

# Opacity Measurement System

PROCESS & EMISSIONS MONITORING SYSTEMS



**OPACITY**

## SPECIFIC FEATURES:

- Meets or exceeds US EPA requirements for 40CFR60 Sections 13, 17 and App. B PS-1
- Outstanding reliability with no continuously moving parts
- Unique measurement technology incorporating “no drift” zero check
- Automatic in-situ zero and span checking with built-in calibration audit



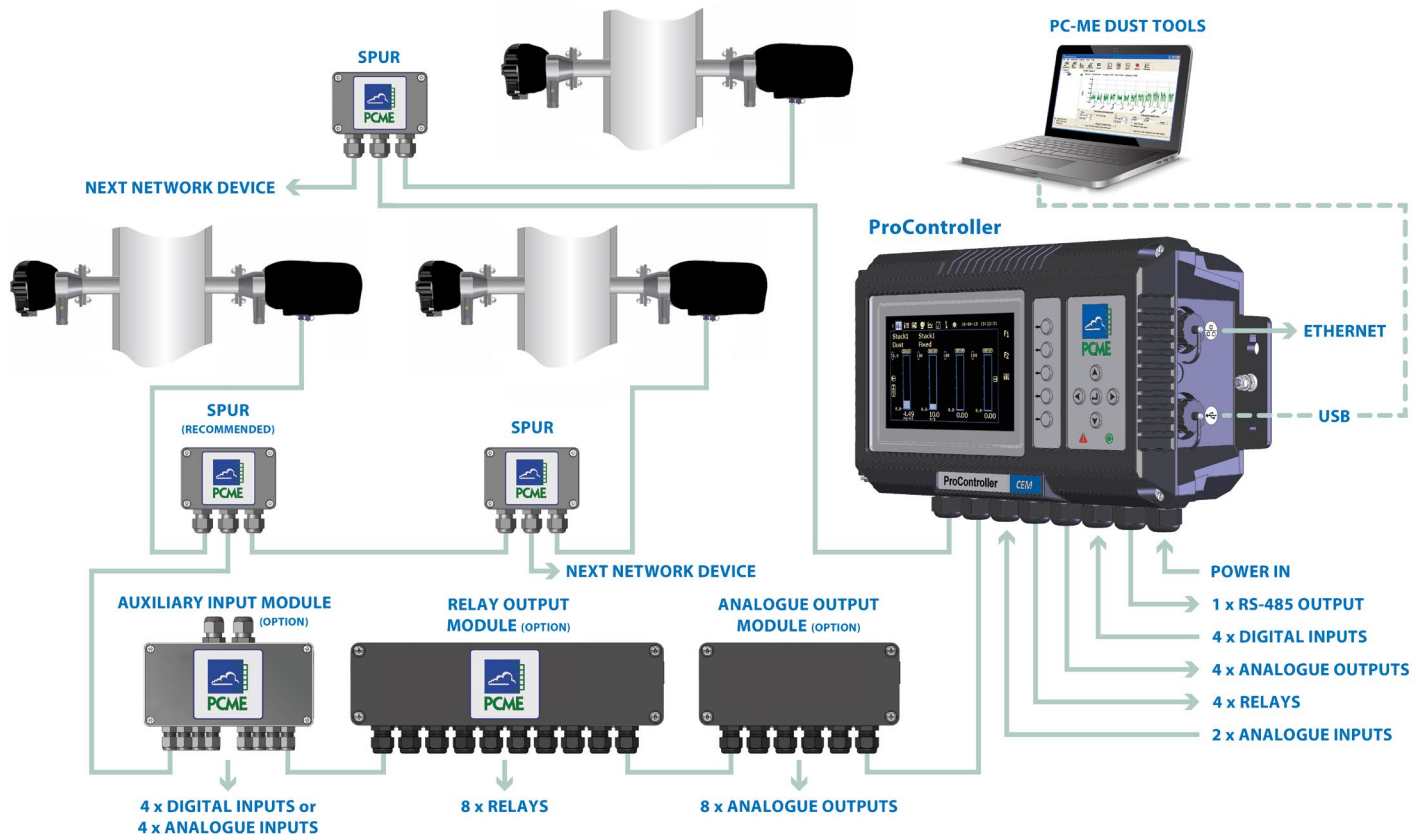
# TECHNOLOGY / APPLICATION

## SYSTEM DESCRIPTION

The PCME STACK 710 Opacity monitor meets or exceeds US EPA PS-1 requirements for Opacity monitoring from combustion stacks providing class-leading performance in a compact, light-weight and easy-to-use instrument. As part of the ENVEA family of products, the PCME STACK 710 supports the functionality of being connected to an Interface Module or ProController (for multiple sensors, Ethernet communication, graphs, historical data screens with graphs and trending, as well as data logging for emissions reporting, redundancy and data analysis functions). In addition, the instrument can be included as part of the ENVEA's dust monitoring network, including Particulate Monitors, Filter Performance and Leak Monitors, to form an unrivalled plant-wide dust monitoring system.

