Alltech® Maxi-Clean™ Cartridges

Save Time and Maximize Sample Preparation Efficiency

Maxi-Clean™ cartridges have the same bed dimensions as 4mL SPE columns for easy method cross-over. Process a single cartridge by syringe or multiple cartridges by vacuum. Maxi-Clean™ cartridges allow you to stack different cartridges for multi-step extractions. Use top and bottom caps for easy transport of field samples. Here's 10 different ways these cartridges can be used to address difficult extractions and SPE protocols.

1. Bulk Preconditioning on a Vacuum Manifold

Save time and solvents by preconditioning Maxi-Clean™ Cartridges on a vacuum manifold. Double stack for even faster preparation.


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2. Direct Substitution into Methods Using Standard 4mL Columns

Maxi-Clean™ Cartridges have the same bed dimensions as traditional 4mL SPE columns, for easy substitution into established protocols.


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3. Stack Two Cartridges in Series for Complex Separations

Maxi-Clean™ Cartridges can be stacked to combine two phases into one extraction step for complex analyses. You can even elute each phase individually, if desired.


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4. Elute Anywhere

Use a syringe to elute your analyte anywhere—directly into an injection valve, or into other receiver vessels. You can even attach a needle and elute directly through a septa or 96-well sealing mat.


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5. Combine SPE with Filtration by Adding a Filter Tube or Syringe Filter in Series

The Maxi-Clean™ Cartridge's luer connections allow you to add a syringe filter or a fritted SPE tube to remove particulates before your sample enters the SPE bed.


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6. Easy to Transport and Store

Use top and bottom caps to transport or store a Maxi-Clean™ Super Cartridge containing your analyte, without risking contamination or dehydration.


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7. Process Individually or in Parallel

Do you only have a few samples to process? Process them with a syringe, instead of setting up a vacuum manifold. Do you have a lot of samples to process? Add an empty reservoir to process them simultaneously on your manifold.


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8. Use In-line

The Maxi-Clean™ cartridge's luer connections allow you to use them in-line, to remove contaminants or act as a "guard" cartridge in low-pressure applications.


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9. Custom-fit to Your Sample Size

By changing reservoir sizes, you can customize a Maxi-Clean™ Cartridge to fit your sample size without changing the bed dimensions.


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10. Choose from many Chemistries

The Maxi-Clean™ line is offered in many of the same media as the Extract-Clean™ line, but slightly paired down, with over 20 chemistries available.


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Alltech® Maxi-Clean™ Cartridges

Reversed-Phase Cartridges

- Same bed dimensions as 4mL SPE columns for method cross-over
- Process a single cartridge by syringe or multiple cartridges by vacuum
- Stack different cartridges for multi-step extractions
- Use top and bottom caps for easy transport of field samples

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Reversed-Phases (Non-Polar) Sorbent Specifications

Packing	Base	% Carbon	End-capped	Average Particle Size	Pore Size	Features	Benefits
Prevail™ C18	Silica	11.0%	Yes	50µm	60Å	100% water wettable	Hydrophilic/hydrophobic retention. Phase remains active even when completely dry. Can omit preconditioning step.
Standard C18	Silica	6.0%	Yes	50µm	60Å	Low carbon load C18	General purpose phase.
High-Flow C18	Silica	8.0%	Yes	100µm	60Å	Large particle	Less flow resistance for faster flow rates of large volume sample.
High-Capacity C18	Silica	17.0%	Yes	50µm	60Å	High carbon load	Maximum capacity phase.
Large Pore C18	Silica	14.0%	Yes	50µm	150Å	Larger than average pore size	Ideal for compounds >1500MW.
Octyl (C8)	Silica	4.5%	Yes	50µm	60Å	Less hydrophobic than C18	Less retention of highly hydrophobic compounds. Use when C18 is too retentive.

