

# YOU'VE FAILED A CALIBRATION, NOW WHAT?

- First, let's look at the simple things. Just because you failed a calibration check doesn't mean there is a catastrophic problem.
  - Is one of your gas cylinders empty?
  - Was the valve on the calibration gas cylinder open?
  - Was the bottle changed recently – if so was the concentration updated in the software?

# SOMETIMES IT ISN'T QUITE THAT SIMPLE

- Lets look at the calibration results to see what failed. Was it one analyzer, or multiple analyzers? Span or zero, or both?
  - Take the system Out of Service.
  - Switch the calibration valve to cabinet mode, we want to start by looking at the analyzer.
  - Activate the calibration gas for the failure point.
  - Check the calibration flow meter and the cylinder pressure. Do they look right? Remember, the calibration flow takes into account the sample flow, the bypass flow and some gas lost to the stack in the probe.

# LET'S RUN SOME GAS

- With the calibration gas still running, how does the analyzer reading look compared to the cylinder value?
  - Remember to give the analyzer time to settle out, the reading should be fairly stable, if it isn't give it a little more time.
  - Switch the valve to the Probe position to compare the analyzer reading to how it looked in the Cabinet position.
  - If the analyzer reads the right value (or close to it) it could just be a matter of the purge time for the gas. There isn't enough time in the calibration sequence for the gas to get up to the probe and back down to the analyzer before the average starts.

# WAIT, MY ANALYZER READS DIFFERENT IN THE PROBE POSITION...

- Did your analyzer read about the same value in the probe and cabinet positions after it settled out? If not, maybe you have a leak. Let's run PMP 21.
  - Switch to your zero gas and the Cabinet position.
  - Make sure your Oxygen analyzer is at zero or close to it.
  - Switch to the Probe position on your valve.
  - Is the reading the same? If your O<sub>2</sub> value is higher in the probe position, you are adding air to the system somewhere.

# LOOKING FOR A LEAK

- Was any maintenance done recently? If so, let's start there, perhaps something didn't get put back right.
  - This would include seals on the sample filter. Also, is it screwed in tightly? Don't screw it in too tight, hand tight is good enough, too tight and the glass can crack or break.
  - Gaskets and O-rings on the probe might also be a problem if the probe was serviced recently.
  - Don't forget about the drain pump tubing – it can crack and wear under the constant abuse of the peristaltic pump.
  - Double check fittings, make sure they are tight, this includes the tube on the inlet of your sample pump, it can vibrate loose.
  - If you still can't find it, work your way up the stack from the sample filter and vacuum gauge by removing the tubing and plugging the sample tubing. Your sample pump should be able to pull about 20" Hg. Also, your sample flows and pressures should drop to zero as well. If your vacuum value drops somewhere or your sample flows pop up as you work your way up, you may have just found your leak.
  - If your pump isn't pulling around 20" Hg, it may need a new diaphragm in your pump.

# IT ISN'T A LEAK

- We've eliminated just about everything but the analyzer.
  - If your analyzer was reading fairly close, just not close enough, let's adjust it.
  - With the system Out of Service, we'll start with the zero gas with the valve in the Cabinet position. Once the analyzer settles out, zero it. How this is done varies by analyzer.
  - With the zero adjusted, let's move on to the span value. Run the span gas and let the analyzer settle. Verify that the span value in the analyzer matches the cylinder value from the certification sheet. Again, this varies by analyzer.
  - With both adjusted, switch back to zero to check the reading then back to span to check that as well. How's it look?

# FINISHING UP

- If your newly adjusted analyzer reading is looking good in the Cabinet position, switch back to the Probe position and verify that it reads properly still by running the zero and span gasses again.
- Assuming your analyzer still looks good, we need to verify it with the rest of the system. Put your system back into Service and run a Calibration check – either a full one or a single analyzer check depending on how much you did with the analyzers.

# FOLLOWING UP

- Now that your analyzer is reading right again, lets do a little checking on our past calibrations. CeDAR has a calibration check graphing feature built in. Take a look at the last several weeks of calibrations to see how your analyzer was looking.
- It is normal for an analyzer to drift slowly one way or another.
- If it has taken some drastic swings it may be time for some service. Light sources may need to be tuned or replaced, sample chambers cleaned, etc.