waste gas flow. This also allows for measurements in gases saturated with water vapour. A partial flow of the extracted sample is subjected to measurement. The sample gas is then reinserted into the duct.

With the laser light source, the photometer provides high sensitivity. At the same time, filtered purge air prevents the measurement cell windows from being soiled. A checking rod allows for easy checking of the StackGuard 2 System during operation.

The measurement system StackGuard 2 System consists of the following components:

- Ring line system with heaters, mixing-section, sample splitter, sampling line and sample return line including suction blower,
- Photometer,
- Control unit SIGAR 2,
- Operation manual in German language,
- Software Version 1.3.

Ring line

The ring line's purpose is to extract a stable sample from the waste gas duct, process it for analysis in the photometer and finally re-insert the sample back into the waste gas duct. Heating of the sample flow prevents the formation of condensation.

Two duct-mounted probes effect sampling and re-insertion. The supply pipe transports the sample to the sample splitter. Wet gases are heated with one or more heaters to allow for determination of dust or soot content without interference from vapour. Heating is controlled. A mixing section is placed at the end of the supply pipe. The sample is thoroughly swirled to homogenise the dust distribution within the sample.

Inside the sample splitter, a small sample is taken immediately upstream of the measurement point which is then led to the measurement cell via the sample cone. The sample temperature is measured near the sample cone.

The return line ensures the re-insertion of the sample into the waste gas duct. To protect the return line from temperatures below the dew point, this line, too, may be heated.

Photometer

The StackGuard photometer integrated in the StackGuard 2 System comprises two mechanically separated parts: the electronics/optics unit and the measurement cell separated by an intermediate plate. To protect optical parts from contamination, the StackGuard uses a purge system which surrounds the sample flow and thus prevents soiling of the optical parts. Ambient air, filtered and heated, serves as purge air.

Measurement takes place in two different stages. At the first stage, the laser is switched off. Zero values of the three detectors are recorded. At the second stage, the temperature-controlled laser is switched on and the measuring light of the two reference detectors and the 20° scattered-light detector is recorded. The measured value is calculated from these signals.

Automatic sensor check

The StackGuard 2 System provides automatic sensor checks. An internal control unit checks instrument functions.

Periodically-recorded values are compared to target values. A warning is issued in the event of excessive deviations. The StackGuard 2 System also monitors the soiling level of the measuring cell windows. To this effect, the signals of the two reference detectors are compared. In the event of excessive discrepancies a warning is issued.

SIGAR 2 control unit

The StackGuard 2 System dust emission measuring system is entirely controlled via the integrated SIGAR 2 control unit. All necessary operational elements are part of the control unit.

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.

Certification of the StackGuard 2 System 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. 0000056503: 4 September 2018
Expiry date of the certificate: 16 July 2023
Test report: 936/21236286/C dated 2 March 2018
TÜV Rheinland Energy GmbH, Cologne
Publication: BAnz AT 17.07.2018 B9, chapter I number 1.2
UBA announcement dated 3 July 2018

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

Measuring system

Manufacturer	Sigrist-Photometer AG
AMS designation	StackGuard 2 System
Serial number of units under test	710207 / 710209
Measuring principle	Scattered light extractive

Test report

Test laboratory	936/21236286/C
Date of report	TÜV Rheinland
	2018-03-02

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	0.065 mg/m ³	0.004 (mg/m ³) ²
Lack of fit	u_{lof}	-0.040 mg/m ³	0.002 (mg/m ³) ²
Zero drift from field test	$u_{d,z}$	0.004 mg/m ³	0.000 (mg/m ³) ²
Span drift from field test	$u_{d,s}$	-0.074 mg/m ³	0.005 (mg/m ³) ²
Influence of ambient temperature at span	u_t	0.055 mg/m ³	0.003 (mg/m ³) ²
Influence of supply voltage	u_v	0.031 mg/m ³	0.001 (mg/m ³) ²
Influence of sample gas flow	u_p	0.100 mg/m ³	0.010 (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)	$u_c = \sqrt{\sum (u_{max, j})^2}$	0.17 mg/m ³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.33 mg/m ³

Relative total expanded uncertainty

Requirement of 2010/75/EU	U in % of the ELV 5 mg/m³	6.7
Requirement of EN 15267-3	U in % of the ELV 5 mg/m ³	30.0
	U in % of the ELV 5 mg/m ³	22.5