

Using the STS Siloxane Monitor to optimise Process Control.

There are two popular systems for the removal of Siloxanes from Biogas, Activated Carbon Filters and Regenerative Filters.

Activated Carbon Filters

Activated carbon filters work by passing the biogas derived from the AD plant through a metal tower filled with activated carbon. Normally the gas will have been dried by running through a chilling plant to remove excess water which would be absorbed by the Carbon.

The siloxanes and other contaminants are trapped by the carbon allowing the filtered gas to pass through and into the engine. The size and design of Carbon filters will depend on the site specifics, flow and anticipated Siloxane loading, often sites will implement a set of towers in series which are rotated to get best optimisation of the Carbon.

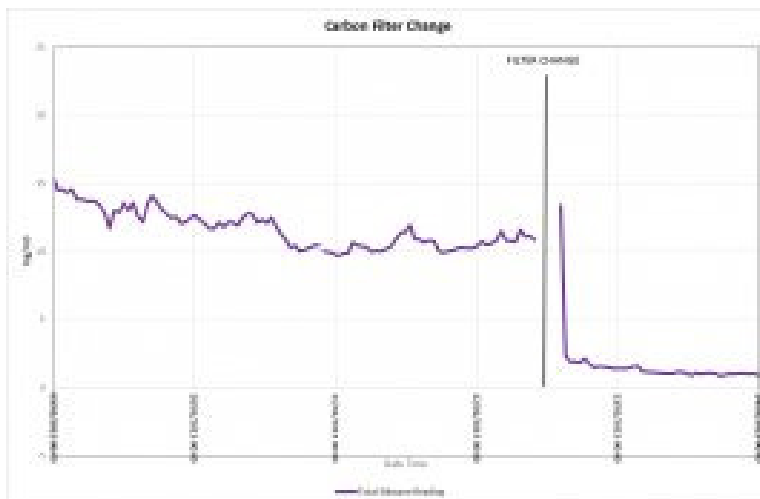
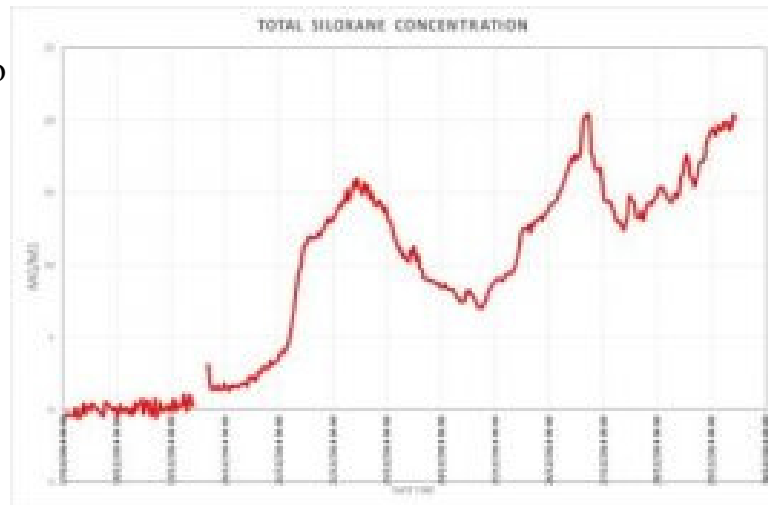


The issue here is that optimisation is based on a very small subset of data taken from bag samples submitted to the lab for analysis which have been shown to be subject to influence from time and temperature causing condensing of the siloxanes onto the bag walls and a resultant variable result. In house tests by STS managed to achieve figures of +/- 100% by manipulating these factors.

Bag analysis is also relatively expensive so users tend to do as few tests as they can - and then rely on the results to produce a schedule for changing the filters. In a perfect world that would be fine, but that assumes no change in the loading of siloxanes received into the plant and a consistent performance of the Carbon and consistent water removal from the gas stream - three things which simply don't happen.

The solution is to monitor the gas flow to the engine post filter on a regular basis, in the case of the STS Siloxane Monitor that is hourly.

This provides the user with a constantly updated dataset on which to make informed decisions regarding the correct time to replace the filters.



This is a win-win situation, changing the filters too early when Siloxane breakthrough has not occurred will incur unnecessary cost and changing the filter

too late when breakthrough has already occurred will cost even more in damage to engine components and degradation of engine oil quality and life time.

Regenerative Filter Systems

Regenerative Filter systems such as those supplied by PPtek Ltd offer a much more proactive solution to Siloxane removal than a standard Carbon Filter. The Regenerative filters operate in pairs with one unit being the Duty filter whilst the other unit is either on Standby or in Regeneration.



The Filters are run for a specified period of time when they are predicted to have reached their peak Siloxane loading and then the filter is switched with the 2nd clean filter. The dirty filter is now regenerated by heating it to drive off the volatile components to flare ready to be brought back on line at the end of the 2nd filter cycle.

This process is made possible by the use of an advanced media which is both excellent at removing Siloxanes and also is efficiently regenerated on a very frequent (usually daily) basis. Media life will depend on site specifics such as the gas make up and the flow but is usually several years.

The STS Siloxane monitor provides a valuable tool in the optimisation of the filter process as the constant data stream can allow adjustments to be made to the running of the plant to improve both Siloxane removal - should the filters be breaking through before the start



of a new cycle, or to extend the filter duty cycle if the loading is not reaching the specified amount before change over. This would have savings in terms of media life and in the energy used in regeneration.

