

## IC Columns Introduction

Alltech® IC Column Specifications						
Column	Composition	pH Range	Applications	EPA Methods	Optimized for Suppressed or Non-Suppressed Conductivity	Page
<b>Anion Exchange Columns</b>						
Allsep™	polymer-based anion exchanger, 7µm	pH 2–10	inorganic anions, weak and strong acid ions, metal complexes, organic acids	300.0, Part A	both	99
Novosep™ A-2	polymer-based anion exchanger, 5µm	pH 3–12	inorganic anions and oxyhalides; ideal for separation of seven common anions plus three oxyhalide anions in one run	300.0, 300.1, 317.0, 326.0	suppressed	100
AN1™	polymer-based anion exchanger, 9µm	pH 2–13	inorganic anions, weak and strong acid ions, organic acids	—	both	100
Anion/S	silica-based anion exchanger, 10µm	pH 2–5.5	inorganic anions	—	non-suppressed	101
Anion/R	polymer-based anion exchanger, 10µm	pH 2–12	inorganic anions, weak and strong acid ions	—	non-suppressed	101
PRP™-X100	polymer-based anion exchanger, 10µm	pH 1–13	inorganic anions, weak and strong acid ions	—	non-suppressed	103
<b>Cation Exchange Columns</b>						
Universal Cation	silica-based cation exchanger, 7µm	pH 2–7	groups I and II cations, amines, divalent transition metals	300.7	both	102
Universal Cation HR	silica-based cation exchanger, 3µm	pH 2–7	groups I and II cations, amines, divalent transition metals; smaller particle size for improved peak resolution	300.7	both	102
PRP™-X200	polymer-based cation exchanger, 10µm	pH 1–13	groups I and II cations (separate runs), amines, lanthanides	—	non-suppressed	103
<b>Organic Acid Columns</b>						
PRP™-X300	polymer-based sulfonated cation exchanger	pH 1–13	simple aliphatic carboxylic acids and alcohols	—	non-suppressed	103
Anion Exclusion	polymer-based cation exchanger, 10µm	pH 1–13	organic acids, weak acid anions	—	non-suppressed	104
<b>Specialty Columns</b>						
Surfactant C8	silica-based reversed-phase, 5µm	pH 2–7	short chain anionic surfactants	—	non-suppressed	105
Surfactant C18	silica-based reversed-phase, 5µm	pH 2–7	long chain or aromatic anionic surfactants	—	non-suppressed	105

## IC Guard Kits Cross Reference

Kit includes holder and three guard cartridges.

**Guard Reference Table**

Brand	Column Type	Guard Cartridge Type	All-Guard™ Kit Part No.
Alltech	Allsep™, Allsep™ A-2	GA-1	<b>38109</b>
	Novosep™ A-2	GA-1	<b>38109</b>
	Anion/R, Anion/S	GA-1	<b>38109</b>
	Universal Cation	GC-2	<b>27109</b>
	Universal Cation HR	GC-3	<b>23115</b>
	Anion Exclusion	GIE-1	<b>38117</b>
	Transition Metal C18	GRP-2	<b>38123</b>
	Surfactant/R	GRP-1	<b>38122</b>
	Surfactant C8, C18	GRP-2	<b>38123</b>
Dionex	IonPac® AS4A-SC, AS7, AS11, AS22, AS24, AS26, AS27	GA-1	<b>38109</b>
	IonPac® CS3, CS10, CS11	GC-1	<b>38113</b>
	IonPac® CS12, CS14, CS15	GC-2	<b>27109</b>
	IonPac® NS1	GRP-1	<b>38122</b>
	IonPac® AS1, AS5	GIE-1	<b>38117</b>

**Guard Reference Table (continued)**

Brand	Column Type	Guard Cartridge Type	All-Guard™ Kit Part No.
Waters	IC-Pak™-A	GA-1	<b>38109</b>
	IC-Pak™-M/D	GC-2	<b>27109</b>
	Ion Exclusion	GIE-1	<b>38117</b>
Hamilton	PRP™-X100	GA-1	<b>38109</b>
	PRP™-X200	GC-1	<b>38113</b>
	PRP™-X300	GIE-1	<b>38117</b>
Misc.	Sarasep ANIONSEP AN1™	GA-1	<b>38109</b>
	Bio-Rad®, Aminex®, HPX-87	GIE-1	<b>38117</b>
	Interaction™ ION-120	GA-1	<b>38109</b>
	Interaction™ ION-210	GC-1	<b>38113</b>
	Interaction™ ORH-801	GIE-1	<b>38117</b>
	Metrohm® Metrosep	GA-1	<b>38109</b>

### more info

Cartridges and holders can also be purchased separately. See specific phase pages for replacement cartridge ordering information.

