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## Vac-U-Chamber

### Cat. Nos. 231-939 and 231-940

### Operating Instructions

## Introduction

Vac-U-Chamber is suitable for the following applications:

- U.S. EPA Methods 18 (VOCs—industrial sources) and 0040 (POHCs—stationary sources)
- Soil/gas vapor sampling (U.S. EPA SOP 2042)
- Indoor air remediation system monitoring petroleum constituents (U.S. EPA SOPs 2102, 2103, and 2104)
- Groundwater testing
- Stack sampling
- Ventilation studies
- Hazmat testing
- Preparation of standards/gas mixes

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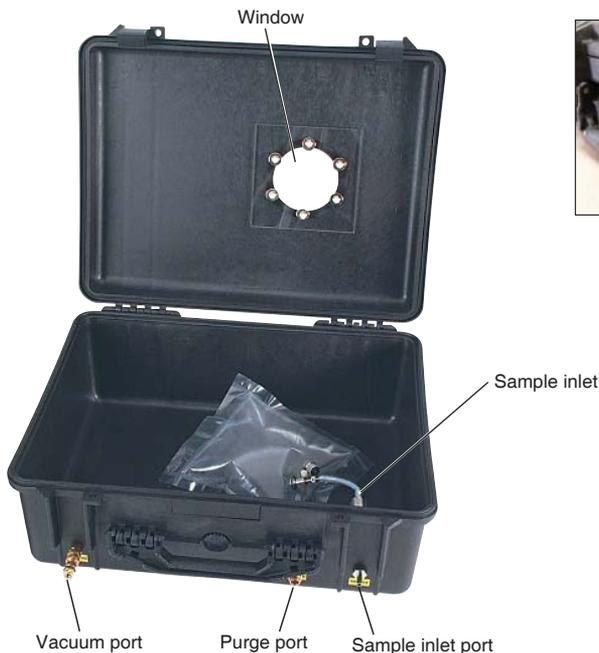
## Description

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The Vac-U-Chamber is a rigid, airtight case with connector fittings on three ports:

1. Vacuum port—to inflate the sample bag
2. Purge port—to evacuate the sample bag before sampling, to sample, and to make a standard
3. Sample inlet port—1/4-inch OD fitting to connect the sample line or gas source

The Small Vac-U-Chamber has the vacuum and sample inlet ports on the front and the purge port on the side; the Large Vac-U-Chamber has all three ports on the front (Figure 1). **Note:** *Designed to contain SKC sample bags.*



*Purge port on side of small model*

*Figure 1. Large Vac-U-Chamber and Ports*

## Vac-U-Chamber Contents

If You Have Cat. No.	Your Package Should Contain
231-940	Small Vac-U-Chamber with polypropylene fittings (supplied without pump) and ¼-inch ID Tygon tubing with polypropylene quick coupling; suitable for use with SKC 1-liter sample bags
231-939	Large Vac-U-Chamber with stainless steel fittings (supplied without pump) and ¼-inch ID Tygon tubing with stainless steel quick coupling; suitable for use with SKC 8-liter bags

*See Accessories/Replacement Parts on page 7.*

## Required Equipment

- Sample pump** such as the SKC Universal XR Series, AirChek® TOUCH, or AirChek XR5000
- ¼-inch ID (5/16-inch OD) PTFE tubing** for sample line
- Sample bags:** 1 liter for use with Small Vac-U-Chamber, 8 liter for use with Large Vac-U-Chamber; *see options below*

Bag Material	1 Liter Cat. No.	8 Liter Cat. No.
Tedlar®	232-01	232-939
SamplePro® FlexFilm	236-001	236-004
Standard FlexFoil®	262-01	262-08
FlexFoil PLUS	252-01	252-08

# Operation

## Set/Calibrate Pump Flow Rate

- If using a Universal XR Series sample pump, ensure that it is in high flow mode. See pump operating instructions.
- Before sampling, allow pump to equilibrate after moving it from one temperature extreme to another.

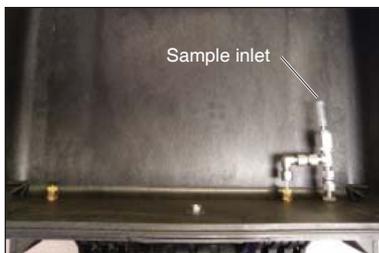
Set the pump for a flow rate sufficient to sample in the required time. See *Timed Sampling and pump operating instructions* for details on setting flow.

Calibrate pump flow rate if required by the method used.

1. Run the pump for 5 minutes before calibrating.
2. Use flexible tubing to connect the pump inlet to the outlet (suction) port of a calibrator.
3. Calibrate the pump to the flow rate specified in the method used. See *pump and calibrator operating instructions* for details.

