Passionate about Particulate

PCME

PCME WET STACK 181

PROSCATTER™ INSIDE

Particulate Measurement System

Particulate CEM for stacks below dew point and with water droplets

- Compliance particulate monitoring for wet stack conditions (PS-11/EN 1418)
- Suitable for stack measurement after Flue Gas Desulphurisation (FGD) plant and wet scrubbers
- Includes *ProScatter*™ PCME QAL 181 Sensor with QAL1 approvals
- Variable speed sampling and optional automatic isokinetic sampling (requires input from external flow meter)

THE QUEEN'S AWARDS FOR ENTERPRISE: INNOVATION 2007

nqa. ISO 9001 Registered UKAS QUALITY MANAGEMENT 015

Certificate No: 9389

System Description

The **PCME WET STACK 181** 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 is certified by TUV and MCERTS as QAL1 compliant. With certification ranges covering both 0-15 mg/m^3 and 0-100 mg/m^3 dust levels, the sensor is suitable for monitoring the highly abated emissions found after Flue Gas Desulphurisation Plant (FGD). The instrument is able to monitor a saturated flue gas which is critical for the application of monitoring emissions from a coal fired power plant fitted with a wet FGD system and meets the requirements of PS-11 and EN 14181.

The system will also operate reliably in the flue gas conditions found after 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 system may be used as a particulate CEM in the following applications:

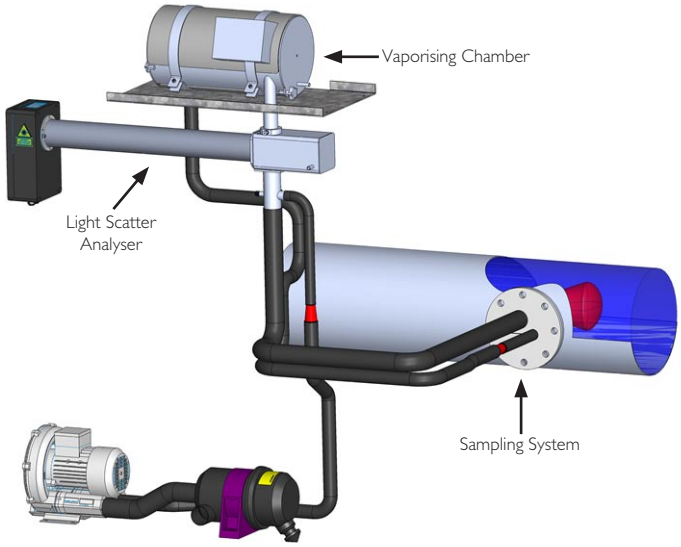
- Flue Gas Desulphurisation (FGD) after coal and oil fired power plant.
- Waste Incineration plant with wet scrubbing abatement plant.
- Pulp and Paper Recovery boilers.
- Metallurgical and chemical processes fitted with wet scrubbers.
- Sugar beat dryers/boilers with high moisture in flue gas.
- Particle board and fibre drying.

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

- PS-11 measurement range 0-15, 0-100 mg/m^3
- QAL1 Certification range (181 sensor) 0-15, 0-100 mg/m^3
- Detection Limit <0.1 mg/m^3
- Max stack temp: 300ºC
- Flue gas: below dew point
- Heater power: 3kW (maximum)
- Flue Gas velocity range 1-20m/s

Principles of Operation

The **PCME WET STACK 181** 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 wall to maximise contact area and thermal conductivity. This means the system is compact compared to systems which heat the sample line directly and therefore needs much shorter heating residence time.



The sampling system is powered by an inbuilt venturi (sampling) pump 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). While the calibration of the instrument is sensitive to different particle sizes, the instrument has reduced sensitivity compared to light scattering sensors using angles of scatter further from the angle of incidence.

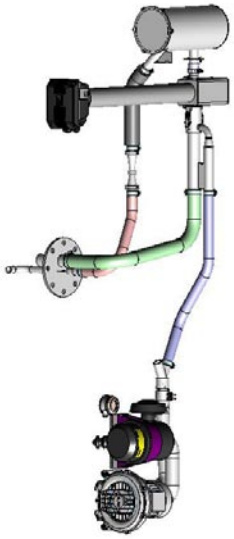
The instrument benefits from a powerful graphics user interface, suitable for the set-up, automatic control and measurement of the light scatter sensor, heater systems and sample line flow.

product features

Added Value Features

Key advantages of the instrument are as follows:

- Highly sensitive (<0.1 mg/m$^{3)}$ and rugged instrument for measuring particulate concentrations in wet flues
- Isokinetic condition automatic adjustment [requires input from external flow meter (option)]
- Automatic control and function test of all critical systems (vaporising chamber, light scatter unit and sampling pump)
- Low maintenance requirements and no laborious service requirements
- Modular design to facilitate lifting to stack location and ease of assembly
- QAL1 approved light scatter probe, suitable for monitoring according to EN 14181 and PS-11
- Automatic zero and span drift check and manual audit functionality
- Powerful user interface and in built data logging and recording



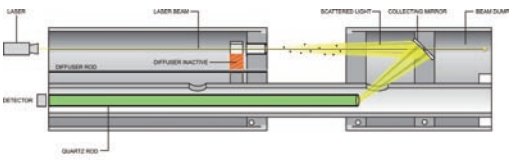
Isokinetic Sampling (option)

The instrument may be set up to take a sample at a specific flow rate for constant flow applications. However, in processes with variable velocity, the instrument can be set up to adjust to isokinetic sampling. The instrument is connected to an external flow meter and the variable speed fan which controls the sampling velocity may be automatically controlled to maintain isokinetic conditions to ensure that accurate, representative samples are collected and analysed.

