

# Passive Air Sampling Kits

(Siltek® Treated: cat.#s 24217, 24160, 24161, 24162, 24163, 24164, 22101, 26253, 26255, 26257, 26259;

Stainless Steel: cat.#s 24216, 24165, 24166, 24167, 24168, 24169, 22100, 26252, 26254, 26256, 26258;

Replacement frits & washers: 24170, 24171)

## The Passive Air Sampling Kit Includes the following parts:

(Note: all stainless steel components are coated for Siltek® versions.)

- 2µm frit/filter
- Spring washer
- Interchangeable critical orifice
- Veriflo® SC423XL flow controller
- Sampling tube
- Vacuum gauge

## Overview

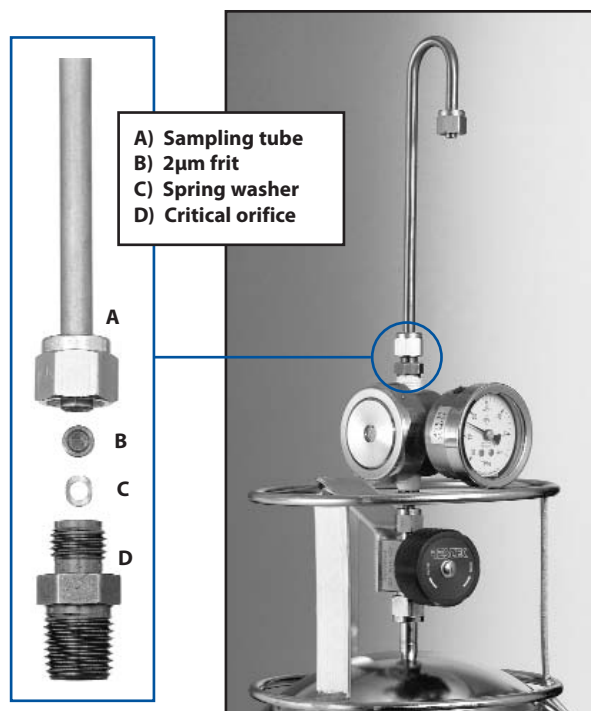
Passive sampling is a nonpressurized sampling technique. It uses differential pressure from an evacuated canister to create a sample flow into the canister. There are two types of passive sampling techniques: grab sampling and integrated sampling. Grab sampling is used to collect the sample in the canister over a very short time interval. Integrated sampling is taken over a much longer time interval (1 to 24 hours). Both of these sampling techniques can incorporate a critical orifice to control flow rate. When using a critical orifice flow restrictor for passive integrated sampling, take into account the decrease in flow as the vacuum in the canister changes. This can be eliminated with a Veriflo® SC423XL flow controller. This flow device incorporates a metal diaphragm downstream of the critical orifice to regulate the flow as the pressure in the canister changes. This controller is capable of maintaining a continuous low flow with vacuum ranges from 29.9" Hg to 7" Hg.

When collecting passive air samples, the final pressure in the canister is held to between 10" Hg to 5" Hg. For example, a 6 liter canister yields a 4 to 5 liter sample. It is important to incorporate an in-line filter to prevent particles from entering the critical orifice of the flow controller. Particles can clog the critical orifice, which will affect the flow through the controller. A vacuum gauge also is recommended to monitor the change in pressure during sampling. The initial and final vacuum readings should be recorded for chain of custody and sample volume calculations.

## Assembly

The passive air sampling kit is pre-assembled and leak-checked at Restek. However, it is still good practice to leak-check the kit prior to use.

**Note:** If attaching any of Restek's passive sampling kits to a 3L canister, use a Siltek® treated (cat.# 563646) or stainless steel (cat.# 563647) connector between the two components.



**Miniature Air Sampling Kit**

## Flow Rates

Ensure the proper flow is set prior to sampling. For field calibration, we recommend using a practice evacuated canister for setting the flow. For lab calibration, any vacuum source capable of >10" Hg can be used. Make sure no contaminants are drawn into the sampling kit during calibration. When calibrating flows, set the flow with kit fully assembled to ensure the same flow rate in the field.

*Please note: There are several different interchangeable orifices available for the Veriflo® SC423XL flow controller. Each critical orifice operates within a particular range. Choose the proper orifice for the desired flow range.*

1. Remove the protective cap on the back of the Veriflo® SC423XL flow controller.
2. Connect an evacuated SilcoCan® canister, TO-Can® canister, or vacuum source to the outlet of the sampling kit or the outlet of the Veriflo® SC423XL flow controller.
3. Connect a high-quality calibrated flowmeter to the inlet of the sampling kit and apply vacuum.
4. Adjust the piston gap screw to the desired flow using a 3mm allen wrench. Allow several minutes for the flow to equilibrate between adjustments.
5. Replace the protective cap once the proper flow has been set.

### Changing the Critical Orifice\*

1. Disassemble the passive air sampling kit at the inlet end of the interchangeable critical orifice.
2. Choose the proper orifice size for desired flow range.

| Flow rate<br>(cc/min.) | Replacement orifice cat.# |                 |
|------------------------|---------------------------|-----------------|
|                        | Siltek® treated           | Stainless steel |
| 0.5-2                  | 24219                     | 24218           |
| 2-4                    | 24233                     | 24245           |
| 4-8                    | 24234                     | 24246           |
| 8-20                   | 24235                     | 24247           |
| 20-40                  | 24236                     | 24248           |
| 40-80                  | 24237                     | 24249           |
| 80-350                 | 22099                     | 22098           |

3. Remove existing critical orifice.
4. Install the proper critical orifice using Teflon® tape around NPT threads.
5. Reassemble sampling kit

### Replacing the 2µm Frit and Spring Washer

\*Replacing the 2µm frit and spring washer is recommended when changing the critical orifice.

Loosen lower 1/4" nut on sample tube. Remove sample tube and remove the 2µm frit and spring washer. Replace with new washer and frit, and reinstall sample tube.

### Cleaning for Reuse

Once the sampling kit has been used in the field for collecting a sample, we recommend cleaning the complete kit before reuse. Extensive cleaning practices ensure a clean air collecting system. There are several different cleaning techniques depending on the concentration of the sample collected. If the kit and the components of the kit are disassembled for cleaning, we recommend leak-checking after reassembly. Some suggestions for cleaning are:

- Flush complete sampling kit with humidified Ultra High Purity (UHP) air or nitrogen.
- Apply low heat while flushing with gas to drive off contaminants.
- If kit and components are disassembled, we recommend sonicating component parts in methanol. This includes the particulate filter and Veriflo® SC423XL flow controller.  
**Note: To prevent damage, do not sonicate the orifice and the O-rings.**
- For extremely contaminated sampling systems, after sonication in methanol, heat treat component parts in an oven at 100 to 150°C. **Do not include O-rings, gauges and other materials that cannot withstand these temperatures.**
- Reassemble and leak-check. Readjust flow rate according to the steps listed in the *Flow Rates* section.

### Repair Service

Normal wear and tear on flow controllers and sampling kits may result in damage causing leakage. This service allows you to extend the life of your equipment for much less than the cost to replace with new. If you would like to take advantage of this service, contact your Restek representative or Customer Service at 800-356-1688. You will be given instructions and an SRV # to return the parts to us.

550131 Sampling Kit/Flow Controller Repair (Includes all new rubber seals in flow controller, orifice, and frit replacement)

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**Call Technical Service at 800-356-1688 or 814-353-1300, ext. 4 (or your Restek representative) if you have any questions about this product or any other Restek product.**



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