Umwelt Bundesamt

TÜVRheinland®
Precisely Right.

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000038496_01

AMS designation:	PCME QAL 181 for total dust
Manufacturer:	PCME Ltd. 60 Edison Road St. Ives Cambs PE273 GH United Kingdom
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: 2004

Certification is awarded in respect of the conditions stated in this certificate (this certificate contains 7 pages).

TÜVRheinland® CERTIFIED

Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

www.tuv.com
ID 0000038496

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

This certificate will expire on:
04 March 2023

German Federal Environment Agency
Dessau, 05 March 2018

Dr. Marcel Langner
Head of Section II 4.1

TÜV Rheinland Energy GmbH
Cologne, 04 March 2018

ppa. Dr. Peter Wilbring

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TÜV Rheinland Energy GmbH
Am Grauen Stein
51105 Köln

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:	936/21220334/A dated 28 September 2012
Initial certification:	05 March 2013
Expiry date:	04 March 2023
Certificate:	Renewal (of previous certificate 0000038496 dated 22 March 2013 valid until 04 March 2018)
Publication:	BAnz AT 05.03.2013 B10, chapter I no. 1.1

Approved application

The tested AMS is suitable for use at combustion plants according to EC Directive 2001/80/EC (13th BImSchV), at waste incineration plants according to EC Directive 2000/76/EC (17th BImSchV), the 27th BImSchV, the 30th BImSchV and TA Luft. The measured ranges have been selected so as to cater for 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 three-month field test at cement 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 936/21220334/A dated 28 September 2012 issued by 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 05.03.2013 B10, chapter I no. 1.1, UBA announcement dated 12 February 2012:

AMS designation:
PCME QAL 181 for total dust

Manufacturer:
PCME Ltd., St. Ives, United Kingdom

Field of application:
For plants requiring official approval and for plants according to the 27th BImSchV

Measuring ranges during performance testing:

Component	Certification range	Supplementary range	Unit
Dust	0–15	0–100	mg/m³

Software versions:
Controller Software 7.90
Sensor Software 1.5D

Restrictions:
None

Notes:
1. As a result of a temporary peak in the dust concentration at the measurement site, a measuring range of 0 to 85 mg/m³ was determined during the manual calibration of the measuring system at a set measuring range of 0 to 100 mg/m³.
2. The maintenance interval is four weeks.
3. During performance testing in accordance with EN 15267-3, the requirement for the determination coefficient R^2 of the calibration function was not fulfilled.
4. The dust concentration is determined in wet flue gas under operational conditions.
5. Supplementary testing (migration to standard EN 15267) as regards Federal Environment Agency (UBA) notices of 12 September 2006 (BAnz p. 6715, chapter I no. 1.2) and of 23 February 2012 (BAnz p. 920, chapter V notification 9).

Test Report:
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Report no.: 936/21220334/A dated 28 September 2012

Publication in the German Federal Gazette: BAnz AT 14.03.2016 B7, chapter V notification 25,
UBA announcement dated 18 February 2016:

25 Notification as regards Federal Environment Agency (UBA) notice of 12 February 2013 (BAnz AT 05.03.2013 B10, chapter I number 1.1)

The current software versions of the PCME QAL 181 measuring system for total dust manufactured by PCME Ltd. are:

Controller Software: 8.41
Sensor Software: 2.6

Opinion stated by TÜV Rheinland Energie und Umwelt GmbH dated 22 October 2015

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

The PCME QAL 181 measuring system is a dust monitor which uses the scattered light principle (forward scattering) to determine dust concentrations.

The sensor probe is mounted directly at the waste gas duct. Particles entering the measurement flow at the end of the probe will scatter light emitted by the laser beam. The forward-scattered light cone is transmitted to the detector's electronics at the far end of the probe outside the waste gas duct via a quartz rod.

The instrument is continually supplied with purge air in order to prevent dust molecules from entering the instrument. The PCME QAL 181 analyser is equipped with automatic zero point, span point and contamination checks. The control unit records results of these checks.

