Umwelt Bundesamt

TÜVRheinland®
Precisely Right.

# CERTIFICATE

## of Product Conformity (QAL1)

**Certificate No.: 0000050627**

| | |
|---|---|
| **Certified AMS:** | STACKFLOW 200 for gas velocity |
| **Manufacturer:** | PCME Ltd.<br>60 Edison Road<br>St. Ives, Cambs, PE27 3GH<br>United Kingdom |
| **Test Institute:** | 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 (2015)**

Certification is awarded in respect of the conditions stated in this certificate (this certificate contains 6 pages).

TÜVRheinland® CERTIFIED

Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

www.tuv.com
ID 0000050627

Publication in the German Federal Gazette (BAnz.) of 14 March 2016

This certificate will expire on:
13 March 2021

German Federal Environment Agency
Dessau, 25 April 2016

Dr. Marcel Langner
Head of Section II 4.1

TÜV Rheinland Energy GmbH
Cologne, 24 April 2016

ppa. Dr. Peter Wilbring


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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

Umwelt Bundesamt

**Certificate:**
0000050627 / 25 April 2016

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| | |
|---|---|
| **Test report:** | 936/21228880/A date 12 October 2015 |
| **Initial certification:** | 14 March 2016 |
| **Expiry date:** | 13 March 2021 |
| **Publication:** | BAnz AT 14.03.2016 B7, chapter II number 1.1 |

**Approved application**
The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13. BImSchV), at waste incineration plants according to Directive 2010/75/EU, chapter IV (17. BImSchV) and other plants requiring official approval. The measured ranges have been selected considering 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 three-month field test at a waste incineration 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 valid at the time of performance testing. As changes in legal regulations are possible, any potential user should ensure that this AMS is suitable for monitoring relevant gas velocity 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 936/21228880/A date 12 October 2015 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 14.03.2016 B7, chapter II number 1.1, Announcement by UBA from 18 February 2016:

**AMS designation:**
STACKFLOW 200 for gas velocity

**Manufacturer:**
PCME Ltd., St. Ives, Cambs,

**Field of application:**
For measurements at plants requiring official approval and plants according to 27. BImSchV

**Measuring ranges during the performance test:**

| Component | Certification range | Supplementary range | Unit |
|---|---|---|---|
| Exhaust gas velocity | 2 - 30 | 2 - 50 | m/s |

**Software version:**

| | |
|---|---|
| Sensor: | 2.01 |
| Operating units: | |
| Interface Modul: | 8.41 |
| MultiController: | 8.41 |
| ProController: | 0.52 |
| PC-ME DUST TOOLS: | 2.31 |

**Restrictions:**
None

**Notes:**
1. The maintenance interval is four weeks.
2. For zero and reference point tests with the fitted adjustment module, an external, calibrated portable measurement instrument for differential pressure is required in order to validate the rated value.
3. The STACKFLOW 200 measuring system is available in different configurations:

| Product designation | Configuration |
|---|---|
| Sensor<br>STACKFLOW 200<br>STACKFLOW 200 Standard<br>STACKFLOW 200 Plus<br>STACKFLOW 200 Pro | <br>Stand-alone<br>with Interface Module<br>with MultiController<br>with ProController |

**Test report:**
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Report No.: 936/21228880/A date 12 October 2015

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

STACKFLOW 200 continuously measures exhaust velocity in flues. As in situ measurement system it determines measurement signal directly in the gas flow without extracting a sample.

It consists of the following system components:

- Sensor, Softwareversion: 2.01
- Measuring module with pressure sensors and electronic cards,
- Calibration module (for AST and QAL3 tests),
- Software PCME-ME DUST TOOLS, version: 2.31
- 24 V voltage module
- OPTIONAL: Control units for parameter setting and visualization of measurement data: ProController (version: 0.52), MultiController(version: 8.41), interface module (version: 8.41)

STACKFLOW 200 measures exhaust gas velocity according to the principle of differential pressure. The sensor measures 3 main physical quantities:

- the difference between ram pressure and static pressure
- the absolute value of the static pressure
- the temperature captured by the PT100 sensor on the outer side of the tube.

Based on these 3 physical quantities STACKFLOW 200 determines the velocity of the flue gas or the gas flow volume.