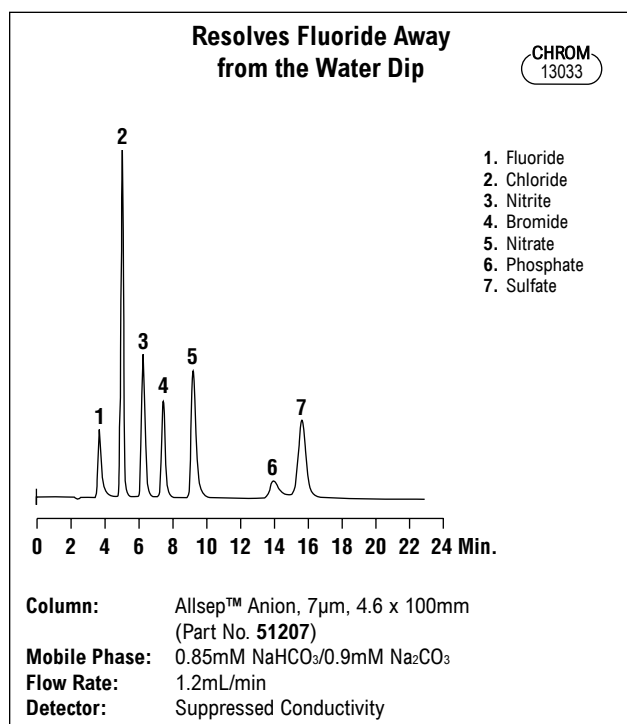
# Alltech<sup>®</sup> Anion Columns

## Allsep<sup>™</sup> Anion IC Columns

- Resolves fluoride away from the water dip
- Meets requirements for U.S. EPA Method 300.0 part A

The Allsep<sup>™</sup> Anion Column is compatible with common IC mobile phases: carbonate, bicarbonate, p-hydroxybenzoic acid, phthalic acid, succinic acid, and sodium octane sulfonate.

Use this column for performing EPA Method 300.0 Part A "Determination of Inorganic Anions in Water" per U.S. EPA guidelines.



Allsep <sup>™</sup> Anion Specifications	
<b>Composition:</b>	Methacrylate based w/quaternary ammonium functional groups
<b>Particle Size:</b>	7 $\mu$ m
<b>Mobile Phase Limits:</b>	pH 2–10, 0–100% organic modifier

Allsep <sup>™</sup> Anion Columns			
Packing	i.d. x Length	PEEK Part No.	SS Part No.
Allsep <sup>™</sup> Anion	4.6 x 50mm	<b>51213</b>	<b>51214</b>
	4.6 x 100mm	<b>51207</b>	<b>51200</b>
	4.6 x 150mm	<b>51209</b>	<b>51208</b>

### related product

Save money with IC All-Guard<sup>™</sup> Kits on page 98. Kit includes one holder and three cartridges.

# Alltech® and Transgenomic® Anion Columns



## Novosep™ A-2 Anion IC Columns

- Separates seven inorganic anions and three oxyhalide anions in a single run
- Meets the requirements of U.S. EPA Methods 300.0, 300.1, 317.0, and 326.0