Designed for Compliance Monitoring

- Meets or exceeds US EPA requirements for 40CFR60 Sections 13, 17 and App. B PS-1.
- Meets or exceeds US EPA requirements for proposed 40CFR60 App. F Procedure 3.
- Meets or exceeds ASTM Standard D6216.



## ADVANCED FEATURES AND BENEFITS

- Outstanding reliability – no continuously moving parts.
- Low maintenance – simple access to optics if required.
- High accuracy and repeatability – designed to meet or exceed US EPA PS-1 monitoring applications.
- Unique measurement technology – unique “no drift” zero check.
- Automatic in-situ zero and span checking – built-in calibration audit.
- Range of instrument outputs – opacity, extinction and dust density.
- User friendly – an icon-driven, integral control panel for setup, control and diagnostics on the sensor or via the control unit.
- Integral air purges – prevents dust and corrosive gases from contaminating the optical system (a separate blower system is required).
- Easily integrated into plant control system – 4-20mA and Modbus RS-485 outputs as standard.
- Low-level measurement through advanced LED design – Opacity from 0-10% to 0-100%.



- Suitable for path lengths up to 10 m (factory set) – varying Opacity levels.
- Advanced user features/benefits – separate and remote advanced digital Interface Module or ProController / data logger/ graphical user interface (GUI) with Modbus RS-485, RS-232, Ethernet capability.
- New compact design – simplifies installation and reduces air purge requirements.

The PCME STACK 710 uses a homogeneous advanced LED light source to reduce the effect of misalignment on the measured opacity. Together with a “Flood LED”, it achieves the highest levels of stability and accuracy. The “no moving parts” optical system gives an instrument with exceptional reliability and proven low-measurement capability beyond most standard Opacity monitors.

# PRODUCT FEATURES

## ADVANCED FEATURES AND BENEFITS

### Easy Auditing

Periodic performance verification could not be simpler. The built-in audit jig accepts standard optical filters and the zero alignment can be completed without removing the instrument from the stack.

### Icon-driven Setup

The instrument can be set up and configured via the integral control panel. The icon-driven menu system assists a language-free and intuitive user interface.

### Dust Density

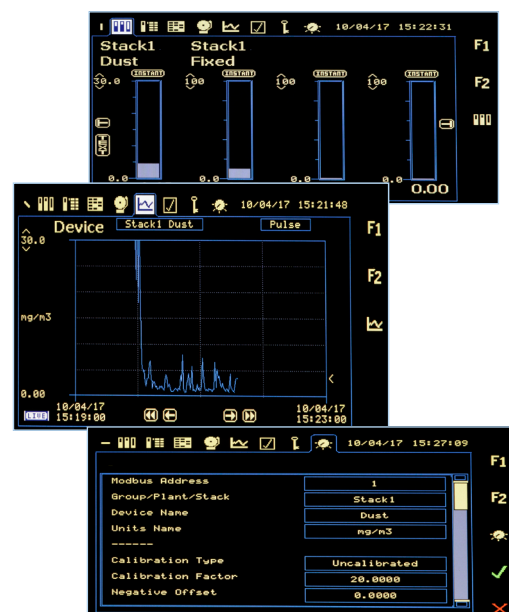
Dust density monitors must be calibrated by comparison with an isokinetic sample test, as in PS-11.

### Automatic Self-checks

The PCME STACK 710 has fully automatic zero and drift compensation system. An automatic span check mechanism confirms the instrument operation at defined intervals.