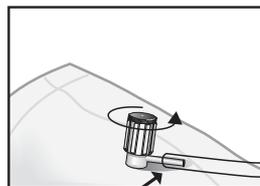
## Install Sample Bag in Vac-U-Chamber

1. Inside the Vac-U-Chamber, insert the inlet stem of the sample bag into the chamber's sample inlet (short piece of PTFE tubing, see below).



Sample inlet inside Vac-U-Chamber

2. Open the valve on the bag by turning the entire upper portion (septum body and cap) of the fitting counterclockwise one revolution.



Do not turn the side stem.

## Fill Sample Bag with a Sample (Grab or Timed)

### Setup

1. Install the sample bag properly. See *Install Sample Bag in Vac-U-Chamber*.
2. Purge the sample bag and/or sample line if required. See *Purge Sample Bag/ Sample Line*.

3. Outside the Vac-U-Chamber, push the quick coupling on the end of the supplied Tygon tubing into the vacuum port; *see right*. Press the open end of the Tygon tubing securely onto the pump inlet. **Note:** *Ensure that the red cap plug is removed from the sample inlet port.*



4. Close the Vac-U-Chamber and secure both latches. Perform grab or timed sampling. *See below.*

### ***Grab Sampling***

1. Turn on the pump and monitor bag inflation through the window in the chamber's lid. Run the pump until the bag is approximately 80% full. **Do not overinflate the bag** (*Figure 2*).
2. Turn off the pump when sampling is complete. Immediately open the Vac-U-Chamber. **Note:** *Disconnect the pump to release the vacuum.*
3. Close the valve on the sample bag by turning the entire upper portion (septum body and cap) of the fitting **clockwise** one revolution.
4. Pull the bag fitting from the chamber's sample inlet (short piece of PTFE tubing).

### ***Timed Sampling***

The Vac-U-Chamber is not a perfect vacuum, but its leak rate is low and allows efficient sample collection, even at lower flow rates (10 ml/min), for a full 8-hour sample. To collect 1 liter of sample into a 1-liter bag, use a vacuum source at approximately 1 L/min for 1 minute. Use similar flows to determine filling times.

1. Set/Calibrate the pump flow rate to collect enough sample in the time required in the analytical method.
2. Turn on the pump and record the start time. Sample for the time specified in the analytical method. **Do not overinflate the bag** (*Figure 2*).
3. Turn off the pump, record the stop time, and immediately open the Vac-U-Chamber. **Note:** *Disconnect the pump to release the vacuum.*
4. Close the valve on the sample bag by turning the entire upper portion (septum body and cap) of the fitting **clockwise** one revolution.
5. Pull the bag fitting from the chamber's sample inlet (short piece of PTFE tubing).

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## **Purge Sample Bag/Sample Line**

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### ***Purge Sample Bag***

1. Ensure that the sample bag is installed properly inside the Vac-U-Chamber. *See Install Sample Bag in Vac-U-Chamber.*
2. Outside the Vac-U-Chamber, connect a source of 99.99% nitrogen OR purified air to the sample inlet port (1/4-inch OD fitting). If desired, insert a charcoal filter between the cylinder and the bag.
3. Push the quick coupling on the end of the supplied Tygon tubing into the purge port (*Figure 1*), and press the open end of the Tygon tubing securely onto the pump inlet.

- Turn on the sample pump and run it until the bag is completely deflated. *Note: If the sample pump used has a flow fault feature, the pump may go into flow fault during this operation. If the pump does not reset automatically, see the flow fault section in the pump operating instructions.*



**Direct the vented air to a safe location. Do NOT breathe the exhaust air from the bag being purged.**

- Turn off the pump and use the quick coupling to detach the Tygon tubing from the purge port as follows, depending on the model. *See below.*



*On the Large Vac-U-Chamber, grip the release ring and push toward the chamber.*



*On the Small Vac-U-Chamber, press down on the release tab.*

- Open the valve on the regulator. Nitrogen will flow into the bag at approximately 500 ml/min. Fill a 1-liter bag for approximately 2 minutes or an 8-liter bag for approximately 16 minutes.



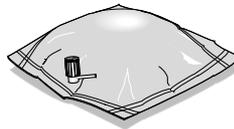
**Use the window in the lid of the chamber to monitor bag inflation. Do not fill the bag more than 80% of its maximum volume (Figure 2).**

- Close the valve on the regulator.
- Evacuate the sample bag: with the red cap on the sample inlet port, push the quick coupling on the end of the supplied Tygon tubing into the purge port (Figure 1) and press the open end of the tubing securely on the pump inlet. Turn on the sample pump and run it until the bag is completely deflated.
- Repeat Steps 3 through 8 at least two more times before sampling. After purging the sample bag, purge the sample line if desired. *See Purge Sample Line.*

*Incorrect inflation*



*Correct inflation*



*Figure 2. Bag Inflation*

### *Purge Sample Line*

1. Remove the red cap from the sample inlet port (*Figure 1*). Press a long length of PTFE tubing (the sample line) onto the sample inlet port. Connect the loose end of the PTFE tubing to a clean air source.
2. Align and push the quick coupling on the end of the supplied Tygon tubing into the purge port (*Figure 1*). Press the open end of the Tygon tubing securely onto the pump inlet.
3. Turn on the pump and let it run long enough to purge the line. Repeat the process as many times as desired.
4. Turn off the pump and use the quick coupling to detach the Tygon tubing from the purge port.

