

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 extractive probe and umbilical maintenance.

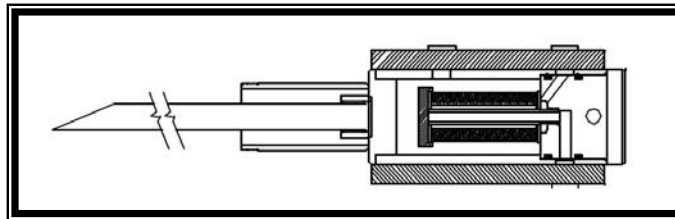
Preventive Maintenance

Extractive system probes are far simpler to maintain than dilution system probes. However, there are still some basic maintenance items that are required to keep your probe functioning properly for years of reliable service. The following steps are recommended at least quarterly:

- Before doing any maintenance on the stack probe, shut down the probe heater and the box heater if present (sometimes found on extractive probes). It's also helpful to turn the sample conditioning system off thereby turning off the sample pump and eliminating any vacuum that could make removing the filter housing difficult.
- Open probe box, remove clasp across back of filter housing, and remove probe head. Replace the o-rings in the probe head. Use a small amount of vacuum grease on the new o-rings.
- Replace the filter if it is a paper element. In the case of a sintered metallic filter, it should be

cleaned ultra-sonically. It's helpful to have a back-up already cleaned for reduced downtime.

- Inspect the stinger for any damage including corrosion and bending. Run a cleaning rod or air-line through it to remove any accumulated dust and particulate.
- Typically, the entire probe is never fully removed from the stack unless there is evidence of stinger damage that needs repair.



Common Problems

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

1. A burned out heater is the most common problem with extractive probes. There is usually an alarm from the heater controller to the CEMS cabinet and most times the DAS. Replacement is simple and straightforward.
2. A leaking purge solenoid will cause the readings to be diluted (lowered). There is no alarm for this condition. The only indication is that the readings are

lower than normal.

3. When the o-rings start to leak, typically the Oxygen reading will exceed the normally expected readings. This will happen during calibrations as well as normal operation.

Umbilical Problems

Umbilicals don't typically experience many problems. With a dilution system umbilical, you can run into deposits on the sample line (typically the first few feet). This can lead to a restriction that will eventually clog the sample line. In this case, the sample line can be disconnected at both ends and a suitable cleaning material can be used to open the sample line back up (either flushed down the line, or pumped up it).

With an extractive umbilical, sections of the heater can burn out. The heater that runs the length of the umbilical is made up of "nodes" which are typically three feet in length. When one of the nodes burns out, it's usually first noticed during purge. It becomes difficult for the heater controller to maintain the umbilical temperature during purging and an alarm will ensue.

Unfortunately, there are no easy fixes for a burned out heater in an umbilical. The whole run will have to be replaced as umbilicals cannot be spliced.

In the next issue we will tackle Sample Conditioning Systems.



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IN THIS ISSUE:

CEMS Maintenance: Part One: Extractive Probes

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