Particulate Matter Spiking for PM CEMS Calibration

- Get Better Results
- Save Time
- Save Money

Calibrating a Particulate Matter Continuous Emission Monitoring System (PM CEMS) can be an expensive and disrupting process. Since most facilities operate well below their permitted limit for particulate emissions, they need a method for increasing particulate concentrations in the stack during the calibration process to meet the requirements of Performance Specification 11 (PS11). In the past this was done by installing a bypass duct or detuning/sabotaging particulate control equipment.

In section 8.6(4)i of EPA’s PS11 (Fig. 1), PM spiking is mentioned as a method for providing a range of PM concentrations.

B3 Systems has developed a new patented method/process [US Patent 6,694,796] for introducing measured amounts of PM into your process without affecting your control equipment. The method provides a means to elevate your PM concentration in a controlled manner.

**How It Works**

An automatically controlled loss-in-weight solids feeder produces a consistent mass flow rate of particulate matter. A solids eductor is used to fluidize the spiked solids into the transfer stream. The PM is then transported to the process injection location where it is injected just downstream of all air pollution control devices and prior to the PM CEMS monitor. The injection nozzles and method may differer based on the process conditions.

An optional tracer gas can be injected with the fluidizing air for verification of flow rate and dispersion at the PM CEMS location.

**Use Your Own Ash**

The physical properties of the PM affect the response of the PM CEMS of dust monitoring sensors, such as emissivity, surface characteristics, size distribution, etc. The characteristics of the particulate matter vary from site to site. That is why it is important to calibrate or challenge each PM CEMS with native material. Using the ash collected from your ESP or baghouse, we can introduce known quantities of particulate matter and observe the PM CEMS response. The patented process developed by B3 Systems ensures adequate dispersion and no particle size segregation during handling.

B3 Systems, Inc.

You Know Us... And We Know Spiking!
Reduce On-Site Time
Reduce the amount of time required on-site for testing. PM spiking allows you to change PM loading conditions quickly and efficiently. This means that time is not lost moving between testing conditions or due to changes in plant operations.

Accurate & Precise Mass Flow Rates
B3 Systems uses a loss-in-weight feeder specially designed to produce precise mass flow rates. The mass flow rate is constantly monitored and controlled to produce consistent flow rates during each test run. The mass flow setpoint is easily changeable over a wide range of PM flow rates to produce calibration points quickly and easily at any desired concentration. The scale and mass flow rates are verified before and after each test using NIST-traceable weights. The accuracy of the mass feed rate control also helps insure that the permitted PM limit will not be exceeded during testing versus de-tuning of the APCD.

Manage Risk and Reduce Retesting Costs
By having the control and accuracy of B3 systems' PM Spiking system, you can reduce the risk of exceeding you permitted PM limit during the calibration process while extending the calibration data points used for the curve. This also reduces the probability that you will have to retest before the next calibration cycle by operating outside 125% of your highest correlation data point.

No Process Disruption
Particulate spiking allows you to calibrate your PM CEMS without messing up the clean side of your baghouse or operating your ESP in a less than ideal condition. You can just run the plant under normal conditions and we can adjust the PM loading for the calibration. It also saves time during testing by targeting PM loading data points you require on the calibration curve.

PM Preparation
As part of the PM spiking operation, B3 Systems also provides a screening / separation operation to remove oversize particles and material which are not be representative of normal PM emissions. This material would bias the results of the initial calibration curve and would influence future QA checks as they are compared to the original curve.

Periodic QA Verification
For many applications, periodic QA verification of instrument response, not correlation, can be completed very cost effectively by using PM Spiking. Tests have shown that instrument response can be easily verified by spiking known amounts of a 'reference PM / ash' at different known concentration levels and monitoring the instrument response. Therefore, once the initial correlation is established, an annual QA check can verify if the instrument is responding the same as when the original correlation was conducted. Most QA verifications can be easily completed in one day without any process disruptions.

Want to Know More?
If you are interested in this service please contact us by phone (919) 790-9090, email sales@b3systems.com or visit our website at www.b3systems.com.

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