



Application Guide

Sampling with *ULTRA Passive (Diffusive) Samplers*



Passive sampling is the collection of airborne gases and vapors at a rate controlled by a physical process such as diffusion, **without** the use of an air sampling pump. Passive (diffusive) samplers rely on the movement of contaminant molecules across a concentration gradient (i.e., molecules diffuse from an area of high concentration in air to an area of low concentration onto the sampler). This rate of diffusion can be calculated mathematically and determined experimentally for individual chemicals. SKC provides diffusion or sampling rates for many organic vapors that can be sampled with SKC ULTRA Passive Samplers. This Application Guide demonstrates the basic operation of SKC ULTRA Passive Samplers and defines the critical sampling information that should be sent to a laboratory for analysis.

Introduction

SKC offers ULTRA Passive Samplers with a choice of sorbents. Choose the sampler with the sorbent best suited for the chemical(s) of interest. Refer to the SKC Passive Sampling Guide on the SKC website www.skcinc.com for more information. The sorbents and analysis for ULTRA Passive Samplers are the same as those specified in the active EPA Method TO-17. ULTRA samplers provide comparable low limits of detection in the ppb to ppt concentration range for some chemicals, while offering economy and convenience¹. Consult the SKC Passive Sampling Guide for sampling rates and minimum and maximum sampling times.

ULTRA Passive Samplers are offered in two configurations. Select the configuration that best fits your application.

Prefilled ULTRA I Passive Samplers

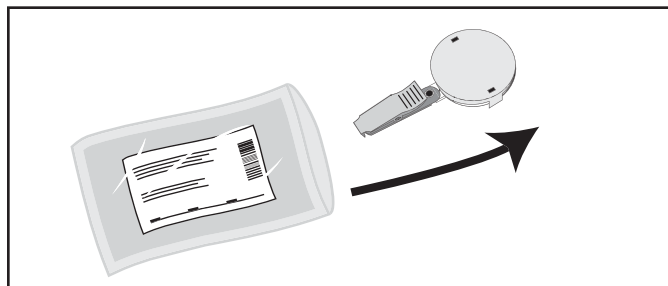
The ULTRA I sampler housing is prefilled with cleaned/purged sorbent. A built-in funnel on the back of the sampler provides for easy and direct transfer of sorbent to a thermal desorption tube in the laboratory.

User-filled ULTRA II Passive Samplers

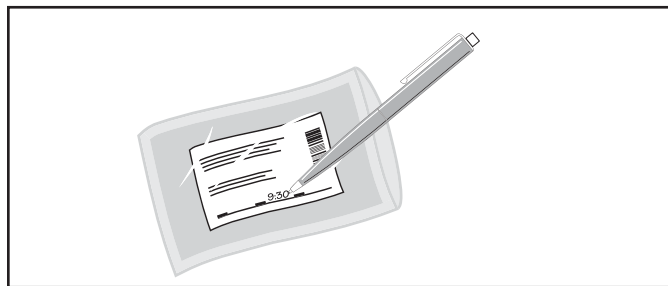
Sorbent for the ULTRA II Sampler is provided separately in glass vials with PTFE lids to maintain low sorbent background. A built-in funnel and vial adapter on the sampler allow the user to transfer cleaned/purged sorbent from the vial directly into the badge housing before sampling. After sampling, the user transfers the sorbent back into the vial. The vial is shipped to the laboratory for thermal desorption and analysis.

1. Sample Collection

Remove the sampler from the resealable pouch.



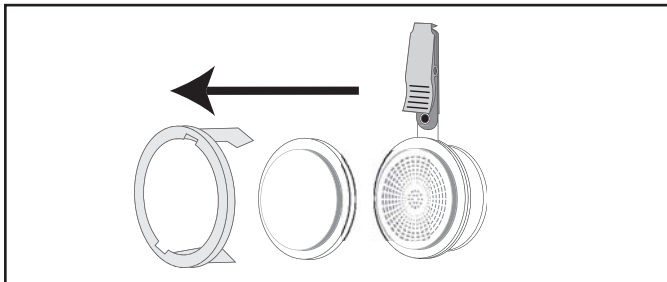
Write start time, date, and sample ID number on the label on the resealable pouch. (For ULTRA I, the barcode on the sampler matches the barcode on the pouch label.)



