

Adjustable Back Pressure Flow Controller Instructions

Please Read The Following Important Information Before Starting

- *Mechanical Gauges should be used only for approximate pressure readings not for recording QC pressures. The final pressures will be measured in the lab.*
- *The Flow Controllers are fragile scientific instruments and should be treated with care. They are sent in individual boxes which should be used to send them back.*
- *If you have any questions please call Steve Hoyt at (805) 801-5660*

Passive Sampling with a Back Pressure Flow Controller

This procedure can be used to collect integrated samples in SUMMA Canisters over a 0.5 hour to 24-hour period using a 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 use.

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/Orifice to the Canister

- The Flow Controller/Orifice needs to be attached to the canister. If the flow controller was certified with a particular canister, attach the flow controller to the corresponding canister. To attach the flow controller to the canister follow the following steps.

- Remove cap from canister valve using a 9/16 wrench.
- Attach the pressure gauge "T" to the canister if provided. This device is optional, and can be used to check the canister-filling rate and initial pressure.
- Attach the flow controller to the top of the pressure gauge "T" and tighten. Tighten all fittings until they are snug and do not move or rotate.

Leak Checking the Sampler

- Connect the gauge and flow controller/orifice as described above.
- Check to make sure all the connections are snug.
- Place the cap that was removed from the canister on the inlet to the flow controller/orifice. Tighten cap. Be sure to use two wrenches so the fitting on the flow controller/orifice does not come loose.
- Open the valve to apply a vacuum to the sampler and then close the valve. This isolates the sampler from the canister. The sampler volume is about 5 mL so any leakage in the sampler will show up on the gauge immediately. A small amount of leakage is expected because the sampler volume is 1000 times less than the volume of the sampler and canister together.
- After closing the valve let the gauge stabilize for about 1 minute. Then check the vacuum gauge. If the vacuum drops less than 2" Hg in 5 minutes then the sampler will not have significant leakage over a 24-hour sampling time. If you have any problems or questions contact Steve Hoyt at (805) 801-5660.

Collecting the Sample

- The following procedure can be used to field check the flow settings for use on integrated air samplers.
- Place the canister and flow controller in the desired sample location. 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 about 3 or 4 turns (if the knob falls off just screw it back on-it does not effect the sample).
- Record the initial vacuum from the pressure/vacuum gauge (if supplied) on the Chain-of-Custody. This reading is only approximate. On some gauges a mark is provided to show the 30" Hg point and the 0 psig point.
- At the end of the sample period, record the final pressure (if you have the gauge option) and close the canister valve. If you do not have integral gauges attach a pressure/vacuum gauge to the canister and record the final pressure. For a valid sample the vacuum must be between about 15"Hg and 5"Hg. It is important that the sample collection time be close to the time the lab preset the flow controllers to.
- Remove the Flow Controller/Orifice (and pressure gauge is supplied) 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. 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. Be sure the Chain-of-Custody is filled out with the desired analysis, contact person, and address the report and billing are to go to.

Field Flow Controller Check

- The canister flow can be checked before sampling or just after the sampling starts.
- Connect a digital flow meter to the inlet of the canister. Make sure the flow meter is connected so the flow arrow goes into the canister. Also make sure the meter is set for the correct gas.
- Use the Digital Flow Meter to check that the flow is in the correct range to give a final can vacuum between 15" Hg and 5 "Hg. These numbers are given in Table 1. The actual flow is not an important sampling parameter, what is important is that the canister be filled to a final pressure between 5"Hg of vacuum and 15"Hg of vacuum.
- If a digital flow meter is not available, monitoring the canister vacuum during the sampling period can make an approximate check of the flow. For Example: If the sampling period is 8 hours, the canister should be at a vacuum of about 22" after 2 hours of sampling (1/4 of the total sample time).

Field Setting of Flow Controller

- This procedure can be used if the flow check described above indicates that the flow is not correct. Only the adjustable Flow Controller can be set in the field and an accurate flow meter is needed.
- Connect the digital flow meter to the inlet of the sampler. Make sure the flow arrows on the flow check show the flow coming into the flow check then out of the flow check into the flow controller.
- Check the flow reading. The correct flow can be found in Table 1 for different sampling times and canister sizes.
- Remove the adjustment cap (unless there is a black 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.

Environmental Analytical Service, Inc.
173 Cross Street
San Luis Obispo, CA 93401

(805) 781-3585

Figure 1
Adjustable Back Pressure Flow Regulator

