

Continuous Mercury Monitoring System (CMM)

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Gasmeter CMM is a complete emission monitoring system designed to meet the regulations for continuous mercury measurement standards in different combustion sources, such as coal fired power plants or waste incinerators. Relying on proven technologies it is a robust, reliable, and cost-effective measurement system to meet the latest standards. The system has low need for maintenance and provides an excellent solution for demanding industrial measurement conditions like other Gasmeter analysers.

Gasmeter CMM employs atomic fluorescence spectroscopy and thermal conversion of ionic mercury compounds to atomic mercury. It measures hot, wet and corrosive gas streams. No wet chemistry or gold amalgamation trap is needed. High inherent sensitivity of the atomic fluorescence spectroscopy enables extensive dilution of the sample gas. The diluted sample gas is transported to the analyser. Directly after thermal reduction of the mercury compounds the dry gas containing only atomic mercury is lead to the sample cell. Calibration of the whole system is performed with an automatic calibration unit capable of producing constant flow of atomic and (as an option) oxidised mercury

General parameters

Measuring principle:	Cold vapour atomic fluorescence (CVAF) with extractive filtration, dilution, and thermal conversion
Performance:	Minimum range 0 – 5 µg/m ³ . Minimum detection limit for total mercury 0.02 µg/m ³ (complete system, with dilution)
Operating temperature:	5 – 40 °C, non-condensing, dust free ambient air
Storage temperature:	-20 – 60 °C, non-condensing
Response time, T₉₀:	Typically < 120 s, depending on the sample line length and measurement time
Power supply:	100 – 115 or 230 V / 50 – 60 Hz

Operating system:	Microsoft Windows CE
Application software:	MAUI

Spectrometer with integrated thermal converter

Operation principle:	Direct cold vapour atomic fluorescence (CVAF) in vacuum pressure
Detector:	Photon detection unit with photon counting
Source:	Low pressure mercury vapour lamp
Operation wavelength:	253.7 nm
Sample conversion:	Integrated high temperature thermal converter

Calibrator for Hg⁰

Operation principle (Hg⁰):	Vapour generation from saturated source and dilution
Calibration gas:	Dried, and Hg scrubbed instrument air
Dilution gas flow control:	MFC 0 – 20 l/min
Span gas flow control:	MFC 0 – 20 ml/min
Hg source temperature:	1 – 10 °C
Calibration concentration ranges converted to Hg⁰:	
Saturated Hg source:	1 – 50 µg/m ³

Measurement parameters

Zero point calibration:	24 hours
Span calibration:	24 hours
Zero-point drift:	< 2% of measuring range per calibration interval
Sensitivity drift:	< 2% of measuring range per calibration interval
Linearity deviation:	< 2% of measuring range

Instrument air preparation

Instrument air inlet:	6 – 10 bar, 60 NI/min, 8 mm Swagelok fittings
Instrument air filtration:	3-stage filter unit
Nitrogen generator:	Capacity 99 % N ₂ , 8 l/min, 5-6 bars, efficiency ratio 20 %
Calibration gas drying:	Absorption dryer, capacity -30 °C
Mercury scrubber:	Absorption scrubber
Vacuum pump:	WOB-L piston twin headed

Alarm outputs

System alarm:	Gasmeter CVAF mercury analyzer and application software
Service request:	Gasmeter CVAF mercury analyzer and application software
Maintenance status:	Gasmeter CVAF mercury analyzer and application software
Result valid:	Gasmeter CVAF mercury analyzer and application software
Concentration alarm:	Gasmeter CVAF mercury analyzer and application software

Air conditioning

Cooling capacity:	A35 °C / A35 °C 1500 W
Internal circulation:	500 m ³ /h

Dilution probe

Operating principle:	Ejector with critical orifice
Material:	SS 316, glass coated sample wetted parts
Operating temperature:	Maximum 250 °C (filter housing temperature)
Filter element:	Glass coated SS 316, 2 µm
Dust load:	< 2 g/m ³
Flow alarm:	Yes
Sample gas pressure:	0.9 - 1.2 bars (in stack)
Sample gas temperature:	400 °C (max., in stack)

Heated probe tube

Material:	SS 316, glass coated sample wetted parts
Temperature:	Maximum setting 250 °C
Length:	122 cm
Mounting flange:	DN100PN16

Other materials, lengths, and temperatures are available on request.

Heated line

Tube size:	2 * 6/8 mm
Core material:	PFA Teflon core
Temperature:	Maximum 200 °C
Fittings:	8 mm Swagelok
Power supply:	230 VAC or 115 VAC
Power density:	200 watts/meter
Dilution and flowback air:	Unheated 2*4/6 mm Teflon core, 6 mm Swagelok

The maximum length for the heated line is 30 m with 230 VAC and 15 m with 115 VAC power supply. Analyzer and calibrator are connected to dilution probe with combined heated line which divides into two parts on both ends.

Electrical connections

Main supply:	3 * 16 A (up to 15 m sample line) 3 * 32 A (15 – 30 m sample line)
Power consumption:	~ 8 kW (the full CMM with heated lines, 30 m)

Measuring data outputs

The CMM system is equipped with four analog outputs representing the result total Hg concentration with different ranges

Analog output range:	4 – 20 mA. Active, load 350 Ω max.
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Enclosure

Material:	Bake painted steel
Dimensions (cm):	212 * 60 * 60 (cooling unit on top)
Weight:	230 kg (full CMM cabinet) 27 kg (dilution probe + probe tube)
Protection:	IP 54