

SKC® Application Guide

Using Sample Bags With the Vac-U-Chamber



The SKC Vac-U-Chamber™ is a rigid air sample box that allows sample bags to be filled directly by using negative pressure provided by a personal air sampling pump. Both sample and pump contamination are eliminated since the air sample does not pass through the pump. The Vac-U-Chamber's rigid walls will not collapse under vacuum conditions. All surfaces in contact with the sample are constructed of inert materials.

Required Equipment

1. An **air sampling pump** capable of sampling at the recommended flow rate, such as:
 - SKC 224-XR Universal Series Sampler
 - SKC AirChek® 52 Sampler
 - SKC 222 Series Low Flow Sampler
2. An **air sample bag** up to 10 liters in size, such as:
 - SKC Tedlar® Bag Cat. No. 232-01 for use with 1-liter Vac-U-Chamber
 - SKC Tedlar Bag Cat. No. 232-08 for use with 10-liter Vac-U-Chamber
3. **SKC Vac-U-Chamber:**
 - 1-liter Cat. No. 231-940
 - 10-liter Cat. No. 231-939

Optional Equipment

1. **Nitrogen** (99.999% pure)
2. An **airflow calibrator**, such as:
 - SKC UltraFlo® Calibrator Cat. No. 709
 - DC-Lite Flowmeter 717 Series

Note: Calibration is required when sampling according to a method.

Introduction

Figure 1 shows the SKC 10-liter Vac-U-Chamber (Cat. No. 231-939) loaded with an air sample bag in a sampling train with a PCXR4 Universal Sampler (Cat. No. 224-PCXR4).

To determine the correct flow rate for the chemical of interest, refer to the appropriate analytical method. Consult the sample pump operating instructions for further details on using the pump.

1. Calibrating Pump Flow Rate

The pump must be calibrated if taking a bag sample according to an analytical method that specifies a flow rate. **Note:** Calibration is not necessary if simply taking a grab sample. Care should be taken to ensure the bag is not filled more than 80% of its maximum volume (Figure 2).

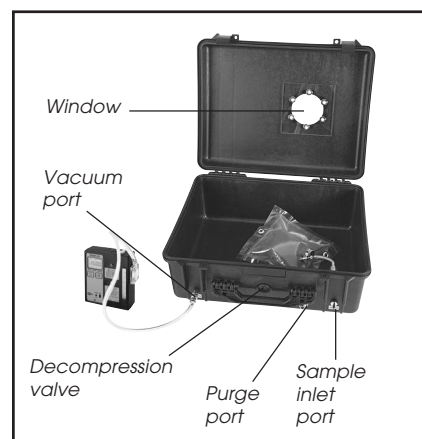


Figure 1.

PCXR4 Sampler Connected to a 10-liter Vac-U-Chamber for Sampling

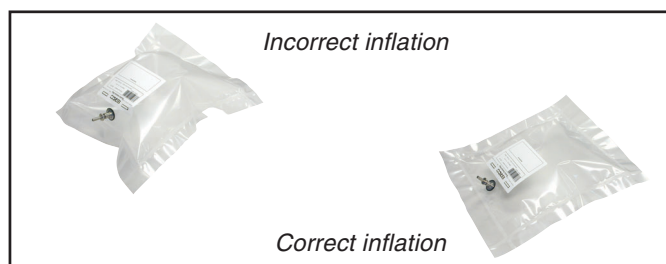


Figure 2. Bag Inflation

Use flexible tubing to connect the pump inlet to the outlet port of an electronic calibrator or film flowmeter. **Note:** If using a 224-XR Universal Series Sampler, ensure that the pump is in the high flow mode. See pump operating instructions.

Calibrate the pump to the flow rate specified in the analytical method. Refer to pump and calibrator operating instructions for details on calibrating pump flow rate or request SKC Application Guide: *Calibrating a Pump Using a Film Flowmeter* (SKC Publication #1163) or *Calibrating a Pump Using an Electronic Calibrator* (SKC Publication #1366).

