

Troubleshooting a CEMS Leak

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9/14/2021



Daily Calibration Fail!!

Unit Online !!

Let's Troubleshoot.

- Look at the calibration report, what failed?
- Did one analyzer fail, or did they all fail?
- Zero failed, Span failed?
- Any Active Alarms?

Leaky CEMS?

- Daily calibrations drifting, failing daily calibrations, CGA's and Linearities not passing, process values not as expected, not normal.
- If not taken care of promptly the result could be CEMs down time, false reporting, NOV.

Two Types of Leaks

1. Negative pressure leak, or vacuum leak
 2. Positive pressure leak
- Both will cause calibration failures, CGA and Linearity problems, inaccurate process values.

Negative Pressure Leak

- A Negative pressure leak will dilute the process gas and calibration gas with ambient air. This will give you high O₂ readings and low process NO_x, CO, SO₂, HC, etc.. readings. It will dilute the daily calibration gases causing calibration fails and calibration drifting. It will also affect the quarterly CGA's and Linearities.

Positive Pressure Leak

- A Positive leak will introduce process gases into the shelter or cabinet, which could be hazardous depending on the concentration.
- A Positive pressure leak will give a false indication on the total system flow coming into the system.
- You think you are pulling down 6LPM and are pulling down 10LPM with 7LPM of calibration gas going up = calibration fail

How to Determine if there is a Leak

- Put CEM system out of service.
- Put the system into cabinet mode and energize the O2 zero gas solenoid.
- Adjust the Zero on the O2 analyzer after O2 analyzer stabilizes.
- Manually place the system into probe mode and flow the O2 zero gas.

How to Determine if there is a Leak

- Make sure the calibration gas flow is greater than the total sample flow including bypass flow.
- The result is the zero in the cabinet mode is zero and if the stack mode is greater than .2% oxygen, this indicates a leak.
- This is how you leak check the CEMs system. The zero at the stack is greater than the zero at the cab, leak in system.

Let's Find the Leak

By sealing off the sample flow while the sample pump is running, the sample and bypass pressure gauges and flow meters will indicate zero, meaning no flow or pressure is being allowed into the system.

If the sample and bypass gauges and flowmeters indicate flow the result is a negative pressure, or vacuum leak.

Let's Find the Leak

Procedure for Locating a Vacuum Leak:

1. Cap off the inlet of the sample pump, most common cause of a leak. Zero pressure and flow indicates good pump. Move on to the cooler.
2. Remove sample line and cap off inlet to cooler. Zero pressure and flow indicates leak at the probe.
3. Cap off sample line at probe. Zero pressure and flow indicates no leak in sample line.

