

# Mercury Stack Gas Monitor SM-3

## EMISSIONS MONITORING SYSTEMS

The Mercury Stack Gas Monitor SM-3 is used for continuous monitoring of mercury in flue gas. Bound forms of mercury like  $\text{HgCl}_2$ ,  $\text{HgO}$ ,  $\text{HgS}$  and particulate mercury are detected as well as elemental mercury.

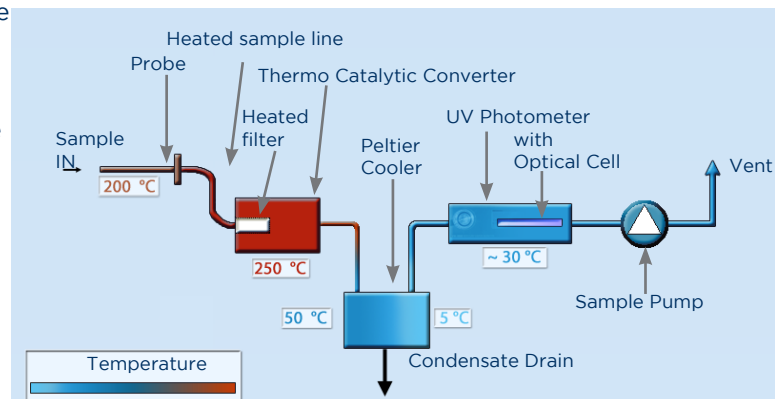
### SPECIFIC FEATURES

- Approved by TÜV Germany (published in GMBI Nr. 33/1999)
- Detects elemental, ionic and bound mercury
- True continuous measurement (no measuring cycle)
- No wet-chemistry, no use of reagents
- Maintenance-free solid state catalyst
- Measuring ranges 1 - 50; 0 - 75; 0 - 500  $\mu\text{g}/\text{m}^3$  Hg (others optional)
- Corrosion protected, rugged construction
- Compact size, mobile operation possible



### OPERATING PRINCIPLE

A sample gas stream is taken from the duct through a heated sampling system. The gas is drawn through a high-temperature particulate filter and subsequently enters the reduction unit. In this part of the analyzer a thermo-catalytic reduction of ionic and bound mercury is performed. Elemental mercury vapor is formed as a result of this transformation process. The gas is then dried in a maintenance-free peltier cooler and fed to the mercury detector where the mercury concentration is measured with the so called "cold vapor atomic absorption spectroscopy (CVAAS)" method. The high surface temperature of the gas entry filter guarantees that mercury is thermally completely desorbed from particles and thus also detected.

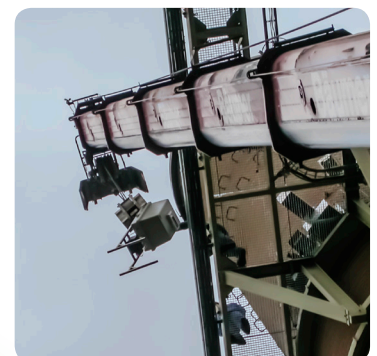


Schematic flow diagram of the Mercury Stack Gas Monitor SM-3



### MAIN APPLICATIONS

- Coal fired power plants
- Cement production
- Municipal waste incinerators
- Sewage sludge incinerators
- Hazardous waste incinerators
- Thermal soil resanitation plants
- Wood combustors using recycled wood
- Metal recycling furnaces



## EASY TO OPERATE EASY TO TRANSPORT

The SM-3 is operated via a waterproof membrane keypad. All inputs required are selected in a easily comprehensible menu shown on the graphical display.

It is also possible to initiate functions like zero adjustment and calibration check from an external computer.

Due to its compactness and low weight the SM-3 is relatively comfortable to transport. That makes it easy to use the instrument at different sampling points.



## TECHNICAL SPECIFICATIONS

Measuring principle:	Thermocatalytic reduction, UV absorption (CVAAS), wavelength = 253.7 nm
UV source:	Electrodeless low-pressure mercury lamp (EDL)
Stabilization method:	Reference beam method
Optical cell:	Fused silica (Suprasil) l = 230 mm
Measuring ranges:	<ul style="list-style-type: none"> <li>• 0 - 50 µg/m<sup>3</sup></li> <li>• 0 - 75 µg/m<sup>3</sup></li> <li>• 0 - 500 µg/m<sup>3</sup></li> </ul>
Detection limit:	< 1 µg/m <sup>3</sup>
Response time T90:	< 60 sec.
Measurement cycle time:	None, uninterrupted continuous measurement
Air supply:	Oil-free compressed air, approx. 1.5 bar
Operating temperature:	5 - 40 °C
Status outputs:	3 x pairs of relay contacts (dry contacts)
Signal outputs:	<ul style="list-style-type: none"> <li>• analogue: 4 - 20 mA (max. 500 Ω)</li> <li>• serial: RS 232</li> <li>• Modbus (option)</li> </ul>
Power supply:	<ul style="list-style-type: none"> <li>• 230 V AC / 50Hz;</li> <li>• 110 V AC / 60 Hz</li> </ul>
Dimensions (WxHxD):	approx. 55 x 100 x 70 cm
Weight	approx. 50 kg

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## THE IMPORTANCE OF CONTINUOUS MERCURY EMISSIONS MONITORING

Monitoring of mercury emissions from stack has become a global issue. More and stricter regulations by authorities as well as the public claim for a complete surveillance of incinerators have caused an increasing interest in continuous emission monitors (CEMs) for mercury. For the potential user of such systems it is important to find a reliable and economic solution. First generation CEMs for mercury were based on the automation of known laboratory methods. This resulted in high maintenance costs, unreliable operation, oversized and heavy construction and last but not least a high price.

By contrast, the SM-3 breaks new ground. The reduction of mercury compounds in stack gas is performed thermocatalytically. Wet chemistry reduction processes are thus unnecessary, reducing the need for maintenance and thereby lowering operating costs.