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2. Assembling the Sampling Train

Connect the inlet stem of an appropriate size bag to the sample inlet (Teflon® tubing) inside the Vac-U-Chamber (Figure 3) or use the Teflon tube adapter for bags with a vertical valve (231 Series bags). Open the valve on the bag. Refer to the bag operating instructions. Attach the quick disconnect fitting on the end of the supplied Tygon® tubing to the purge port of the chamber and the open end of the tubing to the pump inlet (Figure 5). Before evacuating the sample bag, ensure that the red cap plug remains on the sample inlet port outside the chamber. Activate the pump and allow it to run until the bag is completely evacuated. Turn off the pump. To purge the sample line, remove the red cap plug and connect a long Teflon sample line to the sample inlet port on the outside of the pump. Connect the loose end to a clean air source. Turn on the pump for a period adequate to purge the line. Repeat as needed.

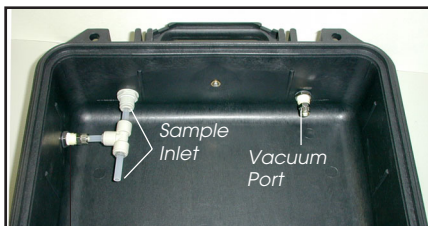


Figure 3.
Ports Inside a
Vac-U-Chamber
(1-liter Model
Shown)

Purge Port (Purge port located on front of 10-liter models)



Figure 4.
Ports Outside a
Vac-U-Chamber
(1-liter Model
Shown)

Purge Port
Vacuum Port Decompression Valve Sample Inlet Port

3. Filling the Bag with a Sample

With the pump still attached to the Tygon tubing, detach the quick disconnect fitting from the purge port on the chamber and insert it into the vacuum port (Figures 1 and 4). Close the Vac-U-Chamber and secure both latches. Ensure that the decompression valve located below the handle is closed (Figure 4).

Grab Sampling

Activate the sampling pump and view the bag inflating through the window on top (Figure 1). Allow the pump to run until the bag is approximately 80% full. **Do not over inflate the bag (Figure 2)**. Turn off the pump and immediately open the chamber. Close the valve on the bag. If the chamber is difficult to open after sampling, loosen the decompression valve to relieve the pressure produced during sampling.

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Timed Sampling

Activate the pump calibrated to the recommended flow rate and record the start time. Sample for the time specified in the analytical method. Turn off the pump, record the stop time, and close the valve on the bag.

Samples can be analyzed directly from the bag using a color detector tube, or the sample can be sent to a laboratory for analysis.



Figure 5.
PCXR8 Sampler
Connected to a
1-liter Vac-U-
Chamber for
Purging

Red Cap Plug (for bag evacuation) Sample Inlet Port (connect purified air source here)

4. Shipping Bag Samples

Sample bags sent to a laboratory for analysis should be packed loosely and padded to minimize possible puncturing during shipment. Bag samples should not be shipped by air unless the cargo cabin is pressurized. A significant decrease in barometric pressure may cause sample bags to burst.

Cleaning a Bag

Flush the bag to remove any possible contaminants. To do so, attach the sample bag to the sample inlet (Teflon tubing) inside the Vac-U-Chamber (Figure 3). Open the bag valve. Refer to the bag operating instructions. Connect a source of purified air, such as 99.9% nitrogen, with an appropriate regulator to the sample inlet port outside the Vac-U-Chamber (Figure 5). Activate the pump to evacuate the bag. **Caution: Direct vented air to a safe location. Do not inhale the exhaust air from the bag.** Turn off the pump. Open the regulator valve and fill the bag again with nitrogen. Close the valve. Turn on the pump and evacuate the bag again. Repeat the process as needed.

If desired, a charcoal tube (Cat. No. 226-09) can be inserted between the nitrogen source and the bag to further reduce the chance of contamination. Open the valve on the regulator and allow nitrogen to flow into the bag at approximately 500 ml/min until the bag is filled to approximately 80%. Close the valve on the regulator fitting. Connect the open end of the supplied Tygon tubing to the pump inlet and the end with the quick disconnect fitting to the purge port on the Vac-U-Chamber (Figure 5). Activate the pump to evacuate the bag. **Caution: Direct vented air to a safe location. Do not inhale the exhaust air from the bag.** Turn off the pump. Open the regulator valve and fill the bag again with nitrogen. Close the valve. Turn on the pump and evacuate the bag again. Repeat the process as needed.

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