



# POD Sampler



## Instruction for use

### PRODUCT REFERENCE

POD Starter Kit: Carbopack X	C-POD-KIT01
POD Cartridge, Carbopack X, pk 10	C-POD-1XX
POD Sampler, pk 10	C-POD-S010



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## 1. Introduction

The Pocket Diffusive (POD) sampler is a compact and easy-to-use radial, diffusive sampling device used for sampling of volatile organic compounds. The POD is typically used for personal exposure monitoring and environmental air sampling.

The POD sampler has a cylindrical sorbent cartridge that is housed in a porous casing that allows air to diffuse through it at a fixed rate. The curved cylindrical surface is exposed to the atmosphere, resulting in a large surface area and short diffusive path length. The result of this is a faster uptake than axial diffusive samplers.

In the laboratory POD samplers are analysed using thermal desorption (TD) coupled to gas chromatography (GC). For analysis, the sorbent cartridge from the sampler is placed inside an empty TD tube prior to being inserted into the TD instrument. For ease the POD cartridge has been designed to be used in conjunction with most commercially available thermal desorption tubes.

## 2. Components

The POD comprises 5 components:

- [1] Adsorbent cartridge
- [2] Diffusive body
- [3] Support body (holder)
- [4] Cover
- [5] Support plate (with clip)



The diffusive body, support body and cover collectively are referred to as a POD sampler.

Each starter kit consists of:

- 1 x POD sampler; including holder, diffusive body and cover
- 2 x Adsorbent cartridge, in storage vial
- 1 x Support plate and clip
- Instruction for use

The following items will also be required, but are not supplied within the kit:

- A method for recording the temperature (and time)
- Gloves, for use when assembling the sampler
- Empty carrier tubes, and springs to secure the cartridge

## 3. Conditioning

POD adsorbent cartridges should be conditioned in a flow of inert carrier gas (He or N<sub>2</sub>) prior to first use and then periodically, to ensure the cartridges have minimal background. To enable conditioning of the POD cartridge it should be placed into an empty carrier tube and then secured using a spring. The tubes with the cartridge inside can then be conditioned using the tube-conditioning mode of the thermal desorption instrument or using an off-line conditioning unit such as the Markes TC-20 Multi Tube Conditioner.

### 3.1 Initial conditioning

Prior to first use, POD adsorbent cartridges should be conditioned using the recommended conditioning procedure for the cartridge type. Typical conditioning times are 5-6 hours with flows of 100 mL/min. For temperature settings please refer to the conditioning instructions supplied with your cartridge. Maximum desorption temperatures differ according to the adsorbent cartridge.

After conditioning, the adsorbent cartridge should be sealed in clean storage vial or sorbent tube sealed with brass long-term storage caps until use.

### 3.2 Subsequent reconditioning

For subsequent re-conditioning of POD adsorbent cartridges conditioning times may be reduced. Typical times for re-conditioning between uses are 30 mins with flows of 100 mL/min. Please refer to the conditioning instructions for details on temperature settings.

Adsorbent cartridges that have been in storage for long periods of time or have been stored improperly should be re-conditioned following the initial conditioning instructions provided with the cartridge. In addition, we would recommend running a blank analysis of the cartridge after conditioning and prior to sampling, where the cartridge is desorbed under the same TD conditions as used for analysis, to determine the cleanliness of the cartridge.

## 4. Sampling

### 4.1 Sampling procedure

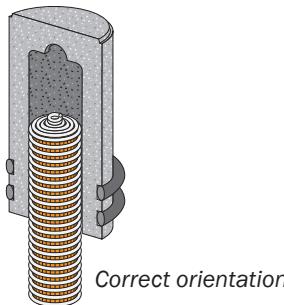
**CAUTION** To avoid contamination, care should be taken to not manually handle the POD adsorbent cartridge. Contact with contaminated surfaces must be avoided and gloves are recommended whilst preparing the sampler for deployment.

To assemble the sampler ready for deployment:

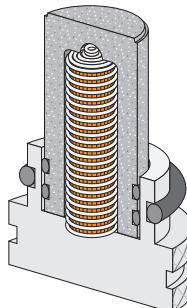
- [1] Unscrew the vial cap or one end of the carrier tube, place the opening against the open end of the diffusive body and slide the adsorbent cartridge to the diffusive body, ensuring correct orientation.

**CAUTION** Care should be taken not to touch the adsorbent cartridge directly.

- NOTES** Minimise any transfer time between the storage vial and the sampler.



- [2] Once the cartridge is positioned inside the diffusive body, push the diffusive body into the holder until secure.



- [3] Push the cover onto the support body (holder) to seal the sampler until ready to initiate sampling.

To attach the POD sampler to the supporting plate:

- [4] Fold the plastic supporting plate with the two slots aligned to create an opening for the clip.
- [5] Thread the clip through the opening and secure by attaching to itself.
- [6] Slide the POD support base (holder) into the slot on the supporting plate.
- [7] Secure the sampler in place by clipping the end of the support plate to the groove of the support base (holder).

When used for personal monitoring, the sampler should be secured in the breathing zone using the supporting plate and clip. Typically, within a 10-inch radius of the worker's nose and mouth.

**NOTES** The sampler should have unrestricted access to the target atmosphere and not be obscured by clothes or other objects.



*Positioning for personal monitoring*

When used for fixed location sampling, the sampler should be placed at an appropriate site in the atmosphere of interest. Samplers can be placed on a flat surface or can be hung in position using the supporting plate and clip.

**NOTES** For samples taken outdoors it is recommended to protect the sampler from the elements using a shelter constructed from non-emitting materials.