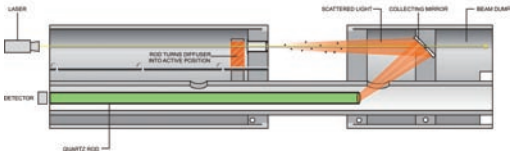
In-built Quality Assurance

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.

Measurement Mode



Span check with diffuser performs QAL3 (upscale check)



Instrument automatic self-checks involve reference scattering bodies which are periodically automatically rotated into the measurement path hence 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 and absolute correlation audit for PS-11 compliance).

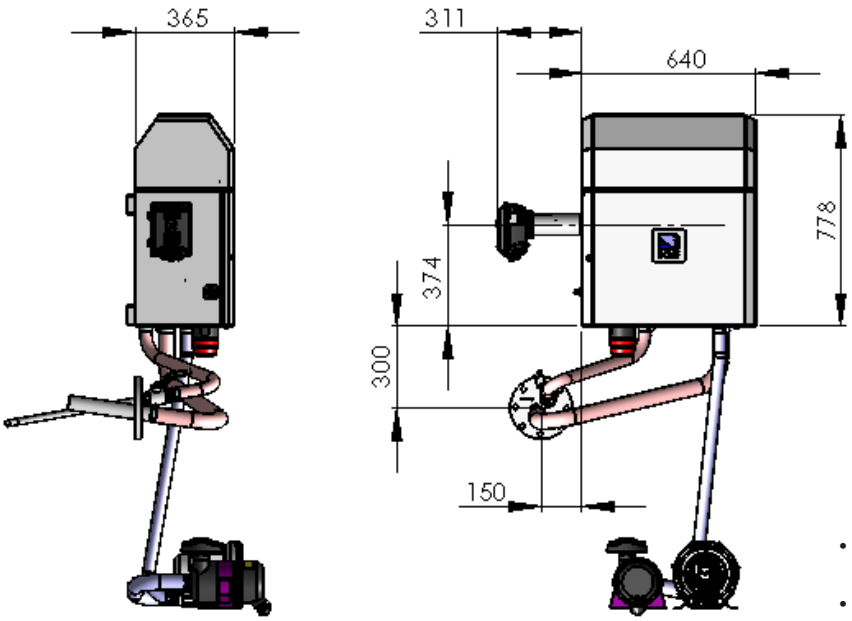
Flow rates and heater temperatures are continually monitored in the extractive flow line, to ensure any sample line blockage or problems though insufficient heating are automatically detected and avoided. The system automatically indicates when valid measurements are occurring, hence avoiding any measurement errors during any system warm up. In addition, trace heaters may be added to the intake air to ensure there is no risk of condensation in the pipes.

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. The system can be isolated from the stack with a safety shut-off valve and the vaporising chamber is easily accessed and cleaned by opening the hinged heater cover.

The system is designed in a truly modular format with safe enabling parts to be easily replaced while still mounted on the stack.

specifications

Dimensions & Stack Mounting Arrangements



Stack Mounting Arrangements

- Analyser unit to be located above and closely coupled to sampling probe (within 1m)
- Sampling probe stack connection is 4" ANSI Flange
- Flange stub sloping at 5-10' from horizontal (into stack)

Options

Sampling Probe

	Standard	Option
Sampling probe flange	4" ANSI, with stub sloping 10 to 15 from horizontal into stack	Consult factory
Sampling probe length	1.2m from flange face	Consult factory
Sample line length between sampling probe and analyser	0.5m	Consult factory
Isolation valve between stack and analyser	None	Manual Ball valve
Sampling probe material	316 SS	Consult factory for acid resistance

ETHERNET CAPABILITY

Analyser

	Standard	Option
Power supply	230VAC (standard), 3.2KW	115VAC 3KW
Interfaces	Modbus/ RS-485 4-20mA (isolated)	Ethernet 4-20mA (isolated)
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	PCME Reporter PC software for reporting on LAN or PC
User interface	Multi language graphics display with set up menus, trending display and QA screens	PCME setup PC software for data display and set up and recording of instrument configuration
External dimensions of main enclosure	778 x 640 x 365mm	As standard
Weight fully assembled	120Kg	As standard

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.

Contact your national or area sales and service office

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