

CERTIFICATE

on Product Conformity (QAL1)

Certificate No.: 0000038497

Certified AMS: PCME QAL 991 for total dust

Manufacturer: PCME Ltd.
60 Edison Road
St. Ives
Cambs
PE273 GH
United Kingdom

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**

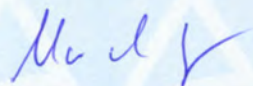
Certification is awarded in respect of the conditions stated in this certificate
(see also the following pages).



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

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

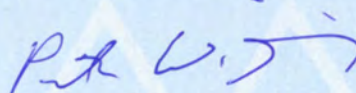
German Federal Environment Agency
Dessau, 22 March 2013



i. A. Dr. Marcel Langner

This certificate will expire on:
04 March 2018

TÜV Rheinland Energie und Umwelt GmbH
Cologne, 21 March 2013



ppa. Dr. Peter Wilbring

www.umwelt-tuv.de / www.eco-tuv.com
teu@umwelt-tuv.de
Tel. +49 221 806-2756

TÜV Rheinland Energie und Umwelt GmbH
Am Grauen Stein
51105 Cologne

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

Test report:	936/21220334/B of 28 September 2012
Initial certification:	05 March 2013
Expiry date:	04 March 2018
Publication:	BAnz AT 05 March 2013 B10, chapter I, No. 1.2

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 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 sixmonth field test at a spray tower to dry charges for the production of ceramic floor coverings.

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 936/21220334/B of 28 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. 1.2

AMS designation:

PCME QAL 991 for total dust

Manufacturer:

PCME Ltd., St. Ives, United Kingdom

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 performance test:

Component	Certification range	Supplementary range	Unit
Dust	0 - 50*	0 - 200*	Units

*0 - 50 units equals 0 - 15 mg/m³ dust in the wind-tunnel

*0 - 200 units equals 0 - 15 mg/m³ dust in the field

Software versions:

Controller Software: 7.90

Sensor Software: 4.4

Restrictions:

1. It is not allowed to operate the measuring system downstream of electrostatic precipitators.
2. In case of flow velocities < 8.8 m/s, the measuring system may only be operated at constant flow velocities.

Notes:

1. The maintenance interval is three months.
2. The proper operation of the measuring system is verified for a waste gas velocity larger than 5.2 m/s.
3. The dust content is measured directly in the gas stream under operating conditions.
4. At the wind-tunnel, the measuring system was not able to measure dust which is artificially coated with heavy metals.
5. The requirement of Standard EN 15267-3 for determination coefficient R² of the calibration function was not met during performance testing.
6. Supplementary testing (implementation of EN 15267) as regards Federal Environmental Agency notices of 14 February 2008 (Federal Gazette (BAnz.), p. 901, chapter I, No. 1.1) and of 23 February 2012 (Federal Gazette (BAnz.), p. 920, chapter V, notification 10).

Test report:

TÜV Rheinland Energie und Umwelt GmbH, Cologne

Report No.: 936/21220334/B of 28 September 2012

Certified product

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

The measuring system consists of a sensor and an interface module (multi-controller). The electrodynamic signal that is collected by the sensor rod is measured in relative "Units" in the electronic unit. The data output on the display and the output of the measuring system QAL 991 are given in relative units, which are representative to the measured dust concentration.

The QAL 991 uses PCME's unique AC Electrodynamic technology. The DC signal created by particles colliding with a probe inserted in a stack is electronically rejected, leaving an AC signal resulting from charged particles passing and interacting with the rod. Since the frequency signal has been specifically optimized (Electrodynamic technology), the instrument has reduced cross sensitivity to changing velocity and has increased stability even with dust build-up on the sensor rod. The dust signal is amplified, digitised and processed at the sensor, consistent with good signal to noise design techniques. In constant processes using bagfilters (where typically particle-charging characteristics are constant), the processed signal can be correlated to dust concentration.

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 PCME QAL 991 for total dust is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

Basic test:

Test report: 936/21206365/A of 09 July 2007
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Cologne

Publication: BAnz. 06 November 2007, No. 206, p. 7925, chapter I, No. 1.1
Announcement by UBA from 23 September 2007

Supplementary testing:

Test report: 936/21206365/B of 09 November 2007
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Cologne

Publication: BAnz. 07 March 2008, No. 38, p. 901, chapter I, No. 1.1
Announcement by UBA from 14 February 2008

Notifications:

Publication: BAnz. 11 March 2009, No. 38, p. 899, chapter IV, notification 10
Announcement by UBA from 19 February 2009 (change of name to QAL 991)

Publication: BAnz. 02 March 2012, No. 36, p. 920, chapter V, notification 10
Announcement by UBA from 23 February 2012 (software and optics)

Initial certification according to EN 15267:

Certificate No. 0000038497: 22 March 2013

Expiry date of the certificate: 04 March 2018

Test report: 936/21220334/B of 28 September 2012
TÜV Rheinland Energie und Umwelt GmbH, Cologne

Publication: BAnz AT 05 March 2013 B10, chapter I, No. 1.2
Announcement by UBA from 12 February 2013

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

Measuring system

Manufacturer PCME Ltd.
Name of measuring system QAL 991
Serial number of the candidates 26206 / 26207
Measuring principle Tribodynamic

Test report

Test laboratory TÜV Rheinland
Date of report 2012-09-28

Measured component

Certification range Staub
0 - 15 mg/m³

Calculation of the combined standard uncertainty

Tested parameter

	u	u ²
Standard deviation from paired measurements under field conditions *	u _D 0.110 mg/m ³	0.012 (mg/m ³) ²
Lack of fit	u _{lof} 0.058 mg/m ³	0.003 (mg/m ³) ²
Zero drift from field test	u _{d,z} 0.017 mg/m ³	0.000 (mg/m ³) ²
Span drift from field test	u _{d,s} -0.017 mg/m ³	0.000 (mg/m ³) ²
Influence of ambient temperature at span	u _t 0.058 mg/m ³	0.003 (mg/m ³) ²
Influence of supply voltage	u _v 0.035 mg/m ³	0.001 (mg/m ³) ²
Uncertainty of reference material at 70% of certification range	u _{rm} 0.121 mg/m ³	0.015 (mg/m ³) ²

* The larger value is used :

"Repeatability standard deviation at span" or

"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u_c)

$$u_c = \sqrt{\sum (u_{max,j})^2} \quad 0.19 \text{ mg/m}^3$$

Total expanded uncertainty

$$U = u_c * k = u_c * 1.96 \quad 0.37 \text{ mg/m}^3$$

Relative total expanded uncertainty

U in % of the ELV 10 mg/m³ 3.7

Requirement of 2000/76/EC and 2001/80/EC

U in % of the ELV 10 mg/m³ 30.0

Requirement of EN 15267-3

U in % of the ELV 10 mg/m³ 22.5