

Passionate
about
Particulate



PCME QAL 181 WS

PROSCATTER™
INSIDE

Particulate

Measurement

System

For stacks below
dew point and
with water droplets



- Compliance continuous particulate monitoring for wet stack conditions (QALI EN 14181)
- Modular design makes it easy to clean and maintain
- Suitable for stack measurement after wet scrubbers and processes below dewpoint
- Extractive system includes *ProScatter™* PCME QAL 181 Sensor System
- Automatic control and function test of all critical components
- No moving parts or radioactive sources

technology/applications

System Description

The **PCME QAL 181 WS** is suitable for measuring particulate emissions from wet scrubbers and other processes where the flue gas falls below the dew point (cold stack conditions) or has water droplet presence. The extractive instrument takes a representative continuous sample from the stack, heats this well above dew point and evaporates any water droplets to enable measurement of the particulate concentration under dry conditions.

This extractive approach with heating overcomes the problem of interference from condensation and water droplets when using an in-situ particulate monitor after wet collectors.

The system uses an advanced *ProScatter*[™] light scatter sensor (PCME QAL 181) which itself is certified by TUV certified to EN 15267-3 with QAL 1 as defined by EN 14181 with a certification range of 0 - 15 mg/m³.

The system will operate reliably in the flue gas conditions found after wet FGD and wet collectors in the Pulp and Paper, Metal and Chemicals industry where particulate levels are higher and the instrument is able to cope with potentially more contaminating conditions.

Process and Application Conditions

The instrument is suitable for the following process and stack conditions:

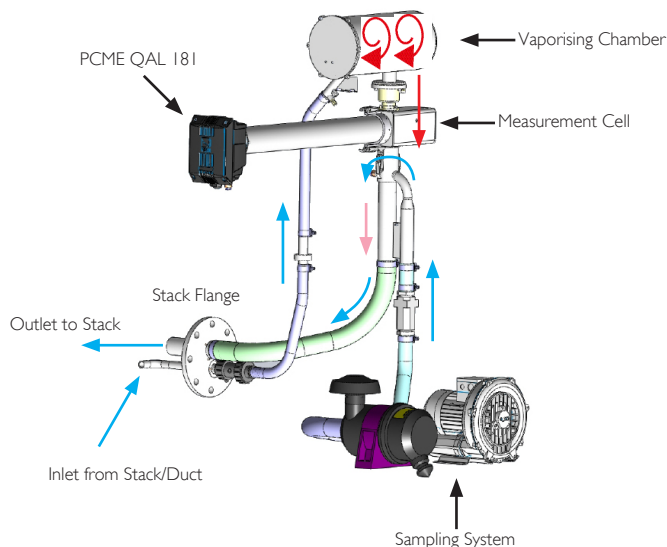
- Measurement range: 0-15, 0-100 mg/m³
- Detection Limit: <1 mg/m³
- Flue gas: below dew point: (wet stack)
- Flue Gas velocity range: 1-20 m/s

Typical wet stack applications:

- Applications requiring QAL1 approved systems for wet stack monitoring
- For applications with corrosive flue gas (e.g. wet FGD plant) an enhanced corrosion resistant version is available
- Waste Incineration plant with wet scrubbing abatement plant and WESPs.
- Pulp and Paper Recovery boilers.
- Metallurgical and chemical processes fitted with wet scrubbers.

Principles of Operation

The **PCME QAL 181 WS** takes a continuous sample from the stack under controlled conditions. The sample passes directly into a heated vaporising chamber to evaporate water droplets and condensation above the dew point. In the vaporising chamber, flue gas and water are thrown against the external wall of the heated cyclone to maximise contact area and thermal conductivity. This means the system is compact and much more efficient than systems which heat a linear sample line.



The sampling system is powered by a modified air amplifier meaning there are no moving parts or fans to block or contaminate. Flue gas is returned to the stack by the same sampling port as the sample is taken.

The key measurement part of the instrument is a QAL1 approved *ProScatter*[™] light scatter sensor (PCME QAL 181), which benefits from using a narrow forward angle of scatter (minimising effects of changing particle type and refractive index). The instrument has reduced sensitivity compared to light scattering sensors using angles of scatter further from the angle of incidence.

The instrument benefits from a powerful graphics user interface, suitable for the set-up, automatic control and measurement of the light scatter sensor, heater systems and sample line flow.