For span checks, a scattering body is automatically entered into the laser beam in order to test the sensor response to scattered light directly.

A "Pro-Scatter" audit unit, which is optionally available, is required for linearity tests of the instrument (AST and QAL2).

The current software version is:	Controller software: 8.41 Sensor software: 2.6
The current manual version is:	Version 5, dated 02/2016

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 PCME QAL 181 measuring system is based on the documents listed below and the regular, continuous surveillance of the manufacturer's quality management system:

Basic testing:

Test report: 936/21204255/A dated 07 July 2006
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Cologne
Publication: BAnz. 14 October 2006 no. 194, p. 6715, chapter I no. 1.2
UBA announcement dated 12 September 2006

Notifications:

Statement issued by TÜV Rheinland Immissionsschutz und Energiesysteme GmbH dated 10 October 2008
Publication: BAnz. 11 March 2009, no. 38, p. 899, chapter IV notification 11
UBA announcement dated 19 February 2009
(Name changed for QAL 181)

Statement issued by TÜV Rheinland Immissionsschutz und Energiesysteme GmbH dated 31 March 2009
Publication: BAnz. 25 August 2009 no. 125, p. 2929, chapter III notification 14
UBA announcement dated 3 August 2009
(New software version)

Statement issued by TÜV Rheinland Immissionsschutz und Energiesysteme GmbH dated 16 October 2009
Publication: BAnz. 12 February 2010 no. 24, p. 552, chapter IV notification 17
UBA announcement dated 25 January 2010
(Design)

Statement issued by TÜV Rheinland Energie und Umwelt GmbH dated 12 October 2011
Publication: BAnz. 02 March 2012 no. 36, p. 920, chapter V notification 9
UBA announcement dated 23 February 2012
(New software version and optics)

Initial certification according to EN 15267

Certificate no. 0000038496: 22 March 2013
Expiry date of the certificate: 04 March 2018

Test report: 936/21220334/A dated 28 September 2012
TÜV Rheinland Energie und Umwelt GmbH, Cologne
Publication: BAnz AT 05.03.2013 B10, chapter I no. 1.1
UBA announcement dated 12 February 2013

Notifications in accordance with EN 15267

Opinion stated by TÜV Rheinland Energie und Umwelt GmbH dated 22 October 2015
Publication: BAnz AT 14.03.2016 B7, chapter V notification 25
UBA announcement dated 18 February 2016
(New software version)

Renewal of the certificate

Certificate no. 0000038496_01: 05 March 2018
Expiry date of the certificate: 04 March 2023

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

Measuring system					
Manufacturer			PCME Ltd.		
Name of measuring system			QAL 181		
Serial number of the candidates			25141 / 31192 / 25142 / 32012		
Measuring principle			Scattered light		
Test report			936/21220334/A		
Test laboratory			TÜV Rheinland		
Date of report			2012-09-28		
Measured component			Staub		
Certification range			0 - 15	mg/m³	

Calculation of the combined standard uncertainty

Tested parameter				u²	
Standard deviation from paired measurements under field conditions *	u_D	0.249	mg/m³	0.062	(mg/m³)²
Lack of fit	u_{lof}	0.029	mg/m³	0.001	(mg/m³)²
Zero drift from field test	$u_{d,z}$	0.035	mg/m³	0.001	(mg/m³)²
Span drift from field test	$u_{d,s}$	-0.069	mg/m³	0.005	(mg/m³)²
Influence of ambient temperature at span	u_t	0.100	mg/m³	0.010	(mg/m³)²
Influence of supply voltage	u_v	0.015	mg/m³	0.000	(mg/m³)²
Uncertainty of reference material at 70% of certification range	u_{rm}	0.121	mg/m³	0.015	(mg/m³)²

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

$$u_c = \sqrt{\sum \left(u_{max,\ j}\right)^2}$$

Combined standard uncertainty (u_c)		0.31	mg/m³
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0.60	mg/m³

Relative total expanded uncertainty	**U in % of the ELV 10 mg/m³**	**6.0**
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