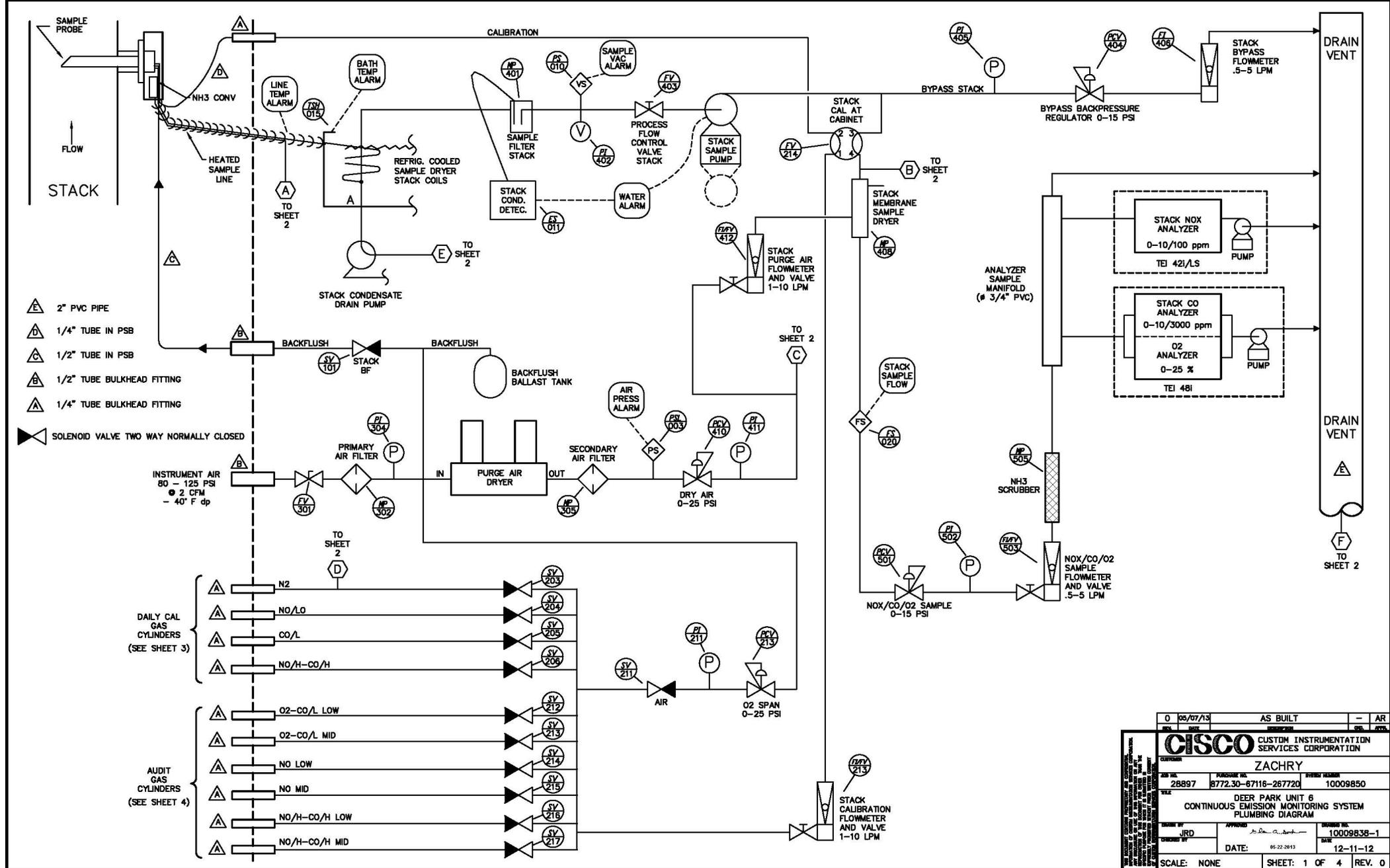
Let's Find the Leak

4. Rebuild the probe and cap off the backflush line at the probe and flow zero O₂ gas. This concludes the negative pressure tests, if a good stack zero can not be accomplished move on to positive pressure test.

Let's Find the Leak

Procedure for Locating a Vacuum Leak:

1. Check for loose fittings, tubing, leaking regulators.
2. Bypass the permeation dryer.
3. Bypass the sample manifold.
4. Increase the calibration gas flow to maximum capacity, peg the flow meter ball to the top of the flow meter.
5. Last Resort: Run a new calibration gas tube up the stack to the probe.



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REV	DATE	DESCRIPTION	BY	CHKD
CISCO CUSTOM INSTRUMENTATION SERVICES CORPORATION				
ZACHRY				
JOB NO.	28897	PROJECT NO.	8772.30-67116-267720	PROJECT NUMBER
FILE	10009850	DEER PARK UNIT 6 CONTINUOUS EMISSION MONITORING SYSTEM PLUMBING DIAGRAM		
DESIGNED BY	JRD	APPROVED	10009838-1	
DRAWN BY		DATE:	05-22-2013	TASK
SCALE:	NONE	SHEET:	1 OF 4	REV. 0

Common CEMs Leak Areas

- Sample Pump Diaphragm
- Sample Pump Tubing
- Backflush Line at Shelter and Probe
- Backflush Valve
- Sample Filter
- Drain Pump Tubing
- Probe O-Rings and Gaskets