

CEMS NEWSLETTER

Monitoring Solutions

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CEMS MAINTENANCE: (A MULTI-PART SERIES)

Over the next several issues of the CEMS Newsletter, we will be presenting a series on CEMS maintenance. This issue covers dilution probe maintenance.

Preventive Maintenance

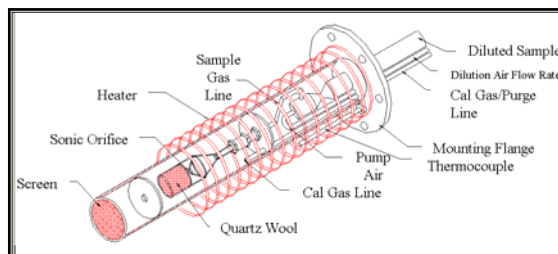
Because a dilution probe is exposed to a wet, hot, sometimes sticky stack gas environment, proper preventative maintenance is required to keep it operating optimally. The following steps are recommended at least quarterly:

- Pull the probe and change the gaskets. There is a gasket behind the heater plate, and on newer probes there is a gasket at the front of the probe mantle along with an o-ring at the probe tip that should be changed.
- Remove the probe mantle and replace the graphite ferrule.
- Remove and replace the quartz wool.
- Inspect and clean the threads where the mantle is installed. Use anti-seize on the threads when re-assembling.
- Wire brush the coarse screen to clean it. This is where most of the build-up occurs and it can easily get plugged.
- Clean the probe port – there will almost always be build-up of particulate here.

- Inspect the probe heater mantle and all other exposed surfaces for corrosion.

Common Problems

There are many common sources of failure with dilution probes. Here are some of the most common things to watch for and how to diagnose them:



1. A leak at the back heater plate will allow stack gases to get inside the probe extension. This will result in corrosion to the tubing inside the extension. The tubing will actually get eaten away from the inside of the probe.
2. A leaking probe gasket on a stack with negative pressure can result in further dilution of the sample before it's transported to the analyzers. In a situation like this, the CEMS will pass daily cals, but once put back on-line will not read correctly (usually very low to nothing at all).
3. Pluggage problems: When a probe gets completely plugged, the CEMS will still typically calibrate OK, but on-line will read "zero" or very low values. When the tip is

completely plugged, the cals can start to fluctuate because the probe orifice gets pressurized.

4. A common problem is a leaking graphite ferrule. Many users are afraid to tighten it down because they'll break the glass orifice. If the orifice is pulled out a small amount before tightening (1/8"), the ferrule can usually be tightened very snugly without breaking the orifice. When the ferrule leaks, both the stack and the cal readings go high.
5. Probes should be sent out periodically for acid cleaning and vacuum leaks. There's no formula for how often but once every 5-7 years is typical. The vacuum reading is a good indication. The reading will be high when plugged at the orifice sample inlet, and low if plugged through the eductor.
6. Heater failures are common. Often the heaters simply burn up. A good indication is if the controller reads the same temperature as the stack. Best thing to avoid premature failure is to keep the heater coils clean and don't over-stress when performing quarterly maintenance (removing and re-installing).

These basic probe cleaning and maintenance techniques should go a long way towards insuring a trouble-free life from your dilution probe.



56 Route 173, Suite B-1, Hampton, NJ 08827
4440 S. High School Rd., Suite D, Indianapolis, IN 46241

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**"Devoted to helping engineers and users
better understand CEMS"**

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or would like to be on our CEMS Newsletter mailing list,
please contact Jim Nowak at:

888-380-5226

908-500-4010

<http://monsol.com/>

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Part One: Dilution Probes

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