Evacuated Bottle Sampling Instructions

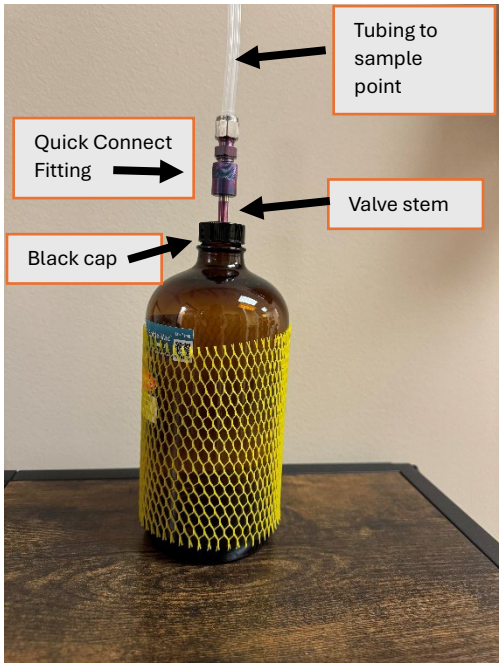
This guide is for collecting gas phase samples in evacuated bottles. Ensuring that air samples are collected properly is an important step in acquiring meaningful analytical results.

Evacuated bottles can collect a gas phase sample as a “grab” (approximately 30 seconds to 1 minute) or time integrated (200 ml/min or 5 minutes for soil gas or several hours for ambient/indoor air samples).

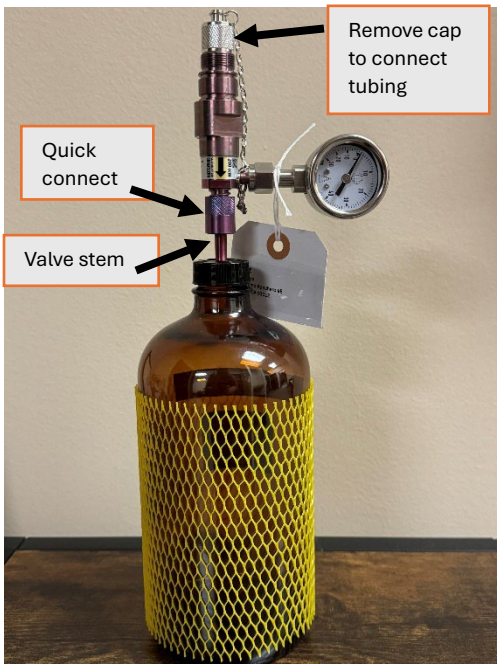
When you request evacuated bottles and/or flow regulators from VSOL, you will be asked for the type of sample being collected and the flow rate or time interval needed by your sampling plan. The flow regulators are pre-set prior to shipment. The flow rate is set at standard atmospheric conditions. If samples are collected at elevation or at ambient temperatures significantly differently than 25°C, they will fill faster or slower depending on sample conditions. If you specify unusual sample conditions at the time of the project set-up, we can set the flow controller accordingly. Mass flow controllers should not be utilized for source or process samples in which the collection point is under vacuum or pressure.

Grab Sample

- Remove the amber bottle from the shipping box
- Inspect the black screw cap and ensure it is tight
- Locate the quick connect fitting and connect tubing if needed and purge tubing as necessary
- Sampling will occur immediately when the quick connect fitting is attached to the bottle valve stem
- To begin sampling pull the spring vertically on the quick connect fitting and gently push the fitting onto the bottle stem. Release the spring, gently pull up on the quick connect fitting to confirm it is attached to the valve. You are sampling.
- After sampling is complete, disconnect the quick connect fitting from the valve by pulling vertically on the quick connect fitting spring to disconnect from the valve
- Note the time collected, sample identification name, and bottle identification on the chain of custody
- Place bottle into the shipping box and return to the laboratory for analysis



Soil Gas Sample with 200 ml/min (5 minute) Regulator



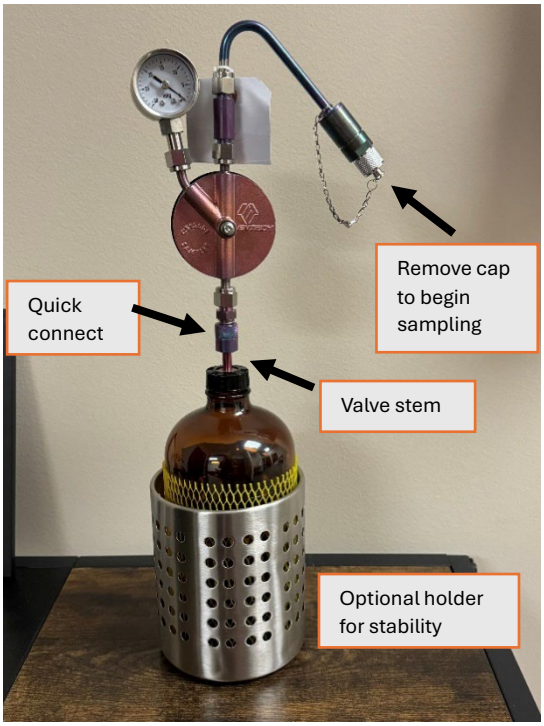
A flow regulator may be required for soil gas collection to restrict the vacuum applied to the soil and pore space to collect a representative sample with minimal intrusion of ambient air.