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## **How to Handle Sample Bags Post-sampling**

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- *Keep bags containing samples out of direct sunlight.*
- *If a sample bag was partially evacuated onto an instrument (gas chromatography) or into a color detector tube, evacuate the remaining sample before disposing of the bag. See Purge Sample Bag, Step 8.*
- *Direct the vented air to a safe location. Do NOT breathe the exhaust air from the bag being evacuated.*
- *Pack sample bags loosely and with padding to minimize possible puncturing during shipment.*
- *Do not ship sample bags by air unless the cargo cabin is pressurized; a significant decrease in barometric pressure may cause sample bags to burst.*

## **Special Application**

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### **Make Standard Gas Samples**

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1. To use your Vac-U-Chamber to make a standard, connect a source of 99.99% nitrogen OR purified air to the sample inlet port (*Figure 1*).
2. Meter into the sample bag an exact amount of nitrogen or air sample. One liter of nitrogen or air is admitted into the bag by flowing 500 ml/min for 120 seconds.
3. Close the valve on the sample bag and remove the bag from the chamber.
4. Inject the proper amount of chemical through the septum fitting. For example, to make a standard of 1 part per million of vinyl chloride, inject 1 microliter of vinyl chloride through the septum into a bag containing 1 liter of nitrogen.
5. Knead the bag to mix.

## Accessories/Replacement Parts

Description		Cat. No.
PTFE Tubing, ¼-inch ID (5/16-inch OD), for sample line	50 feet	231-924
	10 feet	231-937
<b>Nitrogen Cylinder</b> , 103 liters, 99.99% pure, <i>requires regulator</i>		804-9B0994
<b>Regulator</b> for cylinder, 500 ml/min, <i>requires cylinder</i>		804-R713050
<b>Charcoal Tubes</b> , pk/50		226-09
<b>Telescoping Sample Probe</b> , stainless steel	16 inches to 6 feet 5 inches	805-10545
	14.5 inches to 4 feet 5 inches	805-10546
<b>Digital Stopwatch</b>		303-01-1
<b>Accessories/Replacement Parts</b>		
<b>Quick Coupling Male Insert</b> , stainless steel, connected to 3 feet of Tygon tubing, for Large Vac-U-Chamber		P231941
<b>Quick Coupling Male Insert</b> , polypropylene, connected to 3 feet of Tygon tubing, for Small Vac-U-Chamber		P231941M
<b>Quick Coupling Female Connector</b> , polypropylene, for Small Vac-U-Chamber		P231942
<b>Quick Coupling Female Connector</b> , stainless steel, for Large Vac-U-Chamber		P231943
<b>Sample Bags</b>		
<b>Tedlar Bags with Dual Stainless Steel Fitting</b>	1 Liter	231-01
<b>Tedlar Bags with Single Polypropylene Fitting</b>	1 Liter	232-01
	8 Liter	232-939
<b>Standard FlexFoil with Single Polypropylene Fitting</b>	1 Liter	262-01
	8 Liter	262-08
<b>FlexFoil PLUS with Single Polypropylene Fitting</b>	1 Liter	252-01
	8 Liter	252-08
<b>SamplePRO FlexFilm with Single Polypropylene Fitting</b>	1 Liter	236-001
	8 Liter	236-004
<b>Replacement Septa</b>		
<b>Septa for Dual Stainless Steel Fittings</b>		231-9-04
<b>Septa for Single Polypropylene Fittings</b>		232-01-RS

## SKC Limited Warranty and Return Policy

SKC products are subject to the SKC Limited Warranty and Return Policy, which provides SKC's sole liability and the buyer's exclusive remedy. To view the complete SKC Limited Warranty and Return Policy, go to <http://www.skcinc.com/warranty.asp>.

# Appendix

## Performance Profile

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<b>Sampling Media:</b>	1 or 8-liter bag
<b>Sampling Rate:</b>	User selectable
<b>Sample Time:</b>	Varies <i>Do not fill bag more than 80% of its maximum volume</i>
<b>Sample Pump:</b>	AirChek TOUCH, AirChek XR5000, or Universal XR — 1 to 5 L/min
<b>Analysis:</b>	Varies