

## PCME STACK 181 WS

**PROSCATTER™**  
INSIDE

Particulate

Measurement

System

For stacks below  
dew point and  
with water droplets



- Compliance particulate monitoring for wet stack conditions (PS-II capable)
- Suitable for stack measurement after wet scrubbers and processes below dewpoint
- Extractive system includes *ProScatter™* PCME STACK 181 Sensor System
- Automatic control and function test of all critical components
- Corrosion option for flue gas below acid dewpoint

## System Description

The **PCME STACK 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*<sup>TM</sup> light scatter sensor (PCME STACK 181) which itself is certified by TUV and MCERTS as QALI compliant for dry stack conditions, with certification ranges covering both 0-15 mg/m<sup>3</sup> and 0-100 mg/m<sup>3</sup> dust levels.

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:

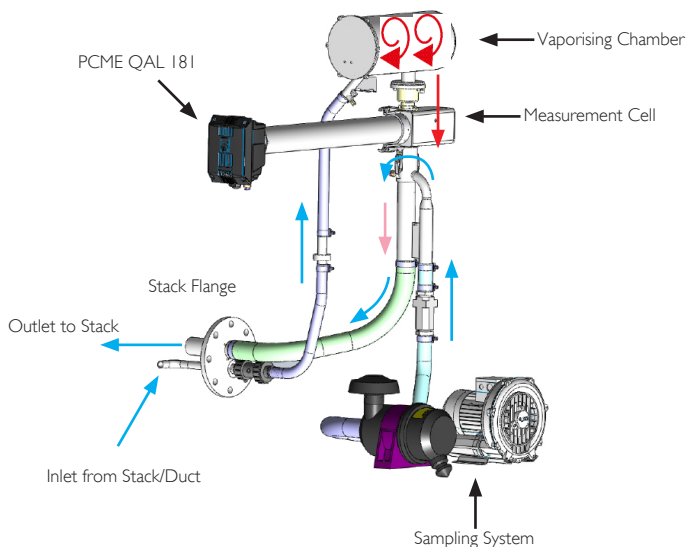
- Measurement range: 0-100 mg/m<sup>3</sup>
- Detection Limit: <1 mg/m<sup>3</sup>
- Flue gas: below dew point: (wet stack)
- Flue Gas velocity range: 1-20 m/s

Typical wet stack applications:

- Applications needing to comply with PS-11
- 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 STACK 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 *ProScatter*<sup>TM</sup> light scatter sensor, 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

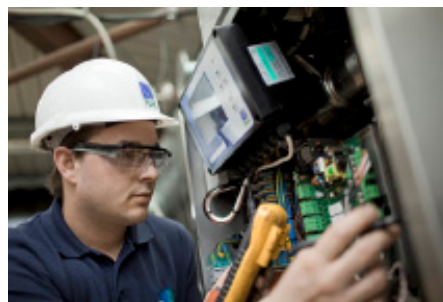
Key advantages of the instrument are as follows:

- Highly sensitive (<1 mg/m<sup>3</sup>) 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)
- Automatic zero and span drift check and manual audit functionality (PS-11)
- Powerful user interface and inbuilt data logging and recording
- Inbuilt system diagnostics
- Proven reliability
- Can be lifted to stack location in parts

# product features

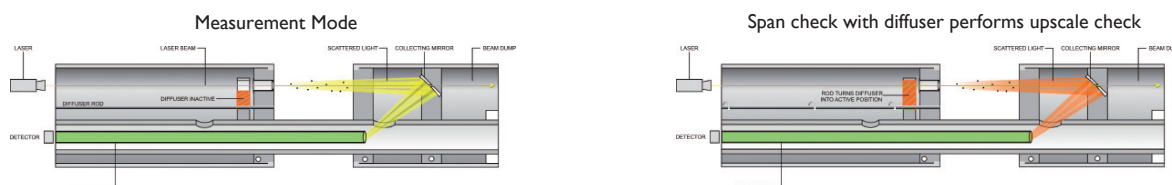
## Serviceability

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 first for 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 up scale 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 and absolute correlation audit for PS-II capability.

Flow rates and heater temperatures are continually monitored to ensure any sample line blockage or problems through 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)<br>DN100 PN10_16<br>JIS 100-5k,10k |
| Sampling probe length                                  | Typically 23.6" or 47.2" (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 or PVDF or Hastelloy<br>(flue gas dependant)    |

