

STS SILOXANE MONITOR TECHNICAL SPECIFICATION



EXECUTIVE SUMMARY

The STS Siloxane Monitor has demonstrated that Carbon tower filter failure and regenerative processes can be identified, trended, and quantified. The resultant data may be used to manage filter change regimes to potentially extend filter life, to optimise regenerative processes, and or, prevent engine damage from siloxane laden gas.

INTRODUCTION

Siloxanes are a class of organic chemicals containing silicon, which burn in CHP engines, producing silica, in effect sand, which is highly damaging to engines and results in major, frequent engine damage and hence overhauls. The solution is to remove the damaging siloxanes in the Biogas or Landfill gas before they reach the CHP engine, this is achieved by using either an activated carbon filter or a regenerative filter. The problem however arises that carbon filters have a finite life span and are relatively expensive to change and that regenerative processes can be energy intensive dependent on the regeneration cycle. By monitoring the gas flow post filter the total siloxane load can be seen and a trend graph produced to show when carbon filter failure is likely or when a regenerative process should be started.

The STS Siloxane Monitor constantly measures the filter output 24/7 putting the operator in possession of accurate and understandable data on which to make an informed decision on plant optimisation.

INSTALLATION

The instrument should be located outside the ATEX zone but as close to the final filter outlet as possible. Connections to the instrument are as follows. The biogas supply is made with ¼" OD PTFE and is either insulated or in some circumstances (particularly where there is a long run) heated to prevent condensing of the siloxanes.

The Siloxane Monitor requires a nitrogen supply from a cylinder and a vent line, taking the biogas from the instrument after analysis to waste. A 240v 10A mains supply is required to run the instrument and associated water traps.

DATA NETWORKING

STS can offer a data communication package for remote access to instrument data. There are a number of options available including GSM and radio repeaters for poor signal areas, email alerts may be set for notification of instrument alarm conditions and threshold breaches for siloxane concentration. Interface into existing systems may also be possible dependant on site systems. A quote will be provided following the conclusion of a site survey and supply of information regarding required protocols.

COST BENEFIT OF CARBON FILTER MONITORING

The reason for considering installation of the SM is to optimise carbon usage by tightly regulating the point when a filter is changed – too early a change wastes carbon, too late inflicts damage on the engines. Typical payback on the installed cost of the instrument is approximately 3 years – this will of course depend on the filter change or regeneration regime.

In the other direction, if the carbon filter is changed too late, then engine damage results. This will appear as shortened life of oil, shortened intervals between top end overhauls, increased cost of replacement components, especially sparking plugs and most importantly, downtime resulting in loss of electricity sales and ROC payments. This is difficult to calculate, but with suggested costs of top end overhauls in the £25,000-50,000 range, oil at £0.6/litre and sparking plugs at £10000 a set, a very few days of siloxane damage may be very expensive.

STS SILOXANE MONITOR

INSTRUMENT SPECIFICATION

DESCRIPTION

The Siloxane Monitor is designed to quantify siloxanes in biogas using NDIR technology and is aimed at the sewage and landfill biogas industries.

Applications include monitoring to optimise carbon filter changes or regeneration cycles, determination of likely engine damage, or evaluation of boreholes for siloxane potential.

The instrument contains a pump which draws the biogas into the system, a concentration section and a gas cell which allows very low level detection.

The outputs of the instrument are a 320*240pixel LCD display showing operating parameters and current siloxane value and recent measurement data; an SD card port for data download; and an optional online communications service. Instrument control is by an alphanumeric keypad.

Calibration is required at 6 monthly intervals and is achieved via an injection system.

SPECIFICATIONS

Performance - detection limit of 1mg/m³ total siloxanes.

Rate of measurement – a result is produced every 45 minutes under standard settings

Biogas consumption - 600 mls are required for every 45 minute cycle.

Weight - 12 Kg

Dimensions - 475 x 170 x 350 mm

Enclosure - painted steel, with aluminium front panel, not weather proof.

REQUIREMENTS

Electricity – 240V, 10A

Nitrogen instrument grade, consumption 100 mls/min – a standard X47S cylinder lasts about 80 days.

Suitable exhaust arrangements for waste gas from instrument

The biogas supply must be non-condensing, unless a water coalescing filter is fitted.

DELIVERY

Currently the Siloxane Monitor can be delivered within 9 weeks of order. We expect to improve on this time in the near future.

STS Instruments Ltd

+44 (0) 1344 483563

sales@safetrainingsystems.com

www.safetrainingsystems.com