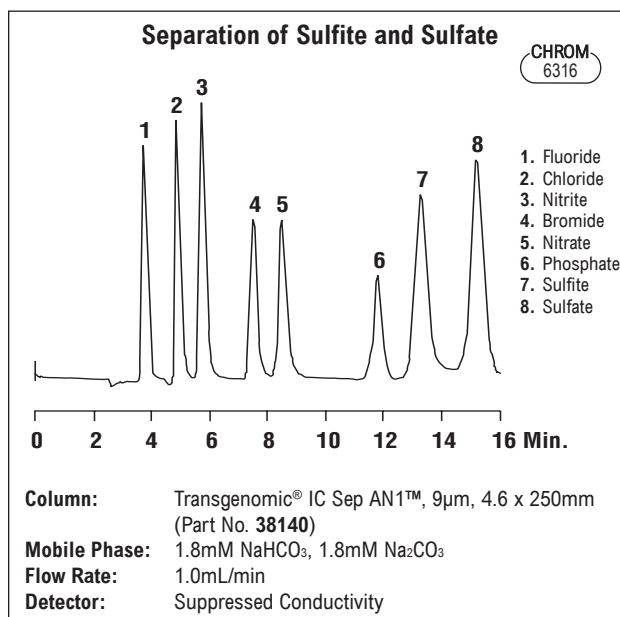
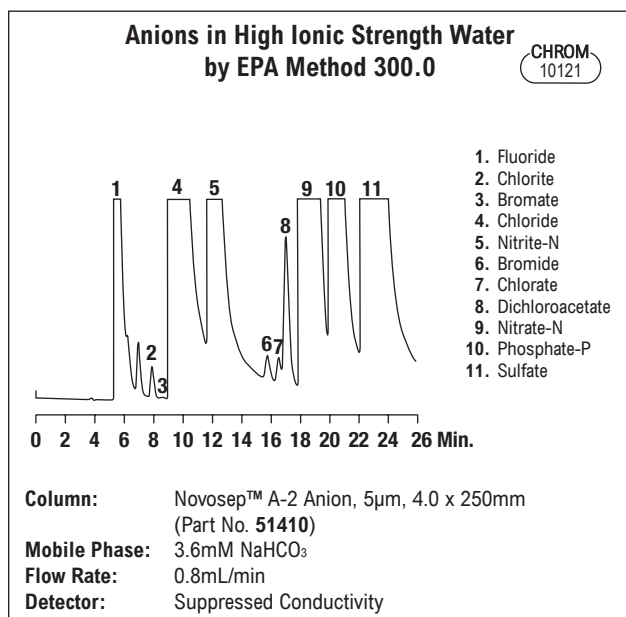
The Novosep™ A-2 Anion Column is ideal for the separation of 10 inorganic anions by suppressor-based ion chromatography using U.S. EPA Method 300.1. The column can also be used to determine inorganic anions in drinking water per U.S. EPA Method 300.0 and trace bromate in drinking water using U.S. EPA Methods 317.0 and 326.0.



## Transgenomic® IC Sep AN1™ IC Column

- Separates anions with carbonate/bicarbonate and hydroxide mobile phases

The Transgenomic® IC Sep AN1™ Column is compatible with both suppressor-based and non-suppressed detection. A variety of mobile phases including sodium carbonate/bicarbonate, sodium hydroxide, and borate/gluconate may be used.



Novosep™ A-2 Anion Specifications	
<b>Composition:</b>	Polyvinyl alcohol-based w/quaternary ammonium functional groups
<b>Particle Size:</b>	5µm
<b>Mobile Phase Limits:</b>	pH 3–12, 0–100% organic modifier, 10% modifier is practical upper limit

Transgenomic® IC Sep AN1™ Specifications	
<b>Composition:</b>	Poly(styrene-divinylbenzene) alkyl dimethyl ethanol ammonium functional group
<b>Particle Size:</b>	9µm
<b>Exchange Capacity:</b>	0.05meq/g
<b>Mobile Phase Limits:</b>	pH 2–13, No organic solvents

Novosep™ A-2 Anion Column		
Packing	i.d. x Length	PEEK Part No.
Novosep™ A-2	4.0 x 250mm	51410

Transgenomic® IC Sep AN1™ Columns		
Packing	i.d. x Length	Part No.
AN1™	4.6 x 250mm	38140

Guards for Novosep™ A-2 Anion Columns			
Description	Qty.	Part No.	
GA-1 Anion Cartridges	3	38108	
All-Guard™ Cartridge Holder*	ea	80101	

\*Direct-Connect™ column coupler included.

Choose a guard column or integral guard discs to protect your IC Sep Column.

