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

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Mercury Emissions Measurements: Traditional Approach
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
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

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\frac{\text{mass Hg}}{\text{sample volume}} = Hg \text{ concentration}
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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 NH$_3$, HCl, 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 100μg/m³ in real time, one sample point displayed per 30 seconds.

Data Availability:
Sorbert 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 100ug/m³ 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: 0.01μg/m³ for 8 hours
Q & A

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