Empore™
Solid Phase Extraction Disks

Activated Carbon

General Information

Empore™ Solid Phase Extraction (SPE) Disks provide an efficient alternative to liquid/liquid extraction for sample preparation. A proprietary process is used to entrap adsorbent particles into a matrix of inert PTFE to create a mechanically stable sorbent disk. The disks can be used for purification and concentration of analytes from aqueous samples.

Empore SPE disks provide a sample prep solution for large volume aqueous samples. The disk format provides a large surface area for sorbent/sample contact. Fast flow rates and high throughput may be realized with use of an Empore solid phase extraction disk.

Product Information

Activated carbon extraction disks are designed for the solid phase extraction of highly polar compounds, such as N-nitrosodimethylamine, which are very water soluble; and volatile compounds, such as trihalomethanes, that are not easily captured by other solid phase adsorbents.

Activated carbon provides one of the most aggressive adsorbents available for solid phase extraction. The carbon surface is a complex combination of characteristics, which includes positive and negative charges. When coupled with high surface area, activated carbon provides adsorption and retention of soluble and volatile analytes.

Suggested Product Applications

Sorbent	Suggested Applications	Product Number	
		47 mm	90 mm
Activated Carbon	N-nitrosodimethylamine (NDMA) Water-soluble or volatile analytes such as oxamyl and methamidophos	2272	2372

CDS Analytical

Extraction Method with Activated Carbon Disk

Step A: Sample Preparation

- Microbiological growth can be retarded by lowering sample pH to 2, if needed.
- Filter Aid 400 and/or prefiltration may be helpful if the sample contains excessive suspended solids.

Step B: Extraction Disk Conditioning

Disk conditioning enhances the flow rate of the water sample through the disk. Condition the disk as follows:

1. Center the extraction disk on the base of the filtration apparatus and clamp the reservoir on the top of the disk.*
2. Add 10 mL (15 mL for a 90 mm disk) of methanol to the disk.
3. Apply vacuum to the disk until the methanol begins to drip through the disk.
4. Allow the disk to soak for one to two minutes.
5. Add two 25 mL portions of water to the disk (two 50 mL portions for the 90 mm disk).
6. Apply vacuum and pull the water through the disk.

For those circumstances where conditioning with methanol is undesirable, the water sample may be applied directly to the disk. The flow may take several minutes to start, however, the efficiency is not affected. The flow rate of unconditioned disks will be lower than the flow rate for fully conditioned disks.

* Place a vial in the vacuum apparatus to collect and dispose of wash and conditioning solvents. Remove vial prior to sample extraction.

Step C: Sample Extraction

- Pour the sample into the reservoir and apply vacuum to draw through the disk. Flow rate is dependent on vacuum setting and solids content of the sample. However, recoveries are not affected by flow rate.
- After sample extraction is complete, remove residual water from the disk by applying vacuum to dry the disk for approximately 5-20 minutes.

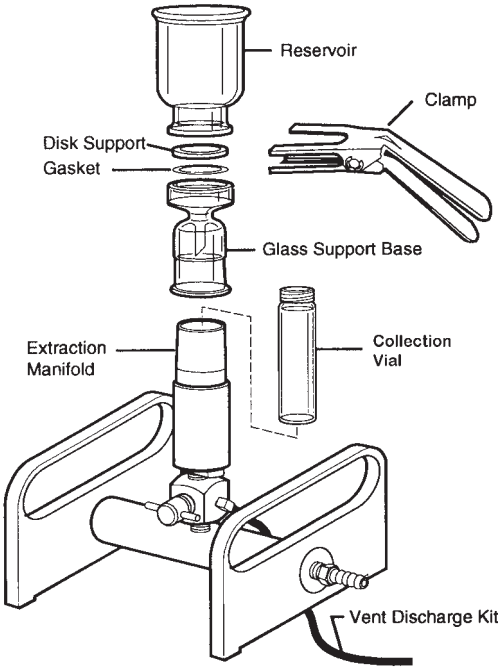
Step D: Sample Elution

Eluting twice with 10 or 15 mL* solvent is recommended. (Use 10 mL of solvent for 47 mm disks and 15 mL of solvent for 90 mm disks). Smaller volumes of solvent may be used if the elution technique has been perfected. The appropriate elution solvent is dependent upon the nature of the individual analyte. Polar solvents such as methanol, acetonitrile or ethyl acetate are generally more efficient at removing analytes from the carbon matrix because these solvents also remove any residual water. In addition, the complex nature of the carbon surface may require a modifier such as trimethylamine, ammonium hydroxide, or hydrochloric acid to interrupt any ionic interactions between the analyte and the carbon.

- Place tip of filter base into the collection vessel (see diagram).
- Add 10 mL elution solvent to sample container, carefully rinsing the sides. Transfer solvent from sample container to reservoir with a pipet, washing the walls of the reservoir in the process.
- Apply vacuum and draw approximately 1 mL elution solvent through the disk. Vent the vacuum and allow the disk to soak for 30 seconds before reapplying vacuum to dry the disk.
- Repeat this process with a second aliquot of eluting solvent.

Note: When using solvents or other chemicals, be sure to read and follow the manufacturer's precautions and directions for use.

Disk Manifold System Setup



Volume Guidelines

The small bed mass of sorbent in the Empore™ membrane allows for the use of smaller solvent volumes compared with traditional SPE products. A general guide to solvent volumes for a disk SPE method using activated carbon is listed in the table below.

Each assay will need some further optimization in terms of selecting the best elution solvent (commonly methylene chloride, methanol or acetonitrile).

EPA Methods will require specific reagents; please refer to those methods when using the Empore Disks for agency reporting.

Volume Guidelines: Activated Carbon

Step	Solvent	47 mm disk	90 mm disk
Condition	Methanol	10-15 mL	20-30 mL
Optional:	Reagent water	10-50 mL	20-100 mL
Aqueous	Sample solution	100-1000 mL	500-2000 mL
Elute	Organic	10-15 mL	20-30 mL

Note: Suggested solvent volumes will vary according to the disk diameter, the amount of filter aid material, the analyte, the analyte's affinity for the chosen sorbent, and the strength of the eluting solvent. A general guide for solvent volumes is to completely cover the disk and bed of filter aid, such that 2-3 mm of solvent is above the top surface.

Product Characteristics

Composition	80% or greater sorbent particle 20% or less PTFE
Thickness	0.50 mm ± 0.05 mm
SPE Flow Rate	< 18-20 min/L DI H_2O @ 25°C @ 20 inHg (47 mm disk)
Particle Size	12 µm (nominal)
Solvents	Compatible with all organic solvents
pH Range	Stable between 1 and 14 under normal use conditions

Note: Empore Solid Phase Extraction Products are intended for solid phase extraction during scientific research only. These products are not intended for use in medical devices or in assessment and treatment of clinical patients.

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