Maxi-Clean™ Reversed-Phase Cartridges

Packing	Bed Weight	Qty.	Part No.
Prevail™ C18	300mg	50	**605926**
	500mg	50	**605929**
	900mg	50	**605942**
Standard C18	300mg	50	**20926**
	300mg	100	**20928**
	600mg	50	**20934**
	600mg	100	**20936**
	900mg	50	**20942**
	900mg	100	**20944**
High-Capacity C18	300mg	50	**20945**
Large Pore C18	300mg	100	**22012**
	600mg	100	**22017**
	900mg	100	**220215**
Octyl (C8)	300mg	50	**20950**
	600mg	50	**20958**
	900mg	50	**20966**

Maxi-Clean™ Drying Cartridges

Packing	Bed Weight	Qty.	Part No.
Sodium Sulfate	3g	100	**219001**

tech tip

What is a Maxi-Clean™ cartridge?

A Maxi-Clean™ cartridge is an alternative format for SPE. It uses the same high-quality packing materials as the Extract-Clean™ columns but has a polypropylene housing with both a female luer inlet and a male luer outlet tip. This allows use of positive pressure from a syringe or negative pressure from a vacuum manifold. 20µm polyethylene frits are placed at each end of the sorbent bed. The packing material is packed and compressed to improve or optimize flow characteristics.


4870

related products

Looking for vacuum manifolds?

See pages 314–315 for vacuum manifolds to process samples.

more info

For SPE Applications, see pages 494–502.

Alltech® Maxi-Clean™ Cartridges

Normal-Phase Cartridges

- Same bed dimensions as 4mL SPE columns for method cross-over
- Process a single cartridge by syringe or multiple cartridges by vacuum
- Stack different cartridges for multi-step extractions
- Use top and bottom caps for easy transport of field samples

4881


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Normal-Phases (Polar) Sorbent Specifications

Packing	Base	% Carbon	End-capped	Average Particle Size	Pore Size	Features	Benefits
Silica (SI)	Silica	—	—	50µm	60Å	Highly polar surface	Most common polar phase.
Aminopropyl (NH_2)	Silica	5.0%	No	50µm	60Å	Polar phase with slight anion exchange properties	Ideal for carbohydrates or generally with analyses containing hydroxyl functional groups.
Florisil® (FL)	Magnesium Silicate	—	—	75–150µm	60Å	Highly polar surface	Referenced in many EPA methods. Ideally suited for pesticides and metals.
Florisil®-PR (FL-PR)	Magnesium Silicate	—	—	75–150µm	60Å	Specifically tested for chlorinated pesticides	Ensures most inert batches suitable for highly active compounds.
Alumina Neutral (AL-N)	Aluminum Oxide	—	—	130µm	100Å	Alumina washed with neutral surface	Interacts with highly aromatic compounds and neutral hydroxyls.

Maxi-Clean™ Normal-Phase Cartridges

Packing	Bed Weight	Qty.	Part No.
Silica (SI)	300mg	50	**20974**
	300mg	100	**20976**
	600mg	50	**20982**
	600mg	100	**20984**
	900mg	50	**20990**
	900mg	100	**20992**
Aminopropyl (NH_2)	300mg	50	**210044**
	300mg	100	**210046**
	900mg	100	**210047**
Florisil® (FL)	300mg	50	**210054**
	300mg	100	**210056**
	900mg	50	**210057**
	900mg	100	**210061**
Florisil®-PR (FL-PR)	300mg	50	**210074**
	300mg	100	**210076**
	900mg	50	**210079**
	900mg	100	**210075**
Alumina Neutral (AL-N)	300mg	25	**210095**
	1800mg	25	**210098**

related products

Looking for standard luer-hub syringes to process Maxi-Clean™ cartridges?
See page 347.


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technical assistance

Contact Tech Support: Phone: 1.800.255.8324 (North America)
Email: contact.alltech@grace.com
Online: www.discoverysciences.com

Alltech® Maxi-Clean™ Cartridges

Ion-Exchange Cartridges

- Eliminate matrix interferences before ion analysis
- Seven chemistries solve a variety of specific problems

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The most difficult part of many IC applications is eliminating interfering components from the sample matrix. These interferences may co-elute or mask peaks of interest, overload the column, or shorten the column life by binding irreversibly to the column packing. The Alltech® unique ion-exchange SPE cartridge eliminates many of these interferences[1,2].

Each metal-free polypropylene cartridge contains 0.5mL or 1.5mL of purified polystyrene resin, contained by 20µm polyethylene frits. The resin is functionalized to retain specific types of components from the sample.