## PROCONTROLLER FEATURES

- Displays instantaneous and average emissions (bar graph, text and online graph).
- Customisable 'channel grouping' screen for displaying related data, e.g. dust, velocity, O<sub>2</sub>.
- Icon and multilingual user interface.
- Monitors data from external sensors for normalisation and centralised analysis, e.g. velocity, O<sub>2</sub>, Temp, etc.
- Status screen for concise display of alarm conditions.
- Controls up to 32 ENVEA sensors provided suitable power is supplied (ProController option only).
- Dual alarm levels with alarm delays.
- Instrument review of three simultaneous memories (Long Term, Short Term and Pulse).
- Alarm log for instrument and emission alarms.
- Windows compatible software to download to PC for reporting (optional).
- Multiple calibration factors.
- Large, high-contrast, anti-glare graphical display (800 x 480 pixels) for easy interpretation of graphical data.
- Multi-channel bargraph shows emissions relative to alarms.
- Permits easy comparison between emission sources.
- Password protected.



## SENSOR HEAD AND OPTICAL SPECIFICATIONS

| Sensor Heads – Transceiver / Retro-Reflector |                                                                                                                      |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Display                                      | Reflective, backlit LCD (128 x 64 pixel)                                                                             |
| User Screens                                 | Setup/Results                                                                                                        |
| Keypad                                       | 4 keys for data input                                                                                                |
| External Indicators                          | Power, System OK, Alarm, Calibration                                                                                 |
| Enclosure Material                           | Cast aluminium, epoxy coated                                                                                         |
| Ambient Temperature                          | -20 to +50°C (-4 to +122°F)                                                                                          |
| Flue Gas Temperature                         | max. 600°C (1,000°F)                                                                                                 |
| Flange Temperature                           | max. 200°C (400°F)                                                                                                   |
| Compliance                                   | EN 61010-2, QAL1 (to EN 14181)                                                                                       |
| Sealing                                      | IP65 (US equivalent: NEMA 4X)                                                                                        |
| Modbus Interface                             | RS-485, Opacity, Optical Density and Status information                                                              |
| Outputs                                      | Isolated 4-20mA<br>Configurable as Opacity, Optical Density<br>3x Relays (1A @24V DC): System OK, Calibration, Alarm |
| Power Supply                                 | 24V DC nominal (18-30V DC)                                                                                           |
| Current Consumption                          | 0.3A nominal (3A on start-up)                                                                                        |
| Dimensions (mm)                              | W 191 x H 201 x D 413 / W 191 x H 201 x D 237                                                                        |
| Weight                                       | Transceiver: 6 kg / Retro-Reflector: 3 kg                                                                            |
| Stack Connection                             | 1 1/2 in. 150 lb ANSI flange                                                                                         |
| Air Purge Blower                             | Required for correct operation*                                                                                      |
| Calibration Filters                          | Option*                                                                                                              |

| Optical Specification |                                                                                                           |
|-----------------------|-----------------------------------------------------------------------------------------------------------|
| Technique             | Double-pass transmissometry                                                                               |
| Operating Wavelength  | 525 nm (±20 nm)                                                                                           |
| Light Source          | Pulsed, high-intensity LED                                                                                |
| Range                 | Opacity: 0-10% to 0-100%<br>Optical density: 0-0.1 to 0-3.0                                               |
| Accuracy              | ±2% opacity                                                                                               |
| Drift (long term)     | <0.3% opacity/month                                                                                       |
| Thermal Stability     | <0.3% opacity/22°C (ambient change)                                                                       |
| Angle of Projection   | <2°                                                                                                       |
| Angle of View         | <2°                                                                                                       |
| Response Time         | ≤10 seconds (to 95%)                                                                                      |
| Averaging             | From 10 seconds to 24 hours, user selectable                                                              |
| Pathlength            | 1-10m                                                                                                     |
| Calibration           | Automatic Zero and Upscale (Span) checks<br>Frequency: 1-24 hours (in 1-hour increments, user selectable) |
| Zero Correction       | Automatic correction for Zero drift                                                                       |
| Fail-Safe Shutters    | Option*                                                                                                   |

\*Please contact your local ENVEA representative.

