Canister Sampling

When sampling using a canister, there are two sampling approaches: "GRAB" sampling and "TIME INTEGRATED" sampling. For GRAB sampling, the canister valve is simply opened and the vacuum inside the canister draws in a sample within a matter of seconds. GRAB sampling is most often used for discrete odor events, or for static concentration sample streams. TIME-INTEGRATED samples utilize a flow controller or critical orifice to collect the sample over a particular time frame or at a given flow rate. Flow controllers/critical orifice assemblies are equipped with particulate filters and are calibrated by the laboratory for a user-defined duration or flow rate.

Equipment

- REQUIRED: 9/16" Wrench, Adjustable Crescent Wrench
- Summa or Silco Canister – Cleaned and certified by ALS, and leak checked prior to shipment. Canisters are available in several sizes, including 6L and 1L.
- Flow Controller/regulator – Used to collect a time-integrated indoor air or ambient air sample. Flow controllers are calibrated by the laboratory for your project-specific requirements; please do not adjust any of the settings or knobs.
- Critical Orifice Assembly (COA) – Used to collect a time-integrated soil gas, sub-slab, SVE system, or other vapor sample. COAs are calibrated by the laboratory for your project-specific requirements; please do not disassemble the device.
- Analog Gauge – Gauge on Swagelok ¼" Tee fitting, used to monitor pressure during sampling. Note that these gauges are for general reference purposes only, and canister vacuum is checked prior to shipping and upon receipt at the laboratory.

1L size canister with analog gauge and critical orifice assembly

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Canister Sampling Instructions

Procedure

Check Initial Canister Vacuum

- Ensure that the canister valve is fully closed (the canister valve should be turned completely clockwise).
- Using a 9/16" wrench, remove the brass cap from the valve on the top of the summa canister.
- Attach the analog gauge on a Swagelok Tee to the valve on the top of the canister. Tighten down with your fingers first, then tighten gently with 9/16" wrench. Stabilize the valve with an adjustable crescent wrench.
- Re-attach the brass cap to the top of the analog gauge. Tighten down with your fingers first, then tighten gently with 9/16" wrench.
- Open the can approximately 1 ¼ turns, and note the initial vacuum reading on the chain of custody. Please note that if the gauge does not equilibrate within 30 seconds or appears to be losing vacuum, the canister is leaking due to a loose fitting. Close the canister valve immediately and tighten the fittings.

Proper use of wrenches to tighten fittings.

Grab Sample

- If collecting a GRAB sample, disconnect the brass cap from the top of the canister and open the canister valve, turning the valve counterclockwise until there is no resistance. Then turn back clockwise slightly until resistance is detected. You may hear a hissing noise as the vacuum dissipates and draws air in.

Time Integrated Sample

- If collecting a TIME INTEGRATED sample, disconnect the brass cap and attach the analog vacuum gauge and flow regulator to the canister. Tighten the fitting with your fingers first, then tighten gently using 9/16" wrench.
- Perform a flow regulator SHUT IN test as described on the next page.
- To begin sampling, turn the valve counterclockwise until there is no resistance. This is approximately 1 ¼ turns. Then turn back clockwise slightly until resistance is detected. Because the flow controller restricts the air flow, you will NOT hear a hissing noise as the vacuum dissipates and draws air in.

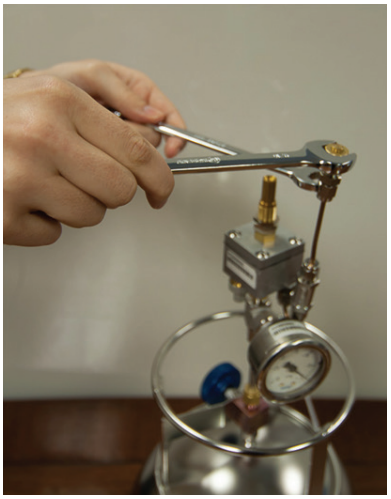
Sampling Completed

- At the end of the sampling period, close the canister valve by turning the knob clockwise. Do not tighten with a wrench.
- Remove all attached equipment from the canister and wrap in bubble wrap for shipment.
- Replace the brass cap on the canister valve. Tighten using a 9/16" wrench.
- Label the sample with the tag provided, and attach the tag to the canister with the provided plastic ties.
- Complete a chain of custody form. Please note the canister barcode ID number on the COC. For time-integrated sampling, please also note the flow controller or critical orifice assembly identification number with the corresponding canister.
- Place the chain of custody form, the bubble-wrapped flow controller, and the canister back into the original boxes in which they were shipped to you.

Conducting a Flow Regulator "Shut-In" Test

When utilizing a flow controller or critical orifice assembly, it is recommended that a "SHUT-IN" test be performed. The purpose of a SHUT-IN test is to assess the connections between the canister, gauge, and flow regulator, and to identify any leaking connections in the system prior to sample collection.

If you are collecting a "GRAB" sample, please disregard this step - not relevant.

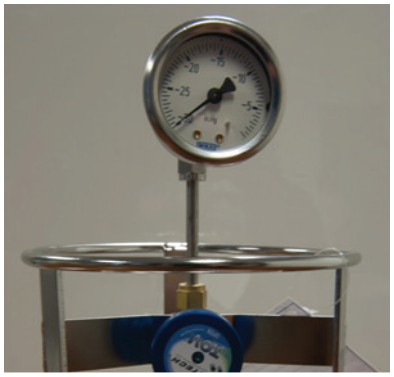


Attach brass cap to top of regulator.