- [8] Once in position, remove the cover to initiate sampling and record the time and temperature.
- [9] After the sampling period has passed, stop sampling by replacing the cover. Record the sample time and temperature.

## 4.2 Transport

For immediate analysis, the adsorbent cartridge may be stored in the covered POD sampler. When ready for analysis the cartridge should be transferred to an empty desorption tube fitted with appropriate end caps.

For storage or transportation, cartridges should be transferred to an empty carrier tube then sealed with long-term storage caps.

Alternatively, cartridges can be stored in sorbent tubes sealed with DiffLok caps for up to 24 h.

**NOTES** We recommend empty carrier tubes with springs, or 2 mL vials with glass inserts, to secure the cartridge and prevent movement during transportation.

**NOTES** Minimise transfer time between the sampler and storage vial or desorption tube.

Sampling tips:

- As with all sampling methodology it is advisable to collect a series of blanks, such as field and shipping blanks.
- In order to ensure accuracy of experimental data it is important to record the average temperature.
- Radial diffusive samplers have a higher sampling rate than axial diffusive samplers so care should be taken not to saturate the adsorbent cartridge with the components of interest.

## 5. Analysis

### 5.1 Thermal desorption

After sample collection, transfer the cartridge from the POD sampler/storage vial to an empty desorption tube for analysis by thermal desorption-GC (-MS).

For guidance on how to develop and optimise thermal desorption methods refer to application notes 021 and 022.

Refer to the conditioning document supplied with your adsorbent cartridge for advice on temperature settings.

**NOTES** There are a number of published sampling rates available, Refer to:  
'Application Note 151: Uptake rates for the POD radial sampler'.

## 6. Cleaning

After use, POD samplers (e.g. support body, diffusive body and cover) should be cleaned using the following recommended procedure prior to re-use. A separate procedure is recommended for the absorbent cartridge.

- [1] Remove the O-rings as per the guidance in section 8.1
- [2] Use air pressure
- [3] Rinse the diffusive body with freshly distilled water, then methanol using a vortex mixer.
- [4] Air blow, then oven dry at approx. 70°C for 4 hours.
- [5] Replace the O-rings as per the guidance in section 8.1

**NOTES** Minimise time between washing and drying the diffusive body. The bodies should not be exposed for long periods whilst wet as this may result in oxidation.

Additionally, the bodies should not be introduced to the oven whilst very wet.

## 7. Storage

New POD adsorbent cartridges are best stored within their shipment vials prior to conditioning.

After sample collection, adsorbent cartridges may be stored in empty desorption tube sealed with brass caps for long-term storage.

After first desorption, adsorbent cartridges can be kept within clean shipment vials or sorbent tubes sealed with brass caps for long-term storage.

The remaining components should be stored in a clean & dry environment.

## 8. Maintenance

### 8.1 POD support and diffusive body O-rings

The POD support body (holder) is provided with an O-ring (part no. U-COV1516) for closure of the sample, whilst the diffusive body is provided with two smaller O-rings (part no. U-COV1517) for fixing the diffusive body into the support body.



*Diffusive bodies*



*Support bodies*

It is recommended that these O-rings are replaced every twelve months, or whenever they are noticeably damaged.

The replacement process is as follows:

**NOTES**

You will require a replacement O-ring (part no. available in section 9.1,), an O-ring extraction tool (part no. SERZ-0351) and an O-ring insertion tool (part no. SERZ-0285).

- Use the O-ring extraction tool to hook out the O-ring, taking care not to scratch the groove in which the O-ring is seated.
- Use the O-ring insertion tool to position the replacement O-ring into the groove.
- Run the O-ring insertion tool around the outer diameter of the O-ring to ensure it is free from distortions.

## **8.2 POD diffusive bodies**

To increase the lifetime of the POD sampler, it is recommended to check the diffusive body for signs of deterioration or damage.

The diffusive body can be cleaned following the recommended cleaning procedures outlined in section 6.

Replacement diffusive bodies are available to purchase using the part numbers listed below.

## 9. Parts list

### 9.1 Spare parts

Part number	Description
C-POD-KIT01	POD Starter Kit, Carbopack X
C-POD-B010	Spare Diffusive Body, for POD sampler, pk 10
C-POD-H010	Spare Support Body, for POD sampler, pk 10
C-POD-C010	Spare Cover, for POD sampler, pk 10
C-POD-1XX	POD Cartridge, Carbopack X, pk 10
C-POD-S010	POD Sampler, pk 10
C-POD-SP10	POD Support Plate, with clip, pk 10
C-POD-S1P0	POD Support Plate, with clip, pk 100
U-COV1517	Spare O-ring, brown, for POD sampler (diffusive body), pk 20
U-COV1516	Spare O-ring, black, for POD sampler (support body), pk 10
CO-NXXX-0000	Empty glass tubes, 30 mm restriction, pk 10
CO-AXXX-0000	Empty, stainless steel tubes, pk 10
CO-TXX-0000	Empty TD Mini-tubes, 60 mm x 6 mm, pk 5

### 9.2 Accessories

Part number	Description
SERZ-0351	O-ring extraction tool
SERZ-0285	O-ring insertion tool

## 10. Specifications

Adsorbent cartridge:

- Dimensions: 13 mm (L) x 3.8 mm (OD)

Compatible tube types

- Industry-standard tubes, glass and stainless steel
- Gerstel TDU tubes / TD Mini-tubes
- DAAMS tubes
- TDS tubes

## 11. Contact details

For technical support, please contact your supplier in the first instance. If they are unable to resolve your query, please contact Markes International's service department:

**E:** support@markes.com

**T:** +44 (0) 1443230935

**W:** www.markes.com

For an instructional product video, please visit:



*Scan the code to  
watch the video*

<https://chem.markes.com/POD>