\*\*The pathlength must be specified at the time of ordering.

| Network Controllers    |                                                                                                                | Standard Controller                  | ProController                                                                                       |
|------------------------|----------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------------|
| Overview               | Number of sensors/channels                                                                                     | 1                                    | 1–32                                                                                                |
|                        | Display                                                                                                        | Two-tone grey, backlit graphical LCD | High-contrast, anti-glare 7" (viewable) TFT LCD                                                     |
|                        | Multiple Data Viewing                                                                                          | PC or RS-485                         | PC/RS-485/Ethernet simultaneously                                                                   |
|                        | Dimensions                                                                                                     | W220 x H124 x D80 mm                 | W390 x H221 x D118 mm                                                                               |
|                        | Power supply voltage                                                                                           | 100–240V AC (50/60 Hz)               | 85–265V AC (50/60 Hz)                                                                               |
|                        | Protection Rating                                                                                              | IP65                                 | IP66                                                                                                |
|                        | Ambient Temperature Range                                                                                      | -20°C to 50°C                        | -20°C to 50°C                                                                                       |
| Features and Functions | Navigation keys                                                                                                | Up/Down/Left/Right/ENTER             | Up/Down/Left/Right/ENTER<br>plus 5 function keys: 3x short-cut keys<br>and 2 user-programmable keys |
|                        | Icon-driven, multilingual menus                                                                                | n/a                                  | ✓                                                                                                   |
|                        | Secure password protection                                                                                     | ✓                                    | ✓                                                                                                   |
|                        | Sensor system setup<br>and configuration options                                                               | ✓                                    | ✓                                                                                                   |
|                        | Configurable emission alarm levels                                                                             | ✓                                    | ✓                                                                                                   |
|                        | Sensor calibration screens                                                                                     | ✓                                    | ✓                                                                                                   |
|                        | Seamless integration with existing<br>control units and sensors                                                | n/a                                  | ✓                                                                                                   |
| Data Logging*          | Long-term Log                                                                                                  | 12 months @ 15 minutes               | 48 months @ 15 minutes                                                                              |
|                        | Short-term Log                                                                                                 | 7 days @ 1 minute                    | 28 days @ 1 minute                                                                                  |
|                        | Pulse Log                                                                                                      | 8 hours @ 1 seconds                  | 32 hours @ 1 second                                                                                 |
|                        | Alarm Log                                                                                                      | 500 entries                          | 500 entries                                                                                         |
| System Outputs         | Ethernet (RJ45)                                                                                                | n/a                                  | ✓<br>Connection type: 100Base-T/Tx 100 Mb/s                                                         |
|                        | USB 2.0                                                                                                        | n/a                                  | ✓<br>Suitable for connecting to a local PC or laptop                                                |
|                        | Relays                                                                                                         | 2 off (programmable)                 | 4 off (programmable)                                                                                |
|                        | 4–20mA                                                                                                         | 1 off (programmable)                 | 4 off (programmable)                                                                                |
|                        | RS-485                                                                                                         | 1                                    | 1                                                                                                   |
| System Inputs          | Digital<br>User selectable for: PLANT OFF indication, Bag-<br>filter cleaning sequences, multiple calibrations | 1                                    | 4                                                                                                   |
|                        | 4–20mA                                                                                                         | 0                                    | 2                                                                                                   |

\*Data logging capacity for one sensor. Data stored varies per sensor type. Please consult ENVEA for specific data.

| Network Accessories                                                                                                     |                                                                                                                              | Standard Controller | ProController |
|-------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------|
| Network Modules<br>(can be connected to<br>Controller Network<br>systems to provide addi-<br>tional Inputs and Outputs) | <b>Analogue Output Module (AOM)</b><br>provides 8 additional 4–20 mA outputs definable<br>to sensors/channels                | 1                   | 1–8           |
|                                                                                                                         | <b>Auxiliary Input Module (AIM)</b><br>provides 4 additional digital inputs, plus<br>4 additional relay outputs              | 1                   | 1–8           |
|                                                                                                                         | <b>Relay Output Module (ROM)</b><br>provides 8 additional relay outputs                                                      | 1                   | 1–8           |
|                                                                                                                         | <b>SPUR</b><br>provides sensor network connection and<br>local isolation during maintenance                                  | 1                   | 1–32          |
|                                                                                                                         | <b>Power Supply Repeater (PSR)</b><br>provides voltage and signal boost for extended cable runs<br>and large sensor networks | 1                   | 1–8           |

## ABOUT ENVEA

As a progressive environmental Company, ENVEA specialises in particulate measurement for industrial processes. With a worldwide reputation for reliability, innovation and technological excellence, the Company produces under the trademark envea™ 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.



ENVEA UK  
ENVEA House Rose and Crown Road  
Swavesey / Cambridge - UK CB24 4RB  
☎ +44 (0)1480 468200  
✉ contact.gb@envea.global



www.envea.global