

Adjustable Back Pressure Flow Controller Instructions

Please Read The Following Important Information Before Starting

- *Mechanical Gauges should be used only for approximate pressure/vacuum readings. The final vacuum will be measured in the lab.*
- *Flow Controllers are fragile scientific instruments and should be treated with care. They are sent in individual boxes, which should be used for the return shipment.*
- *All flow controllers are individually leak checked and flow checked before they are sent out.*
- *If you have any questions please call Steve Hoyt at (805) 801-5660*

Passive Sampling with a Back Pressure Flow Controller

This procedure describes the collection of integrated samples in SUMMA Canisters over a 0.5 hour to 24-hour period using a Veriflow backpressure flow controller. This is a passive sampling process since it requires no power and the canister vacuum is used as the driving force to fill the canisters.

The backpressure flow controller is adjustable and has been preset by the laboratory for the desired sampling time. Since the flow controllers are adjustable, they can sometimes lose their setting in the shipping process due to vibration. It is recommended (but not required) that the flow be checked before or during use using a low flow digital flow meter.

With the back pressure flow controller, it is important to maintain at least 5"Hg vacuum in the canister in order to keep the flow rate uniform. This can be checked in the field using a vacuum gauge, but the final determination of sample validity is done when the sample arrives at the lab where it is checked with a digital pressure gauge.

Attaching the Flow Controller to the Canister

- The Flow Controller needs to be attached to the canister as shown in Figure 1.
- Remove cap from canister valve using a 9/16 wrench. Attach the pressure gauge side of the flow controller unit to the canister, and tighten until snug.
- The flow controller unit comes with a mechanical gauge attached and the unit and has been leak checked. The gauge is used to check the initial canister vacuum and monitor the canister-filling rate. The mechanical gauges will only provide an approximate measurement of the vacuum.

Leak Checking the Sampler

- Connect the gauge and flow controller as described above.
- Check to make sure the connection between the flow controller and canister is snug.
- Place the cap that was removed from the canister on the inlet to the flow controller. Gently tighten cap.
- Open the valve to apply a vacuum to the sampler. Check the vacuum gauge. If the vacuum drops less than 1" Hg in 5 minutes the system passes the leak check.

Collecting the Sample

- Place the canister and flow controller in the desired sample location. For most projects the canister should be placed so the inlet to the flow controller is about five feet above the ground. Canisters can be set on tables or clipped to a fence. Fill out the sample information on the Chain-of-Custody form supplied.
- At the desired starting time, open the valve on the canister by turning the green knob counter clockwise (if the knob falls off just screw it back on-it does not effect the sample).

- Record the initial vacuum reading from the pressure/vacuum gauge on the Chain-of-Custody form. This reading is only approximate.
- At the end of the sample period, record the final pressure and close the canister valve. For a valid sample the vacuum must be between -15"Hg and -5"Hg. The validity of the sample will be determined by the canister vacuum measurement at the laboratory.
- Remove the Flow Controller from the canister and place the cap on the canister. Pack the canister and flow controller in the original boxes and ship back to EAS labs. Be sure the Chain-of-Custody is filled out with the desired analysis, contact person, and address for report and billing.

Field Setting of Flow Controller

- This procedure can be used to verify or reset the flow. Only the adjustable Flow Controller can be set in the field and an accurate low flow meter is needed.
- Connect the digital flow meter to the inlet of the flow controller. Make sure the flow direction arrows on the flow meter show the flow coming into the flow meter then out of the flow meter into the flow controller. Open the canister valve and record the flow.
- Compare the measured flow to the theoretical flow (in ml/min). The theoretical flow is calculated to fill the canister to -10"Hg over the sample collection time. Calculate the measured flow rate by dividing the target sample volume in ml by the sample time in minutes.

Canister Size in Liters	Canister Volume in ml	Target Sample Volume (ml)
6 Liter	6000	4000
3.2 Liter	3200	2100
1.0 Liter	1000	660

- Remove the adjustment cap (some of them have a black adjustment knob). Use a 1/8" Allen wrench to make the flow adjustment. Always adjust the flow controller screw (or black knob) clockwise to set. If the flow goes below the desired value, turn the adjustment screw counterclockwise several turns, then turn clockwise to readjust.
- After setting the flow controller tap it lightly with a wrench to relieve mechanical stress on the internal spring. It is recommended to check the flow after 30 min to verify the flow.

When Done:

Ship the Sampler and Canister back to Environmental Analytical Service, Inc.

The canisters have a \$500 value and the flow controllers have a \$950 value so the package should be insured, since the sampler is responsible for all the equipment until it arrives at EAS.

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Figure 1

Adjustable Back Pressure Flow Regulator