Procedure

- Attach the analog vacuum gauge and flow regulator to the canister.
- Attach the brass cap to the end of the flow regulator. (For critical orifice assemblies, the nut and ferrule may need to be removed prior to attachment). Tighten the fitting with your fingers first, then tighten gently using 9/16" wrench.
- Open the canister valve counterclockwise approximately 1 ¼ turns, and leave it open for roughly 10-15 seconds. After the time has elapsed, turn the valve clockwise to close.

  The canister valve is left open for 10-15 seconds in order to allow the closed system to equilibrate.
- After the valve is closed, observe the vacuum gauge for approximately three to five minutes. If the vacuum gauge shows more than approximately 1 inHg change in pressure per minute, then there is a loose fitting. Re-tighten all fittings and continue to observe if the canister retains its vacuum. If the canister retains pressure, it is considered to be "leak-tight."
- Ensure valve is closed, remove brass cap, and continue with Canister Sampling Instructions for a Grab Sample or Time Integrated Sample.



Observe gauge for vacuum loss.

Canister Sampling Troubleshooting & Frequently Asked Questions

What do I do with the digital gauge provided?
If a digital gauge has been provided, it is to be used for checking the initial pressure ONLY. Due to the qualitative nature of the analog gauges, a digital gauge has been provided to assist in accurately establishing the initial vacuum of a canister, however if it is used after sampling occurs, then there is a possibility of sample cross-contamination.

The valve on my canister is twisting around in circles. Is this normal?
If you have a canister with a blue valve, then yes. These canisters contain special ferrules that allow the valve to make full revolutions with no effect to the canister vacuum. The fittings are not loose, so please do not tighten. If tightened, there is a chance that the now compressed ferrule could cause the valve stem to leak, corrupting the sample.

The analog gauge does not move when I'm checking the canister vacuum or when the canister has begun sampling. What could be the problem?
Due to jostling during shipping, as well as "wear and tear" from previous field work, the analog gauge needle may be stuck. Either disconnect the gauge from the canister and tap the gauge with the back of your hand prior to re-assembly, or try another gauge.

How do I connect tubing to the regulator?
If you have a flow controller (small and boxy in shape, used for ambient applications), then the tubing is connected to the sample inlet, located at the open end of the "U" shaped 1/8" metal tubing. A nut and ferrule need to have been requested separately.

If you have a critical orifice assembly ("L" shaped metal tubing, used for source applications), then unscrew the nut located at the long end of the orifice. Inside should be a ferrule and small ceramic frit. Place the frit back inside of the COA.

Place provided nut over the tubing, then slide the pink ferrule on to the tubing with the wider side of the ferrule closest to the nut, and the narrow side closest to the end of the tubing. Attach the nut to the regulator threads and twist until finger tight, and then tighten until snug using a 9/16" wrench.

The canister seems to be filling faster or slower than the specified flow regulator duration I requested. What should I do?
As part of the ALS Laboratory QA/QC protocol, each flow regulator undergoes calibration prior to shipping, as well as a post-calibration after the regulator has been returned by the client. If a regulator does not pass initial calibration, then the regulator undergoes maintenance and re-cleaning, if it does not pass the post-calibration, then the laboratory Project Manager is required to notify the client.

Close the canister valve, and try tapping the gauge with your finger or back of your hand and make sure that it stays steady. Gauges sometimes require manual "re-calibration".

If your canister is filling **slower** *than expected:*
Is there high humidity, or visible water vapor in the inlet tubing? Is there visible particulate matter? Are you taking a soil gas sample? Each flow regulator is outfitted with an in-line filter, which is designed to keep particulate matter and water vapor out of the canister. Particulate matter or water vapor could be clogging the filter or the regulator inlet.

Try outfitting the canister with a different regulator and trying again.

If your canister is filling **faster** *than expected:*
Did you perform a shut-in test prior to sampling? If not, it is likely there is a leak in the sampling train, which is causing the expedited sampling rate.

- If this is an ambient air sample, close the valve to suspend sampling, perform a shut-in test to confirm that there is no further leaking. If the shut-in test passes and there is no further leaking, then begin sampling since the ambient air is being collected as sample, there should not be any contamination issues from the leak.
- If this is a "source" level sample (ex. soil gas, SVE system, landfill gas, using tubing to connect to a source, etc.), and you have not performed a shut-in test, stop your sample immediately. Perform a shut-in test on the sampling train to confirm leak. If there is a leak, your sample has likely pulled in ambient air, which is likely not representative of the intended sample. You may wish to discontinue sampling with this canister, and instead restart sampling with a new/unused canister.

Please inquire with your ALS Project Manager for further troubleshooting.

How tight should the canister valve be after sampling completion? What about the brass cap?
After sampling, the valve only needs to be finger tight. DO NOT USE A WRENCH TO TIGHTEN. For the brass cap, please twist the cap on using your finger, until it is "finger-tight." From there, use a 9/16" wrench to ensure it is snug – but DO NOT OVERTIGHTEN.