Added Value Features

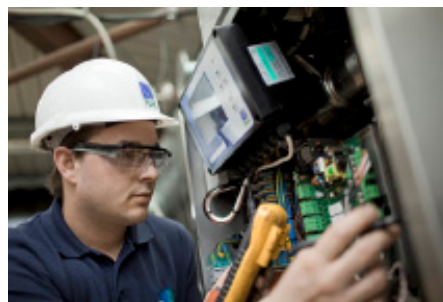
Key advantages of the instrument are as follows:

- Highly sensitive (<1 mg/m³) and rugged instrument for measuring particulate concentrations in wet flue gases
- Automatic control and function test of all critical systems (vaporising chamber, light scatter unit and sampling pump)
- QAL1 approved light scatter probe, suitable for monitoring according to EN 14181
- Automatic zero and span drift check and manual audit functionality (QAL3)
- Powerful user interface and inbuilt data logging and recording
- Inbuilt system diagnostics
- Proven reliability
- Can be lifted to stack location in parts

product features

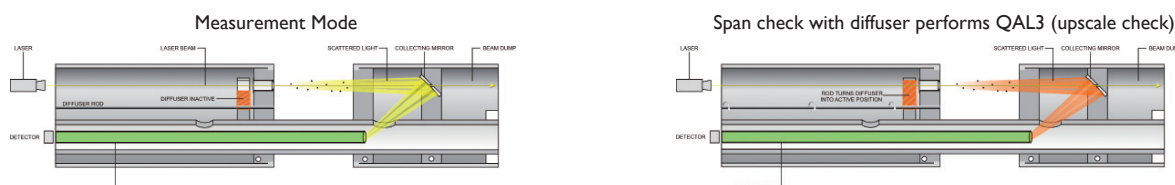
Serviceability

The system will provide reliable measurement of particle emissions in the aggressive environment of a wet stack, provided the system is correctly installed and commissioned and is appropriately maintained. As a good practice for any extractive system the frequency of scheduled maintenance and cleaning is defined considering the stack application. Plant personnel should be trained for first line support by PCME's network of service teams who also provide more in depth and 'contracted' on-site support.



Inbuilt Quality Assurance

The instrument has automatic zero and span checks on both the measurement instrument and the sample and handling system to ensure good quality measurements and to permit early diagnosis of any deterioration in system performance.



Instrument automatic self-checks involve reference scattering bodies which are automatically rotated into the measurement path periodically providing a full check of the instrument's capability to measure scattered light.



The instrument has been designed for easy and safe operator access to the measurement volume for external auditing with reference materials (as required for the AST linearity test for EN 14181 compliance). Flow rates and heater temperatures are continually monitored to ensure any sample line blockage or problems though insufficient heating are automatically detected and avoided. The system automatically indicates when valid measurements are occurring, hence avoiding any measurement errors during any system warm up.

The instrument has been designed to facilitate maintenance and cleaning of all major components. The central control system records all critical measurements to facilitate diagnosis of problems.

Modular design enables parts to be replaced whilst mounted in stack

Specification

Sampling Probe

	Standard
Sampling probe flange	4" ANSI (Class 150) DN100 PN10_16 JIS 100-5k,10k
Sampling probe length	Typically 600 or 900 mm (others on request)
Sample line length between sampling probe and analyser	1m
Isolation valve between stack and analyser	Manual ball valve on inlet
Sampling probe material	316 SS + PVDF + Hastelloy (flue gas dependant)

Analyser

	Standard	Option
Power supply	230VAC (standard), 3.2KW	115VAC 3KW
Interfaces	Modbus/ RS485 / 232 4-20mA (isolated)	Ethernet
Data recording	1 year of Emission averages (15 minutes) Rolling 24 hours of short term data Rolling 2 hour of pulse data Instrument self check results	PC-ME Dust Tools software for reporting on LAN or PC
User interface ¹	Multi language graphics display with set up menus, trending display and QA screens	PC-ME Dust Tools PC software for data display and set up and recording of instrument configuration
External dimensions of main enclosure	779 x 640 x 365mm	As standard
Weight fully assembled	120Kg	As standard
Frame	None	Standard Extended Others on request
Material of wetted parts	316 SS	Other materials on request
GPRS Module	Diagnostics	Remote Interogation

