



General Information

Handling and Storage

The disks may be handled in the same manner as any sorbent membrane. The disk should be stored in a dry place at room temperature.

Suggested Usage

CDS Empore™ Radium Rad Disks are available with a diameter of 47 mm. Disks fit into existing single or multiple station vacuum manifolds and into 50 mm planchets for use with proportional counters.

Disposal

Dispose of used disks according to standard radiochemical procedures and regulations. Unused disks may be disposed of in accordance with standard procedures for laboratory waste.

For full details on test procedures and possible interferences, consult EF U Test Methods.

RA-195: "Rapid Determination of Radium-228 in Water by Elution of Ingrown Actinium-228 from Empore Radium Rad Disks."

RA-295: "Rapid Determination of Radium-228 in Water Using Empore Radium Rad Disks."

RA-395: "Rapid Determination of Radium-226 in Water Using Empore Radium Rad Disks."

More information

Technical Service and Sales Assistance:

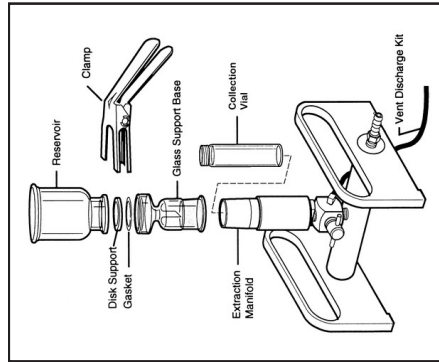
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Suggested Vacuum Apparatus



Important Notice to Purchaser:

All statements, technical information and recommendations contained in this literature are based on tests conducted with CDS approved equipment and are believed to be reliable. However, the accuracy, completeness or the tests are not guaranteed. THE FOLLOWING IS MADE IN THE MOST FAVORABLE MANNER POSSIBLE, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. The seller's and manufacturer's only obligation will be to replace the quantity of the product proved to be defective. Neither the seller nor CDS will be liable for any injury, loss or damage, direct or consequential, arising out of the use or the inability to use the product. CDS Empore Sample Preparation 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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Empore™ Radium Rad Disks

with selective separation and counting of radium isotopes and their decay products

Instructions for Use

General Product Characteristics

Description

CDS Empore™ Radium Rad Disks are unique products that simplify conventional radiochemical sample preparation methods. Empore Radium Rad Disks combine CDS Empore Membrane technology with sorbent particles. The adsorbent particles contained in the disk allow selective adsorption of radium. The adsorbent particles contained in the disk allow selective adsorption of radium. The specific radium isotopes may then be determined by separation and counting of their respective daughter nuclides (e.g. actinium-228 for radium-228 and radon-222 for radium-226).

Composition

90% ± 2% sorbent particles
10% ± 2% PTFE

Product Characteristics

Diameter: 47 mm (nominal)
Thickness: 0.5 mm ± 0.05 mm
Solvents: Compatible with all organic solvents
pH: Stable between 0-12
Flowrate: 4-10 mm/L DI H₂O @ 25°C @ 20 in Hg (0.68 bar)

Disk Identification

Unique disk identification number
Element specificity: Ra

CDS Empore Sample Preparation 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. CDS does not warrant the use of these products for any application outside the products' intended use.





Safety Information

⚠WARNING:	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠WARNING:	
To reduce the risks associated with environmental contamination, handling radioactive materials or false negative results:	<ul style="list-style-type: none"> Read, understand and follow all recommendations in the product MSDS and Instructions for Use.
To reduce the risks associated with radioactive materials:	<ul style="list-style-type: none"> Always wear the proper PPE (Personal Protection Equipment) when handling used product.
To reduce the risks associated with environmental contamination:	<ul style="list-style-type: none"> Dispose of used disks according to standard radiochemical procedures and regulations. Unused disks may be disposed of in accordance with standard procedure for laboratory waste.

Scope and Application

General: Water Analysis

CDS Empore™ Radium Rad Disks are intended for determination of radium in aqueous samples. The CDS Test Methods that use the Empore Radium Rad Disk eliminate many of the steps involved in EPA Methods 904.0 and 903.1. The steps for preparation and concentration of radium using the CDS Empore Rad Disks may also be incorporated into other test methods. Separation of radium takes approximately 20 min. for a 1 liter sample and is amenable to batch processing. The method detection limit depends on sample volume and counting protocol but generally will be less than or equal to 0.1 pCi/L for radium-226 and 1.0 pCi/L for radium

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Apparatus and Materials

- 47 mm Empore Radium Rad Disks
- 47 mm single or multiple station vacuum manifold (see diagram)
- Proportional counter or liquid scintillation counter
- 50 mm planchets or scintillation vials

Reagents

- Nitric acid, concentrated and 2M
- Methanol
- Others as determined by individual test method

Sample Preparation

- Acidify the sample to 2M with concentrated nitric acid
- If visible solids are present in the sample, prefilter through a 0.45 µm filter if exclusion is desired

Extraction Disk Conditioning

Proper disk conditioning is critical for a successful extraction. Conditioning prepares the sorbent to interact efficiently with the sample matrix. **FAILURE TO CONDITION THE EXTRACTION DISKS PROPERLY WILL RESULT IN ERRATIC AND LOW RECOVERIES.**

- Center the Empore Radium Rad Disk on the base of the filtration apparatus and clamp the reservoir in place on top of the disk.

* Performance of the Empore Rad Disk is only warranted when used in this position.

- Condition the disk by adding 20 mL of 2M nitric acid under low vacuum. Flow rate should be no more than 50 mL/min. Leave 3-5 mm of liquid on the surface of the disk.

Note: If disk should become dry while conditioning, repeat the steps above.

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Sample Extraction

- Pour the sample into the reservoir and apply low vacuum. The flow rate should not exceed 50 mL/min. Do not allow the disk to dry.
- Rinse the disk with 20 mL of nitric acid at the same flow rate. Note: the disk should not be allowed to dry during the conditioning or the sample processing steps.

Radium 228

For determination of radium-228, the end time of this rinse step is recorded as the start of actinium-228 ingrowth. At this point, depending on the test method, the disk may be set aside to allow for ingrowth of actinium-228 which is subsequently eluted and counted (CDS Test Method RA-195). Alternatively, the radium may be eluted from the disk and the actinium-228 separated by chemical procedures after the period of ingrowth as described in EPA 904.0 (1) CDS Test Method RA-295).

Radium 226

Following CDS Test Method RA-395, the radium-226 is determined by elution and transferring into a radon bubbler. The subsequent de-emanation procedure for the separation of radon-222 is taken directly from EPA Method 903.1 (2).

Counting Options

The instrument type, counting times and frequency of counts are dictated by the isotope(s) of interest and the data quality objectives. Radioactive ingrowth and decay corrections must be applied. For full details on test procedures and supporting information, consult CDS Test Methods (3-5).

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