### Analyser

|                                       |  |   |
|---------------------------------------|--|---|
|                                       | Standard/Controller  | Option  |
| Power supply                          | 230VAC (standard), 3.2KW   | 115VAC 3KW  |
| Interfaces                            | Modbus/ RS485 / 232<br>4-20mA (isolated)   | Ethernet  |
| Data recording                        | 1 year of Emission averages<br>(15 minutes)<br>Rolling 24 hours of short<br>term data<br>Rolling 2 hour of pulse data<br>Instrument self check results | PC-ME Dust Tools<br>software for reporting on<br>LAN or PC  |
| User interface <sup>1</sup>           | Multi language graphics<br>display with set up menus,<br>trending display and QA<br>screens  | PC-ME Dust Tools PC<br>software for data display<br>and set up and recording of<br>instrument configuration |
| External dimensions of main enclosure | 30.7 x 25.2 x 14.4"  | As standard   |
| Weight fully assembled                | 264 lbs  | As standard   |
| Frame                                 | Standard   | Extended <sup>2</sup>   |
| Material of wetted parts              | 316 SS   | PVDF or Hastelloy <sup>2</sup>  |
| GPRS Module                           | Diagnostics  | Remote Interogation   |

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

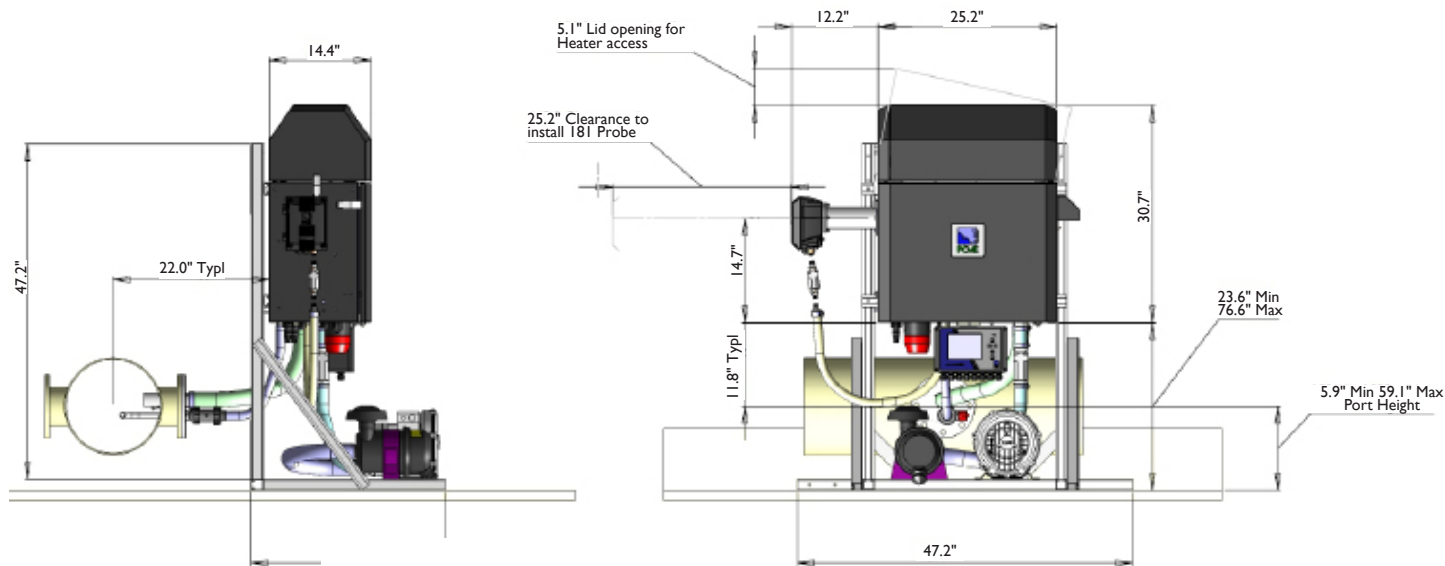


<sup>1</sup>Option to install additional Control Unit remote from system

<sup>2</sup>Others on request

# 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

## Order Codes

### PCME STACK 181 WS - A B C D E F G

#### PCME STACK 181 WS

| Option | Description   | Default   | Options   |
|--------|---|---|---|
| A      | Corrosion Resistance (of the system's wetted parts) | Not required<br>Hastelloy   | 0<br>HAST   |
| B      | Voltage   | 115V<br>230V  | 115V<br>230V  |
| C      | Probe Length  | 600mm<br>1200mm   | P600<br>PI200   |
| D      | Probe Type (sensor material)*                       | Standard<br>PVDF<br>Hastelloy   | Standard<br>PVDF<br>HAST                                    |
| E      | Frame   | Not required<br>Required  | 0<br>FRAME  |
| F      | Control Unit  | MultiController<br>MultiController with Ethernet  | M<br>M+ET   |
| G      | Audit Units   | Not included<br>Single Filter audit unit<br>5 audit set<br>Hastelloy single audit unit<br>Hastelloy 5 audit set | 0<br>AUD-1-LS<br>AUD-5-LS<br>AUD-1-LS-HAST<br>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)

| Configuration options   | System Set                                      | OPT-SYSSET                                 |
|-------------------------|---|--|
| Real-time data options  | Online  | OPT-ONLINE                                 |
| Historical data options | Data Downloader<br>Data Viewer<br>Data Reporter | OPT-DOWNLOAD<br>OPT-VIEWER<br>OPT-REPORTER |

Example Order Code:

PCME STACK 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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