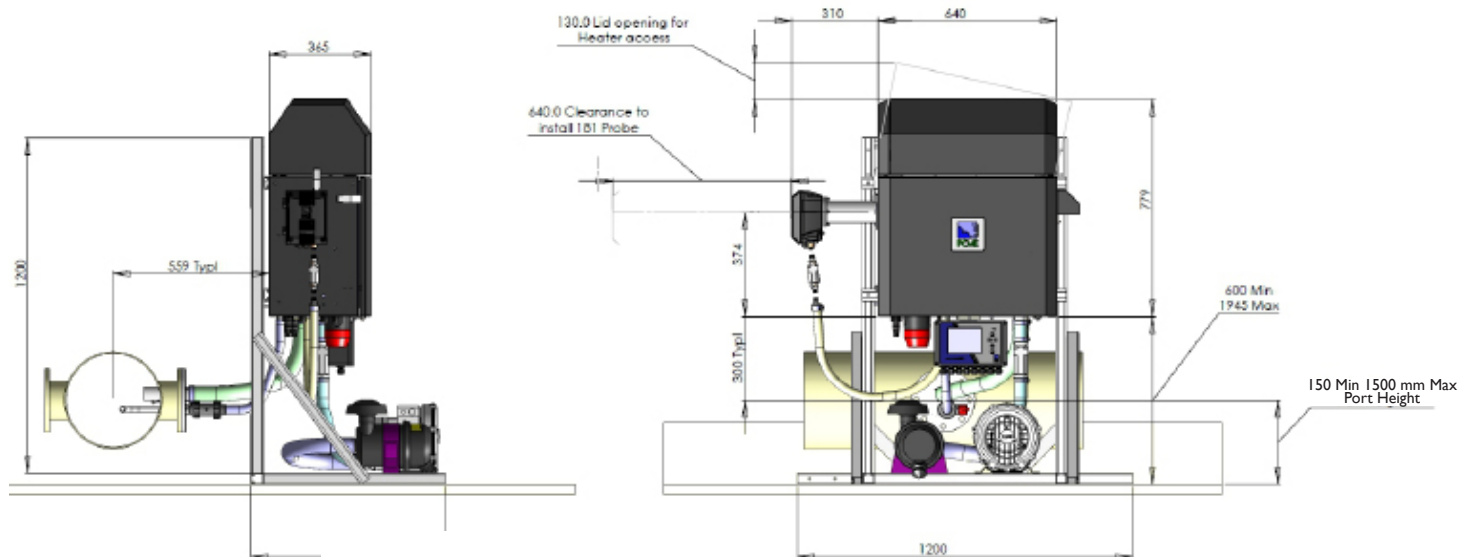
Systems supplied against a completed Application Suitability Form and Site Installation Form.



¹Option to install additional Control Unit remote from system

specifications

Dimensions & Stack Mounting Arrangements



- Analyser unit to be located above and closely coupled to sampling probe
- Sampling probe stack connection is 4" ANSI (class 150)/DN100 PN10_16 /JIS 100-5k, 10k Flange

Note: Example arrangement
Stack/duct shown in image (yellow) not included
All units in mm unless otherwise stated

Order Codes

PCME QAL 181 WS - A B C D E F G

PCME QAL 181 WS

Option	Description	Options	Default
A	Corrosion Resistance (of the system's wetted parts)	Not required Hastelloy	0 HAST
B	Voltage	115V 230V	115V 230V
C	Probe Length	600mm 1200mm	P600 P1200
D	Probe Type (sensor material)*	Standard PVDF Hastelloy	Standard PVDF HAST
E	Frame	Not required Required	0 FRAME
F	Control Unit	MultiController MultiController with Ethernet	M M+ET
G	Audit Units	Not included Single Filter audit unit 5 audit set Hastelloy sing audit unit Hastelloy 5 audit set	0 AUD-1-LS AUD-5-LS AUD-1-LS-HAST AUD-5-LS-HAST

*The choice of sensor material will depend on the process conditions and composition of the flue gas

PC Software Options (PC-ME Dust Tools)

Option	Description	Default
Configuration options	System Set	OPT-SYSSET
Real-time data options	Online	OPT-ONLINE
Historical data options	Data Downloader Data Viewer Data Reporter	OPT-DOWNLOAD OPT-VIEWER OPT-REPORTER

Example Order Code:

PCME QAL 181 WS -

A	B	C	D	E	F	G
HAST	230V	P600	HAST	FRAME	M	AUD-5-LS-HAST

About PCME Ltd

As a progressive environmental Company, PCME specialises in particulate measurement for industrial processes. With a worldwide reputation for reliability, innovation and technological excellence, the Company produces equipment for concentration and mass monitoring for regulatory, environmental and process control requirements. A dedicated team of qualified application and sales engineers is always on hand and should be consulted in the selection and usage of the most suitable equipment for any particulate application.

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