

A Quick Guide on how to monitor  
mercury emissions from coal burning  
sources at increasingly low  
concentrations

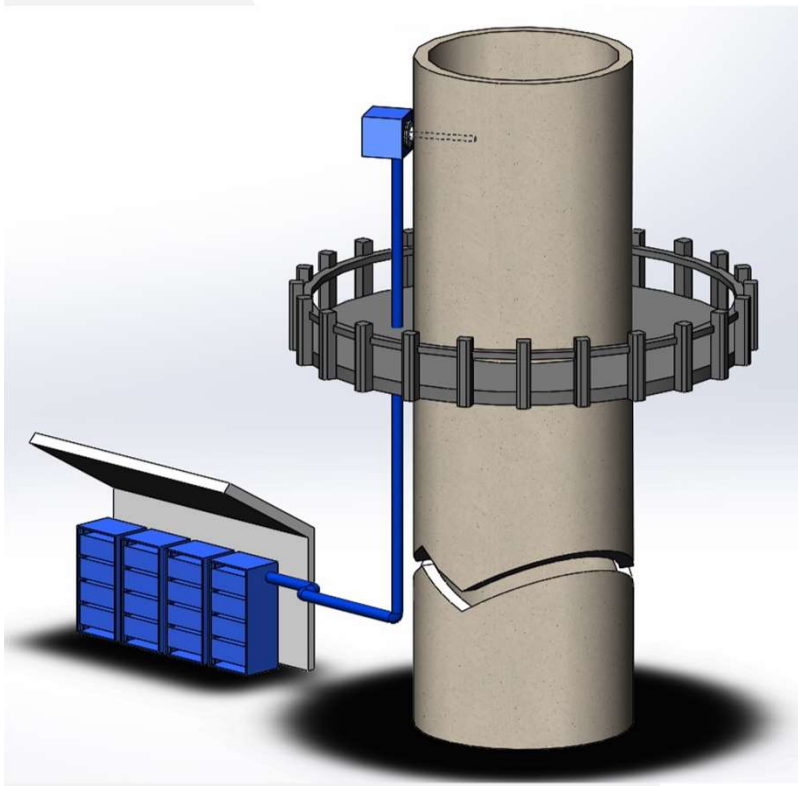
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WORLDWIDE LEADER  
Emissions & Process Monitoring

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## Mercury Emissions Measurements: Traditional Approach



## Mercury Emissions Monitoring

### Sorbent Traps - Alternative Approach to Hg Measurements

- ▶ No longer considered an alternative approach
  - ▶ More than 50% of US coal power plants and cement plants use sorbent traps for continuous monitoring
  - ▶ 100% use sorbent traps for Relative Accuracy Test Audits
- ▶ US EPA Reference Method
  - ▶ Considered by the EPA to be the most reliable and accurate method
- ▶ Can be used for quick spot checks
  - ▶ US EPA Method 30B
- ▶ Can be used for continuous monitoring
  - ▶ US EPA Performance Specification 12B



## Basic Characteristics of Hg Sorbent Traps

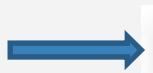
### Sorbent Trap Method

- ▶ Sorbent traps are inserted into sampling probe
- ▶ Two sorbent traps are used to ensure quality
- ▶ Glass tube containing sorbent designed to capture Hg
- ▶ A minimum of two or three sections to ensure that all Hg is captured
- ▶ Probe is inserted into a sampling port & Sample pumps are turned on
- ▶ Duration of sample collection can range from 10 minutes to as long as 14 days
- ▶ After sampling is complete, Volume of sample is recorded
- ▶ Sorbent traps are removed from probe and analyzed for mass of Hg captured



$$\frac{\text{mass Hg}}{\text{sample volume}} = \text{Hg concentration}$$

Sample  
flows  
through  
glass tube



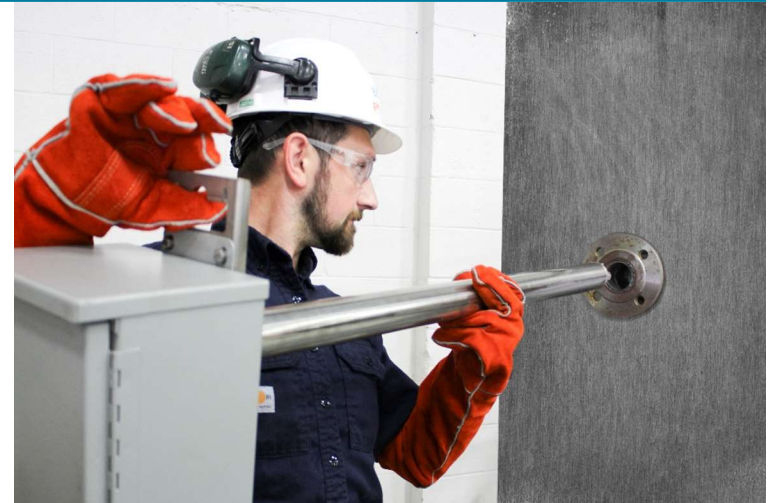
Hg is collected  
on sorbent



## Mercury Emissions Monitoring

### Advantages of Sorbent Trap Method

- ▶ Simple and accurate (US EPA Reference Method)
- ▶ Self-validating method, built-in quality assurance
  - ▶ Paired agreement, break-through section, spike
- ▶ Portable
- ▶ Low capital expenses compared to traditional CEM approach
  - ▶ Ideal for performing initial Hg emissions testing without needing to buy expensive CEM equipment
- ▶ Same sampling equipment can also be used with other sorbent traps including  $\text{NH}_3$ ,  $\text{HCl}$ ,  $\text{SO}_3$ , As, Se



## Mercury Emissions Monitoring

### US EPA Mercury Toolkit



**Sorbent Traps**



**Sampling System**



**Analysis System**



## 915J Mercury Monitor



**Design is simple with (4) easily movable modules:**

- 1) Probe
- 2) Filter dilution conversion box
- 3) Temperature controlled analyzer enclosure
- 4) Analyzer console box.

**High Sensitivity:** Very accurate at low Hg levels.

**Detection:** 0.1 to 100 $\mu\text{g}/\text{m}^3$  in real time, one sample point displayed per 30 seconds.

**Data Availability:**

Sorbent Trap typical data availability is 97%. 915J (with 4,500,000+ operating hours) is greater than 98%.

**Data Accuracy:** 915J Process Monitor

Specifically designed for Mercury Control

Evaluations High Sensitivity: Very Accurate at low mercury levels. **Detection:** 0.1 to 100 $\mu\text{g}/\text{m}^3$  in real time, one sample point displayed per 30 seconds.

## Personal Mercury Badge

- ▶ Measure exposure to total mercury in order to demonstrate workplace compliance with Permissible Exposure Limits (PELs)
- ▶ Inexpensive, reliable, durable
- ▶ Every badge individually numbered for chain of custody
- ▶ NIST traceable analysis by thermal decomposition w/ AA spectrometry within 4 weeks of sampling
- ▶ Reporting limit:  $0.01\mu\text{g}/\text{m}^3$  for 8 hours





# Q & A

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