

On-Line Siloxane Monitoring Siloxane Sentry® Portable GC

An outcome of the biogas-to-energy market, has been the realization that an obscure family of silicon based organic compounds have a significant impact on equipment, and must be controlled. More specifically, the product of siloxane combustion, silicon dioxide or silica, coats engine cylinder heads or gas turbine blades, and coats downstream catalysts with a glassy material that has a variety impacts. These impacts include: reduced heat dissipation from the cylinder head, faster degradation of engine oil, short turn-arounds between engine rebuilds, destruction of expensive catalyst, and in some cases, bent rods and/or catastrophic failure.



When effective control technology, such as absorbent media, is applied before combustion, regenerations or change-outs are on a timed interval, because of uncertainty as to degree of saturation of the media. A real-time on-site measurement tool is required for cost-effective, positive control of siloxanes. However, to-date the available on-line analytical tools have been developed primarily for organic compounds that are of an environmental or safety concern, such as Hazardous Air Pollutants or HAPs. Heretofore, siloxane testing has been done via grab or composite samples that are sent to a laboratory for GC-MS analysis. Off-site laboratory analysis is a time consuming and costly procedure.



Siloxane deposits in engine exhaust line



Siloxane deposits on engine pistons

PhotoVac Inc. and its technology partner Venture Engineering, have responded to the need for on-line, near real-time siloxane measurement with the introduction of the Siloxane Sentry®. The unit's features include robust design, low sample loss, rapid identification and a reasonable detection limit. Other trace compounds such as NMOCs and hydrogen sulfide can be determined simultaneously as well.



LEG to Electricity Plant "Genset"



Siloxane Sentry® Features

Principal of Operation:	Gas Chromatogram/ Photoionization detection
Applications:	Control of siloxane sorbent regeneration or replacement cycle. Product quality monitoring for high Btu gas plant, prior to injection into the gas utility pipeline. Fuel quality monitoring prior to combustion. Measurement of Siloxanes in raw feed gas. Measurement/guard of siloxanes in combustion exhaust prior to catalytic oxidation/reduction.
Area Classification/ Power Supply:	Class 1 Div 1, Groups A-D (portable, battery powered unit) Fixed unit (120/240 VAC power supply) requires a Z purged cabinet for installation in classified areas
Communication:	Digital output provided for Ethernet connection
Connection:	¼ inch Swagelock?
Siloxanes Measured:	All major groups in landfill gas and digester gas; i.e., L2, L3, L4, D4, D5
Detection Limits:	As low as 50 ppb
Speciation:	The base unit provides a total for process control. Speciation can be provided. Co-elution of L3 and D3, and of D4 and D5, requires additional features and is not available in a portable unit.
Elution Time/ Measurement Interval	Less than 30 minutes turnaround for all elutions Measurement interval preset from 30 minutes to 8 hours
Calibration:	Performed daily by the operator. Calibration gas (Siloxane blend) supplied by PhotoVac.
Interferences:	Interferences from freons or other compounds are possible, leading to a more frequent regeneration of sorbent. Interferences can be managed by separate measurement of the interfering compound, or adjusting the threshold for regeneration upward in proportionately.

Installation:

Installation can be accomplished within one day, if a connection is available. Installation engineering is provided on a reimbursable basis. Time required varies with site conditions. For a fixed installation, a 36 inch x 36 inch Z purged cabinet, vented away from ignition sources, is recommended.