The basic version of STACKFLOW 200 only consists of the sensor (measurement probe measuring module and adjustment module), as well as of a 24 V voltage module. Operation requires an external computer.

The measurement probe consists of a stainless steel tube with several pressure ports, a temperature sensor and equipment access door for maintenance purposes.

The measuring module main elements are the pressure sensors and electronic cards. Each measurement point is fitted with a delimiter and a buffer volume used to stabilize the pressure detected by the sensors (time average).

Two magnet valves periodically trigger backwashing of the complete AMS including measurement probe and measuring module. This provides a clean and dry air buffer between the pressure sensors and the Pitot tube in order to protect the sensors from corrosive gases in the stack. Condensate formation and contamination of the tubes are prevented in the fluid circulation as well.

The adjustment module includes an adjustable generator of differential pressure (0 – 20 hPa) as well as three 3-way hand valves. Additionally, there are two pressure measurement connectors for the connection of reference differential pressure systems.

The differential pressure generator uses compressed air, metering orifices and a bypass to compensate pressure overload.

STACKFLOW 200 can optionally also be connected to a multi-channel PCME ProController/ MultiController or a single channel PCME Interface Module. The operation units simplify the operation of the sensor.

**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 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 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 Energy GmbH. With revocation of the publication the certificate loses its validity. After the expiration of the certificate and on requests of the TÜV Rheinland Energy 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 STACKFLOW 200 for gas velocity is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

**Initial certification according to EN 15267**

Certificate No. 0000050627: 25 April 2016,
Expiry date of the certificate: 13 March 2021

Test report: 936/21228880/A of 12 October 2015
TÜV Rheinland Energie und Umwelt GmbH, Cologne,

Publication: BAnz AT 14.03.2016 B7, chapter II number 1.1,
Announcement by UBA from 18 February 2016

**Certificate:**
0000050627 / 25 April 2016

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

| | | | | | |
|---|---|---|---|---|---|
| **Measuring system** | | | | | |
| Manufacturer | | | PCME Ltd. | | |
| AMS designation | | | STACKFLOW 200 | | |
| Serial number of units under test | | | TÜV 1 TÜV 2 / TÜV 3 TÜV 4 | | |
| Measuring principle | | | Differential pressure | | |
| **Test report** | | | 936/21228880/A | | |
| Test laboratory | | | TÜV Rheinland | | |
| Date of report | | | 2015-10-12 | | |
| **Measured component** | | | Velocity | | |
| Certification range | | | 2 - 30 | m/s | |

**Calculation of the combined standard uncertainty**

| **Tested parameter** | | | | $u^2$ | |
|---|---|---|---|---|---|
| Standard deviation from paired measurements under field conditions * | $u_D$ | 0.252 | m/s | 0.064 | $(m/s)^2$ |
| Lack of fit | $u_{lof}$ | -0.173 | m/s | 0.030 | $(m/s)^2$ |
| Zero drift from field test | $u_{d,z}$ | 0.121 | m/s | 0.015 | $(m/s)^2$ |
| Span drift from field test | $u_{d,s}$ | 0.156 | m/s | 0.024 | $(m/s)^2$ |
| Influence of ambient temperature at span | $u_t$ | 0.070 | m/s | 0.005 | $(m/s)^2$ |
| Influence of supply voltage | $u_v$ | 0.023 | m/s | 0.001 | $(m/s)^2$ |
| Uncertainty of reference material at 70% of certification range | $u_{rm}$ | 0.242 | m/s | 0.059 | $(m/s)^2$ |

* The larger value is used :
"Repeatability standard deviation at set point" or
"Standard deviation from paired measurements under field conditions"

| | | | |
|---|---|---|---|
| Combined standard uncertainty ($u_C$) | $u_c = \sqrt{\sum (u_{max,j})^2}$ | 0.44 | m/s |
| Total expanded uncertainty | $U = u_c * k = u_c * 1.96$ | 0.87 | m/s |

| | | |
|---|---|---|
| **Relative total expanded uncertainty** | **U in % of the range 30 m/s** | **2.9** |
| **Requirement of 2010/75/EU** | **U in % of the range 30 m/s** | **10.0 **** |
| Requirement of EN 15267-3 | U in % of the range 30 m/s | 7.5 |

** The EU-directive 2010/75/EU on industrial emissions provides no requirements for this component.
A value of 10.0 % was used for this.