Transgenomic® IC Sep Guards		
Description	Qty.	Part No.
Guard Column, 50 x 4.6mm	ea	38145
Guard Column Guard-Disc™	5	38146

### more applications

To view our complete searchable chromatogram database visit [www.discoverysciences.com/chromdb/](http://www.discoverysciences.com/chromdb/)

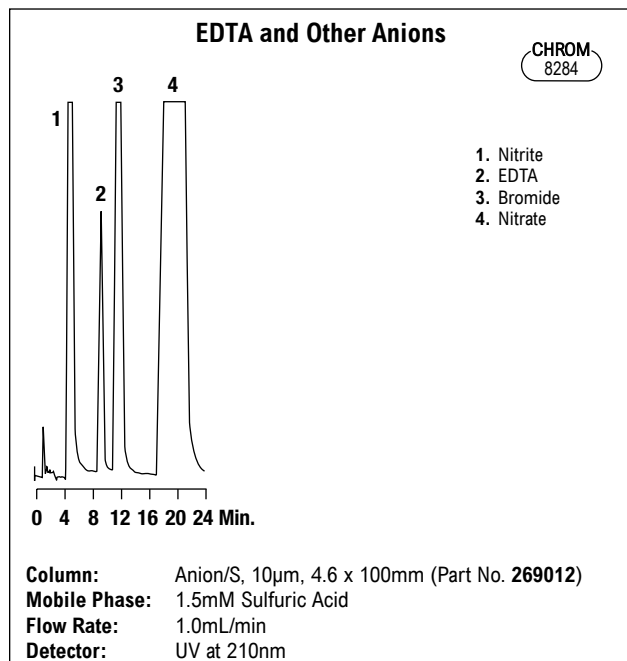


# Alltech® Anion Columns

## Anion/S IC Columns

- Silica-based for symmetrical peak shapes
- Separates inorganic and organic anions

The Anion/S Columns are best suited for routine separations of chloride, bromide, nitrate, and sulfate. Not suitable for fluoride analysis.



### Anion/S Specifications

<b>Composition:</b>	Silica w/quaternary ammonium ion exchanger
<b>Particle Size:</b>	10 $\mu$ m
<b>Exchange Capacity:</b>	0.25meq/g
<b>Mobile Phase Limits:</b>	pH 2–5.5, 0–100% organic modifier

### Anion/S Columns

Packing	i.d. x Length	PEEK Part No.	SS Part No.
Anion/S	4.6 x 100mm	269012	269013
	4.6 x 250mm	—	269001

### related product

Save money with IC All-Guard™ Kits on page 98. Kit includes one holder and three cartridges.

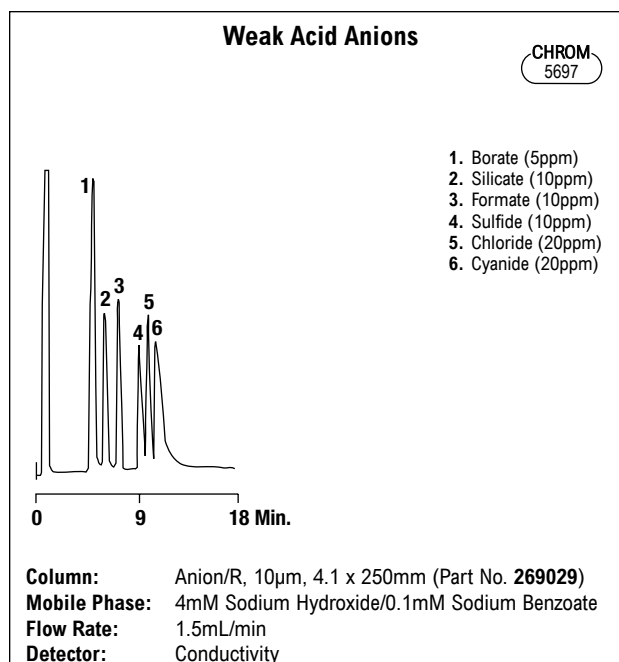
Alltech



## Anion/R IC Columns

- Polymer-based for broad pH stability
- Separates seven common inorganic anions

Because of their high pH stability, these columns are ideal for the separation of anions using high pH mobile phases such as p-hydroxybenzoate, sodium hydroxide, and sodium carbonate/bicarbonate. The larger dimension columns (150mm and 250mm) are suitable for a high-resolution separation of the seven common inorganic anions.