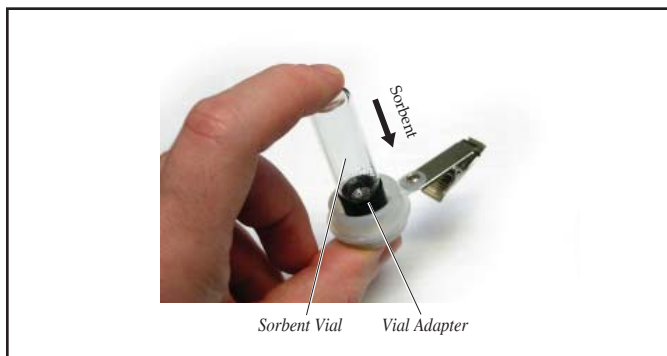
Prepare the passive sampler for sampling.

Sampling with ULTRA Passive (Diffusive) Samplers

For ULTRA I: Remove cover lock and cover from the face of the sampler (to expose diffusion holes) immediately before sampling and store lock and cover in the resealable pouch. *Do not remove the back plate that covers the aluminum cone.*



For ULTRA II: In a clean, organic solvent-free environment, remove the plug from the vial adapter on back of the sampler and remove the lid from the sorbent vial. Position the sampler vial adapter facing down over the open end of the vial. Screw the open end of the vial onto the adapter. Rotate the assembly until sorbent is draining from the vial into the sampler. Tap the vial lightly before removing it from the adapter. Replace the plug on the adapter. Remove the cover from the face of the sampler immediately before sampling and store the cover in the resealable pouch.

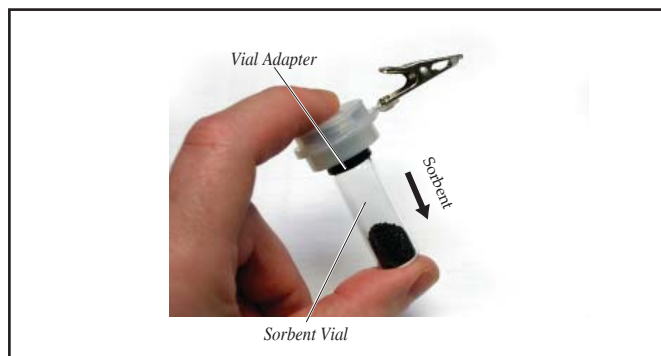


Clip the sampler onto a worker's collar near the breathing zone or in the area to be sampled. Ensure the diffusion holes are facing out and are not covered.

After sampling, unclip the sampler and seal the sampler with the cover.

For ULTRA I: Seal with the cover and cover lock. Write the sample stop time on the label on the resealable pouch. Ensure the barcode on the sampler matches the barcode on the pouch label and place the sealed sampler into the pouch.

For ULTRA II: In a clean, organic solvent-free environment, remove the plug from the vial adapter on back of the sampler. Screw the open end of the sorbent vial onto the adapter. Rotate the assembly until the sorbent is draining from the sampler into the vial. Tap the sampler lightly. Ensure all sorbent is recovered in the vial. Immediately screw the lid onto the vial. Mark sample vial as desired and insert into the pouch.



2. Sampler Storage and Shipment to Analytical Laboratory

Carefully package sealed pouches containing sampler or sorbent vial and blanks. Send to a laboratory for analysis.

Samples may be stored for up to 21 days at < 39.2 F (4 C) in a clean, organic solvent-free environment.

3. Critical Information to Include in Sample Shipment

The laboratory will need to know the air volume for the chemical of interest. Calculate as follows:

$$\text{Chemical sampling rate supplied by SKC (ml/min)} \times \text{Sampling time (min)} = \text{Air volume (ml or L)}$$

The laboratory will determine the total micrograms (μg) found on the sampler for the chemical of interest. The air volume will be used to report the chemical concentration in air as parts per billion (ppb) or parts per trillion (ppt).

4. Analysis

Thermal desorption followed by analysis using gas chromatography (GC) with a detector specified in the method for the compound of interest

References

¹ SKC Update to EPA Method TO-17 available at www.skcinc.com.

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