- Remove the amber bottle from the shipping box
- Inspect the black screw cap and ensure it is tight
- Leak check flow regulator and bottle by keeping the grey Swagelok cap attached to the end of the flow regulator. Pull the spring vertically on the quick connect fitting and gently push the fitting onto the bottle valve stem. Release the spring, gently pull up on the quick connect fitting to confirm it is attached to the bottle stem. This is a closed system, and you can record the vacuum in the bottle on your field notes.
- Disconnect the quick connect fitting/flow regulator from the bottle and connect tubing to your sample point. (Purge tubing with recommended volume according to your sample plan)
- Sampling will occur immediately when the quick connect fitting is attached to the bottle valve stem.
- To begin sampling pull the spring vertically on the quick connect fitting and gently push the fitting onto the bottle stem. Release the spring, gently pull up on the quick connect fitting to confirm it is attached to the valve. You are sampling.
- After sampling is complete, disconnect the quick connect fitting from the valve by pulling vertically on the quick connect fitting spring to disconnect from the valve.
- Note the time collected, sample identification name, flow regulator and bottle identification on the chain of custody.
- Place bottle into the shipping box and return to the laboratory for analysis.

Time Integrated Sample (8 hours to 24 hours)

Flow restrictors are devices which provide sample collection at a desired flow rate and/or sampling interval. By using a flow controller at a specified flow rate, air samples can provide information on average compound concentrations over a defined time period. For example, an 8-hour integrated sample can be used to determine indoor air quality in the workplace. Similarly, a 24-hour integrated sample may be collected to determine residential exposure to indoor air sources.

- Remove the amber bottle from the shipping box
- Inspect the black screw cap and ensure it is tight
- Leak check flow regulator and bottle by keeping the grey Swagelok cap attached to the end of the flow regulator. Pull the spring vertically on the quick connect fitting and gently push the fitting onto the bottle stem. Release the spring, gently pull up on the quick connect fitting to confirm it is attached to the bottle valve stem. This is a closed system, and you can record the vacuum in the bottle on your field notes.
- Remove the grey Swagelok cap to begin sampling through the flow regulator.
- **Reminder:** Sampling will occur immediately when the quick connect fitting is attached to the bottle valve stem if the cap is removed.
- After sampling is complete, disconnect the quick connect fitting from the valve by pulling vertically on the quick connect fitting spring to disconnect from the valve.



- Note the time collected, sample identification name, flow regulator and bottle identification on the chain of custody.
- Place bottle into the shipping box and return to the laboratory for analysis.

Volatile Organic Compounds (VOCs) EPA TO-15 Standard Compound List (Scan)

Actual reporting limits will be higher depending on the canister pressurization dilution factor and/or sample matrix effects. Typical canister pressurization dilution factors are between 1.5-2.0.

Compound	MRL (ppbv)	MRL ($\mu g/m^3$)
Acetone	2.0	4.8
Acrolein	0.5	1.1
Benzene	0.5	1.6
Benzyl chloride	0.5	2.6
Bromodichloromethane	0.5	3.3
Bromoform	0.5	5.2
Bromomethane	0.5	1.9
1,3-Butadiene	0.5	1.1
2-Butanone (MEK)	0.5	1.5
Carbon disulfide	1.0	3.2
Carbon tetrachloride	0.5	3.1
Chlorobenzene	0.5	2.3
Chloroform	0.5	1.0
Chloromethane	0.5	1.7
Cyclohexane	0.5	4.3
Dibromochloromethane	0.5	3.0
1,2-Dichlorobenzene	0.5	3.0
1,3-Dichlorobenzene	0.5	3.0
1,4-Dichlorobenzene	0.5	2.0
1,1-Dichloroethane	0.5	2.0
1,2-Dichloroethane	0.5	2.0
1,1-Dichloroethene	0.5	2.0
cis -1,2-Dichloroethene	0.5	2.0
trans -1,2-Dichloroethene	0.5	2.0
1,2-Dichloropropane	0.5	2.3
cis -1,3-Dichloropropene	0.5	2.3
trans -1,3-Dichloropropene	0.5	2.3
1,4-Dioxane	0.5	1.8
Ethanol	1.0	1.8
Ethyl acetate	0.5	1.8
Ethylbenzene	0.5	2.2

Compound	MRL (ppbv)	MRL ($\mu g/m^3$)
Ethylene dibromide (1,2-dibromoethane)	0.5	3.8
4-Ethyltoluene	0.5	2.5
Trichlorofluoromethane (Freon 11)	0.5	2.8
Dichlorodifluoromethane (Freon 12)	0.5	2.5
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	0.5	3.8
1,2-Dichlorotetrafluoroethane (Freon 114)	0.5	3.5
Heptane	0.5	2.0
Hexachloro-1,3-butadiene	0.5	5.3
Hexane	0.5	1.8
2-Hexanone (MBK)	0.5	2.0
4-Methyl-2-pentanone (MIBK)	0.5	2.0
Methylene chloride	0.5	1.7
Methyl *tert* -butyl ether (MTBE)	0.5	1.8
Methyl methacrylate	0.5	2.0
Naphthalene	1.0	5.2
2-Propanol	2.0	4.0
Propylene	0.5	0.9
Styrene	0.5	2.1
1,1,2,2-Tetrachloroethane	0.5	3.4
Tetrachloroethene	0.5	3.4
Tetrahydrofuran	0.5	1.5
Toluene	1.0	3.8
1,2,4-Trichlorobenzene	0.5	3.7
1,1,1-Trichloroethane	0.5	2.7
1,1,2-Trichloroethane	0.5	2.7
Trichloroethene	0.5	2.7
1,2,4-Trimethylbenzene	0.5	2.5
1,3,5-Trimethylbenzene	0.5	2.5
Vinyl acetate	0.5	1.8
Vinyl chloride	0.5	1.3
m.p -Xylene	0.5	2.2
o -Xylene	0.5	2.2