### Anion/R Specifications

<b>Composition:</b>	Poly(styrene-divinylbenzene) Trimethylammonium
<b>Particle Size:</b>	10 $\mu$ m
<b>Exchange Capacity:</b>	0.19 $\pm$ 0.02meq/g
<b>Mobile Phase Limits:</b>	pH 2–12, 0–100% organic modifier

### Anion/R Columns

Packing	i.d. x Length	PEEK Part No.	SS Part No.
Anion/R	4.1 x 100mm	—	269031
	4.1 x 250mm	—	269029
	4.6 x 100mm	269036	—
	4.6 x 150mm	269034	—

### Guards for Anion/S and Anion/R Columns

Description	Qty.	Part No.
GA-1 Anion Cartridges	3	38108
All-Guard™ Cartridge Holder*	ea	80101

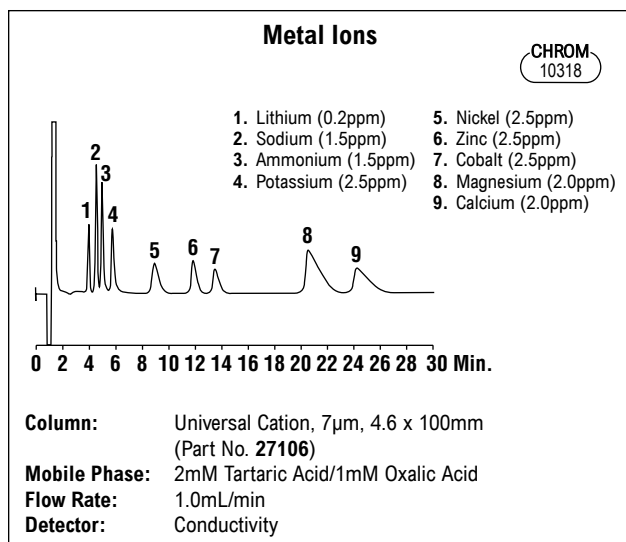
\*Direct-Connect™ column coupler included.

# Alltech® Cation Columns

## Universal Cation and Universal Cation HR IC Columns

- Separate Groups I and II cations in one isocratic run
- Separate transition metals without post-column reaction
- New Universal Cation HR 3µm particle size for improved efficiency

Compatible with a variety of mobile phases including complexing acids (citric acid, tartaric acid, oxalic acid), mineral acids (nitric acid, hydrochloric acid, sulfuric acid) and non-complexing organic acids (methanesulfonic acid).



Universal Cation Specifications	
<b>Composition:</b>	Silica coated with polybutadiene/maleic acid copolymer
<b>Particle Size:</b>	3µm and 7µm, spherical
<b>Mobile Phase Limits:</b>	pH 2–7, 0–100% organic modifier

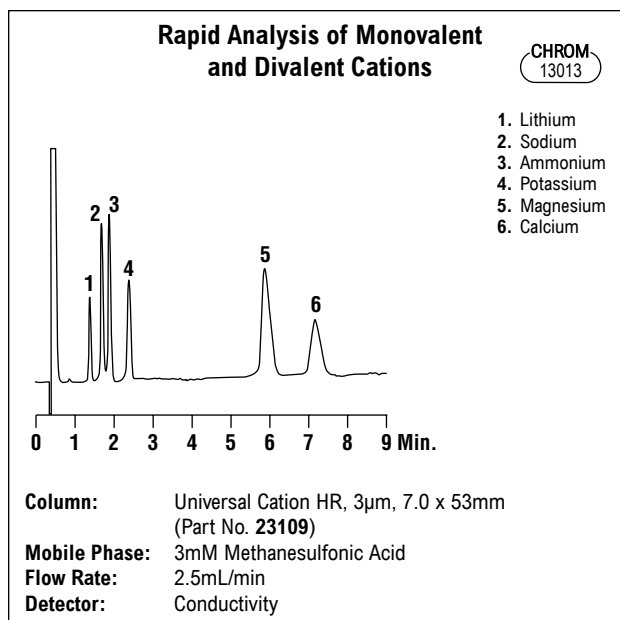
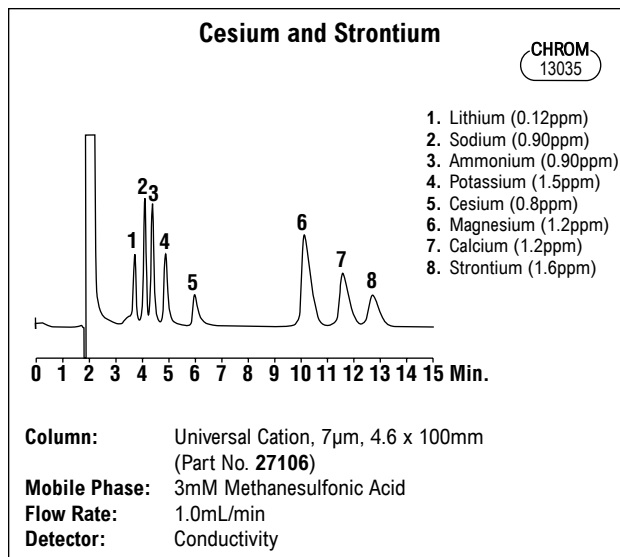
Universal Cation Columns			
Packing	i.d. x Length	PEEK Part No.	SS Part No.
7µm	4.6 x 100mm	27106	27100
3µm HR	4.6 x 100mm	—	23100
	7.0 x 53mm	—	23109

