

Gasmeter™ 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. 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 – 10 µg/m ³ , tested range up to 0 – 1000 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

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 and/or HgCl₂

Operation principle (Hg⁰):	Vapour generation from saturated source and dilution
Operation principle (HgCl₂):	HgCl ₂ solution dosing and evaporation
Calibration gas:	Dried, and Hg scrubbed instrument air
Dilution gas flow control:	MFC 0 – 30 l/min
Span gas flow control:	MFC 0 – 30 ml/min
Hg source temperature:	0 – 15 °C
Calibration concentration ranges converted to Hg⁰:	
Saturated Hg source:	1 – 200 µg/m ³
HgCl₂ solution dosing:	1 – 1000 µg/m ³

Measurement parameters

Zero point calibration:	24 hours
Span calibration:	24 hours
Calibration linearity test:	1 week
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
Temperature drifts:	< 2% of measuring range

Instrument air preparation

Instrument air inlet:	6 – 10 bar, 80 l/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 element:	Glass coated SS 316, 2 µm
Dust load:	< 2 g/m ³

Heated probe tube

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

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

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. There are also 2 unheated 4/6 mm lines for dilution and blowback gases.

Electrical connections

Main supply:	3 * 16 A
Power consumption:	~ 6 kW (the full CMM with heated lines, 20 m)

Measuring data outputs

Gasmeter measuring system is equipped with analog output representing the result total Hg concentration.

Analog output range:	4 – 20 mA
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Enclosure

Material:	Bake painted steel
Dimensions (mm):	2030 * 600 * 600 (cooling unit on top)
Weight:	~ 500 kg (full system)
Protection:	Cabinet IP 54, air conditioning unit IP 34