[1]R. Saari-Nordhaus, J.M. Anderson, Jr., and I.K. Henderson, *Am. Lab.* August (1990) 19.
[2]I.K. Henderson, R. Saari-Nordhaus, and J.M. Anderson, Jr., *J. Chromatogr.* 546 (1991) 61.

Ion-Exchange Sorbent Specifications

Packing	Base	Counter Ion	Particle Size	Functional Group	Exchange Capacity	Retains	Applications
SCX	Styrene-DVB	Hydrogen	50µm	Benzene Sulfonic Acid	2.0meq/mL	Cations, (+) charged compounds	Remove/concentrate basic compounds.
SAX	Styrene-DVB	Acetate	50µm	Tetramethyl Ammonium	1.0meq/mL	Anions, (–) charged compounds	Remove/concentrate basic compounds.

Ion Chromatography Sorbent Specifications

Packing	Base	Counter Ion	Particle Size	Molecular Exclusion Limit	Exchange Capacity	Retains	Applications
IC-OH	Styrene-DVB	Hydroxide	50µm	1000 Daltons	1.0meq/mL	Anions	Exchanges anions for hydroxide. May be used to remove or concentrate anions from sample and to increase pH of acidic samples. Removes cations that form insoluble hydroxide salts.
IC-H	Styrene-DVB	Hydronium	50µm	1000 Daltons	2.0meq/mL	Cations	Exchanges cations for H^+. May be used to remove or concentrate cations from sample and to reduce pH of basic samples.
IC-Ag	Styrene-DVB	Silver	50µm	1000 Daltons	2.0meq/mL	Chloride Iodide Bromide	Removes excess halides through formation of Ag-halide salts.
IC-Ba	Styrene-DVB	Barium	50µm	1000 Daltons	2.0meq/mL	Sulfate	Removes excess sulfate through formation of BaSO.
IC-Na	Styrene-DVB	Sodium	50µm	1000 Daltons	2.0meq/mL	Cations	Exchanges cations for Na^+. May be used to remove or retain cations from sample without changing the pH of the sample.
IC-Chelate	Styrene-DVB	Sodium	50µm	1000 Daltons	0.4meq/mL	Polyvalent metal ions	Exchanges transition metals and divalent cations for Na^+. May be used to remove or retain divalent cations and transition metals from sample.
IC-RP	Polystyrene	—	550µm	—	—	Hydrophobic components	Removes surfactants, organic acids, and other organic substances. Inorganic ions pass through.

General Ion-Exchange Maxi-Clean™ Cartridges

Packing	Bed Weight	Qty.	Part No.
SCX	600mg	50	**21902**
	600mg	100	**21903**
SAX	600mg	50	**21907**
	600mg	100	**21908**

Ion Chromatography Maxi-Clean™ Cartridges

Packing	Bed Weight	Qty.	Part No.
IC-OH	0.5mL	50	**30262**
IC-OH	1.5mL	25	**30254**
IC-H	0.5mL	50	**30264**
IC-H	1.5mL	25	**30256**
IC-Ag	0.5mL	50	**30266**
IC-Ag	1.5mL	25	**30258**
IC-Ba	0.5mL	50	**30268**
IC-Ba	1.5mL	25	**30261**
IC-Na	0.5mL	50	**30270**
IC-Na	1.5mL	25	**30263**
IC-Chelate	0.5mL	50	**30250**
IC-Chelate	1.5mL	25	**30265**
IC-RP	0.5mL	50	**30260**
IC-RP	1.5mL	25	**30252**

Maxi-Clean™ IC-RP SPE Cartridges

Introduction

Maxi-Clean™ Ion Capture Devices are solid-phase extraction devices used to eliminate matrix interferences from samples prior to analyses by LC, IC, or GC. Each device consists of either 0.5mL or 1.5mL of polystyrene-based packing sandwiched between polyethylene frits within an injection-molded medical-grade polypropylene housing (**Figure 1**). Samples and wash solvents are passed through the packing using a luer hub syringe. As sample comes in contact with the packing, specific chemical interactions take place which selectively retain certain components of the matrix in the device while the remaining components pass through the device outlet.