### technical assistance

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

### more applications

To view our complete searchable chromatogram database visit [www.discoverysciences.com/chromdb/](http://www.discoverysciences.com/chromdb/)



### Guards for Universal Cation Columns

Description	Qty.	Part No.
GC-2 Universal Cation	3	271010
GC-3 Universal Cation HR	3	23110
All-Guard™ Cartridge Holder*	ea	80101

\*Direct-Connect™ column coupler included.

### related product

Save money with IC All-Guard™ Kits on page 98. Kit includes one holder and three cartridges.

# Hamilton® Anion, Cation, and Organic Acid Columns

## PRP™-X100 Anion Columns

High pH stability makes this column ideal for the separation of weak anions. PRP™-X100 provides excellent resolution for the seven most frequently analyzed inorganic anions. For non-suppressed analyses only.

## PRP™-X200 Cation Analysis Columns

For separation of the alkali metal and alkaline earth cations in separate runs.

## PRP™-X300 Organic Acid Columns

For separation of simple aliphatic carboxylic acids and alcohols. Inorganic anions are not retained.

### Hamilton® PRP™-X100 Specifications

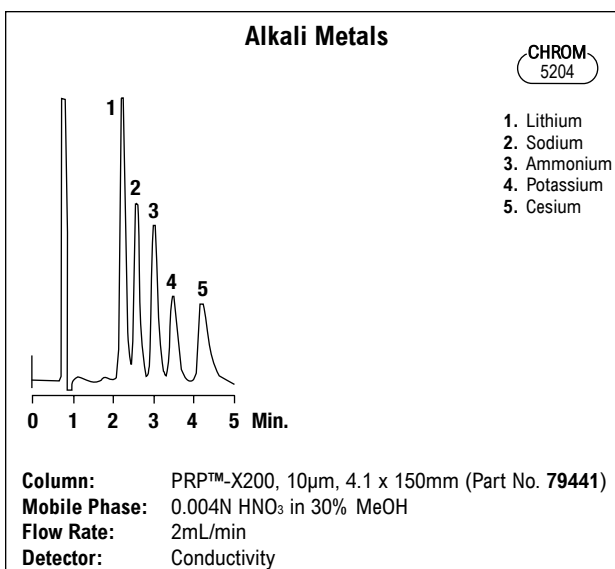
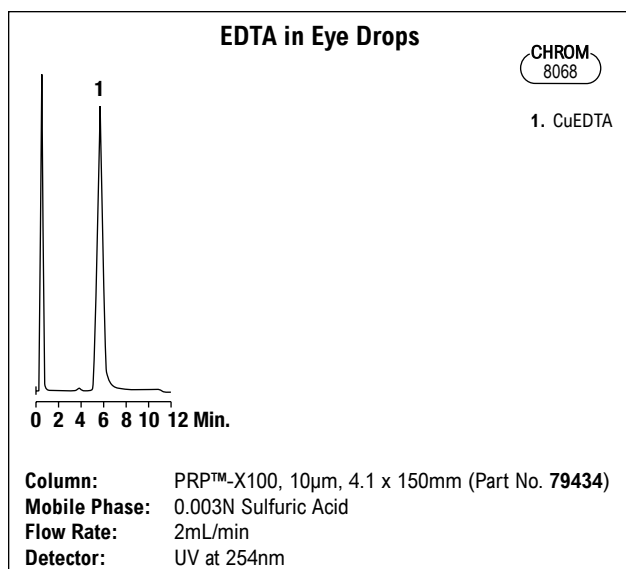
<b>Composition:</b>	Trimethylammonium psDVB copolymer
<b>Particle Size:</b>	10µm, spherical
<b>Exchange Capacity:</b>	0.19meq/g
<b>Mobile Phase Limits:</b>	pH 1–13, 0–100% organic modifier

