

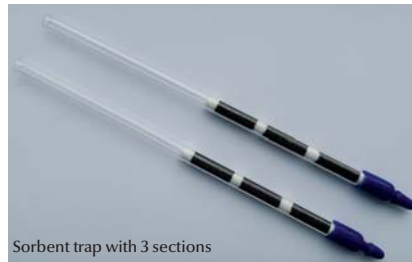
Mercury CEMS according PS 12B

Mercury emission monitoring by sorbent traps is a good and practical alternative to conventional Hg CEMS with the following features and advantages:

- First part in which the sampled flue gas is coming into contact is the trap therefore no risk of losses in sampling probe and sampling line
- Low maintenance
- Paired sorbent traps for quality assurance purposes
- Suitable independent from the mercury concentrations. Limit of detection can be influenced by correct selection of the sample gas flowrate and the sampling period
- Availability > 95 %
- No negative bias due to e.g. saturated gold trap or Hg⁺ converter like it can happen with a Hg-CEMS



The AMESA M features a paired trap probe design for audit purposes and quality control. The design incorporates a built-in pitot tube and a thermocouple to sample under volume proportional conditions.



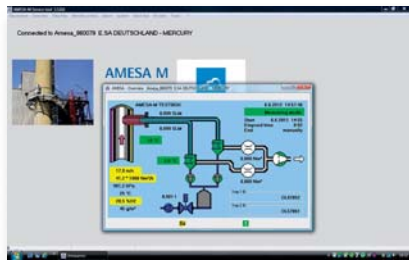
Sorbent trap with 3 sections

Control function of the sampling traps by 3 sections:
 1. section: sample section
 2. section: breakthrough check section
 3. section: spiked quality control section

AMESA M SV remote control

AMESA M SV allows the remote control of AMESA M units by serial link:

- Simultaneous control of 1 up to 4 AMESA M units per location
- Detailed display of operating conditions, status, errors, configuration data and diagnosis
- Operates under Windows™



Overview window



System window



AMESA M Meets the US EPA Performances Standard 12 B mentioned in the US Portland Cement Rules and the new MATS (Mercury and Air Toxics Standards)

Sorbent Trap Monitoring System (STMS) for Continuous Mercury Emission Monitoring



LCD Display



Control cabinet AMESA M

Major fields of application

- Cement Kilns
- Power Plants
- Biomass
- Industrial Boilers
- Incinerators

More than 15 years experiences of continuous sampling of Dioxins and Furans (PCDD/PCDF) with the AMESA system were used to design the AMESA M for continuous sampling of mercury.

Exclusive features

- Fully Automated
- Volume Proportional Sampling
- Moisture Determination
- Long-Term Sampling
- Dry gas meter to determine sample volume
- Thermal mass flow meter to control mass flow independent of gas pressure and temperature
- Sampling periods from 15 minutes up to 4 weeks

Specifications subject to changes without prior notice - Ref.: AMESA M eng 06/2012

System Description

The AMESA-M long-term sampling system is designed to meet the requirements of continuous mercury monitoring applications. This unique system is a development of the proven AMESA system originally designed to measure micro-pollutants (such as dioxins/furans) in flue gas streams.

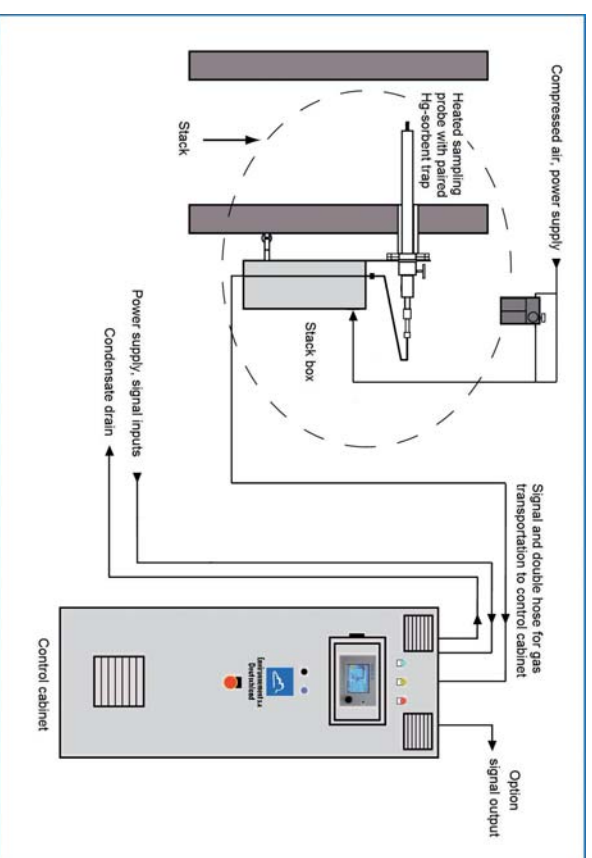
The AMESA M consists of a control cabinet and a sample probe assembly. The heated sample probe is equipped with paired Hg-sorbent traps which extract a sample from the flue gas stream under volume proportional conditions. Gaseous mercury (elemental Hg and oxidized forms of Hg) is collected in the sorbent trap. The traps are placed at the entrance of the sampling probe, which is mounted on the stack or duct. In this way it is possible to determine mercury concentrations < 1 µg/Nm³ with high accuracy.