Successful application of IC devices requires:

1) proper conditioning of the device prior to sample application,
2) application of the sample at a rate slow enough to allow the chemical interaction to take place while the sample is in the device, and
3) control of sample size to keep within the device's capacity.

The following information provides general recommendations for the use of IC-RP devices. This procedure may be modified to accommodate samples with different characteristics.

General Information

Maxi-Clean™ IC-RP devices provides a reliable method for the removal of hydrophobic components from aqueous samples prior to analysis by ion chromatography. IC-RP devices contain either 0.5mL or 1.5mL of hydrophobic porous polystyrene packing. Hydrophobic components of the sample are retained in the packing by reversed-phase mechanisms. Polar organics and inorganic anions and cations are not retained. The net result is removal of hydrophobic components from the matrix while polar components pass through the cartridge intact. This mechanism may be used to remove surfactants, organic acids, proteins and other organic substances.

Flow Rate

The devices have a number of flow-dependent parameters that may affect results. In general, high flow rates, particularly in the sample loading step, will decrease the performance while low flow rates will improve the extraction process. Low flow rates allow the sample to diffuse into the packing thus increasing capacity and improving the effeciency. The recommended flow rate for sample loading is 1mL/minute or less.

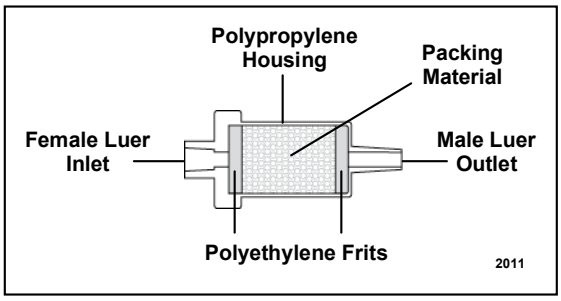

Figure 1

Sample Mass

Each device capacity is dependent on the nature of the sample components and on the matrix solvent. Sample components with the greatest degree of hydrophobicity and with net neutral charge will exhibit the highest capacity. In addition, capacity is enhanced when the matrix solvent is aqueous. Device capacity may be determined experimentally by passing a large volume of sample through the device and collecting the eluate in 1mL fractions. Assay each fraction for the contaminant. The device capacity is defined as the amount of sample that may be applied before the contaminant appears in the eluate. Best routine results are obtained when sample size is adjusted to use 50% or less of the device capacity.

Sample Volume

The internal volumes of the different devices include the flow passages and interstitial packing volume. Although it is possible to recover all but 100µL (for the 0.5mL devices) or 150µL (for the 1.5mL devices) of sample with an air purge, best results are obtained when the sample volume greatly exceeds the internal volume of the cartridge.

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General Procedure

1. **Precondition the Device.** Pass 5 to 10mL of HPLC grade methanol through the device. This removes interstitial contaminants and wets the packed bed. Follow this with 5 to 10mL of IC grade water. For trace analysis work, repeat this procedure until the water rinse is free from interferences.
2. **Load the Sample.** Load the entire sample at 1mL/minute or less. The total amount of contaminant contained in the sample should not exceed the device capacity and preferably should be below 50% of total capacity. Discard the first 1mL of eluate. Collect the remaining eluate for analysis.

Other IC Devices

Device	Retains
IC-RP:	Hydrophobic Components
IC-OH:	Anions (pH increase)
IC-H:	Cations (pH reduction)
IC-Ag:	Chloride, Iodide, Bromide
IC-Ba:	Sulfate
IC-Na:	Cations (no pH change)
IC-Chelate:	Polyvalent Metal Ions
IC-Mixed Mode RP-OH:	Hydrophobic Components and Anions (pH increase)
IC-Mixed Mode RP-H:	Hydrophobic Components and Cations (pH reduction)

IC-RP Devices

Description	Volume	Qty	Part No.
Maxi-Clean™ IC-RP	0.5mL	50	**30284**
Maxi-Clean™ IC-RP	1.5mL	25	**30286**
Extract-Clean™ IC-RP	0.5mL	50	**40284**
Extract-Clean™ IC-RP	1.5mL	30	**140286**

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