A process control computer is located in the stack box which performs all measurement and control functions in the stack (i.e. static pressure, the flue-gas temperature, flue-gas velocity (optional), etc.). The controller of the stack box and the control cabinet communicate by TCP/IP protocol.

After flowing through the stack box, the extracted sample gas passes through an umbilical to the control cabinet for precise volume determination. The gas passes an electric gas cooler with a jetstream heat exchanger in which the gas is cooled down to 5 °C. The moisture in the gas condenses and is pumped away by a peristaltic pump. Optional the condensate flows into a condensate tank, where the condensate volume is measured and the flue-gas moisture is determined. After the gas cooler, the dried gas passes to a rugged single-tube dry volumetric-gas meter which is calibrated by the manufacturer. The working pressure range is from -500 mbar up to +1 bar. The control system converts the measured operating volume into standard volume.

The gas is then directed to a thermal mass-flow controller which determines and accurately controls the mass flow (kg/s) independent of gas pressure and temperature. It requires no maintenance under normal operating conditions with clean, dry gases.

The unit stores sampling data, that is available to download on a USB flash drive. Data is stored for up to a four-week period. After each sample cycle, the traps are removed for analysis. The analysis is achieved with an onsite analyzer or a certified laboratory.



Technical characteristics

General data

- Measuring range (total mercury): 0.001 - 1000 µg/m³
- Sampling interval: from 15 minutes up to 4 weeks
- Flue gas temperature: < 200 °C with heated probe
> 200 °C with cooled probe
- Max dust concentration in the flue gas: 500 mg/m³
- Operating temperature (control cabinet): +5 to +40 °C
(optional air conditioner for temperatures over +40 °C)
- Max relative humidity (control cabinet): 50%
- Volume proportional control cycle: 1 sec
- Velocity measurement accuracy: ±1% of measuring range
- Volume measurement accuracy: ±1.5% of measuring range

Sampling probe

- Length: from 350 up to 2000 mm
- Probe shaft diameter: 60 mm
- Stack mounting: DN 100 flange
(other flanges upon request)
- Material: st.st. or hastelloy (others on request)

Stack Box

- Dimensions: 600 × 600 × 200 mm (H × W × D)
- Weight: 23 kg
- Power Supply: 230 VAC, 50 Hz (option 115 VAC, 50/60 Hz)
- Power consumption: approx. 0.7 kW
- Fuse: 16A
- Compressed air: 3 to 7 bars, dry, oil free
- Compressed air connection: 8 × 1 or 6 × 1 mm hose



Sorbent Traps

Control cabinet

- Dimensions: 1800 × 600 × 500 mm
- Weight: approx. 210 kg

Utilities

- Power supply: 230 VAC, 50 Hz
(option 115V, 50/60 Hz)
- Power consumption: approx. 0.85 kW
- Fuse: 20A
- Option cooled probe: Cooling water: 0.5 to 5 l/min
(needed if flue gas temperature > 200 °C)
- Water connection: ½" hose (inlet & return)

Inputs / Outputs

- Digital outputs: status (monitoring mode, fault, error)
- Digital inputs: furnace off, maintenance
- Analog inputs (optional): humidity, gas velocity, static pressure etc

Disposal

- Flue gas recycling: 8 × 1 mm hose
- Condensate drain: 8 × 1 mm hose
- Condensate quantity: approx. 0.1 - 2 l/day
(depending on flue gas moisture content and sampling flowrate)

Options

- flue gas velocity measurement integrated in sampling probe
- integrated flue gas humidity measurement
- heated sampling line
- USB flash drive
- transportation box for sorbent traps and USB flash drive
- special sorbent traps, i.e. special traps for separate sampling of elemental Hg and oxidized Hg