### Hamilton® PRP™-X200 Specifications

<b>Composition:</b>	Sulfonated psDVB copolymer
<b>Particle Size:</b>	10µm, spherical
<b>Exchange Capacity:</b>	0.35meq/g
<b>Mobile Phase Limits:</b>	pH 1–13, 0–100% organic modifier

### Hamilton® PRP™-X300 Specifications

<b>Composition:</b>	Sulfonated psDVB in H+ form
<b>Particle Size:</b>	3µm and 7µm
<b>Mobile Phase Limits:</b>	pH 1–13, 0–100% organic modifier



### Hamilton® PRP™-X100 Columns

Packing	i.d. x Length	Part No.
PRP™-X100	2.1 x 150mm	<b>79348</b>
	2.1 x 250mm	<b>79346</b>
	4.1 x 100mm	<b>79439</b>
	4.1 x 150mm	<b>79434</b>
	4.1 x 250mm	<b>79433</b>

### Hamilton® PRP™-X200 Columns

Particle Size	i.d. x Length	Part No.
PRP™-X200	4.1 x 150mm	<b>79441</b>
	4.1 x 250mm	<b>79442</b>

### Hamilton® PRP™-X300 Columns

Particle Size	i.d. x Length	Part No.
PRP™-X300, 7µm	4.1 x 150mm	<b>79464</b>
	4.1 x 250mm	<b>79465</b>

### Hamilton® PRP™-X100 Guard Kits and Cartridges

Description	Qty.	Part No.
Guard Column Starter Kit	ea	<b>79448</b>
PRP™-X100, 1 Holder, 2 Cartridges		
Replacement Guard Cartridges (Requires Hamilton® Guard Holder)	5	<b>79446</b>
PRP™-X100, 25 x 2.3mm		

### Hamilton® PRP™-X200 Guard Kits and Cartridges

Description	Qty.	Part No.
Replacement Guard Cartridges (Requires Hamilton® Guard Holder)	5	<b>79449</b>
PRP™-X200, 25 x 2.3mm		

### Hamilton® PRP™-X300 Guard Kits and Cartridges

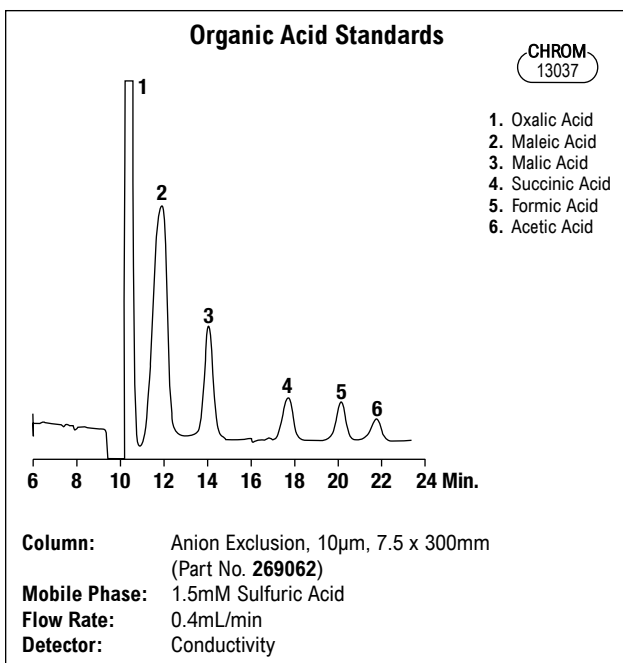
Description	Qty.	Part No.
Replacement Guard Cartridges (Requires Hamilton® Guard Holder)	5	<b>79453</b>
PRP™-X300, 25 x 2.3mm		

# Alltech® Anion Exclusion Columns

- Separate organic acids and weak acid anions
- Polymer-based for broad pH stability
- Economical choice for small inorganics



Anion Exclusion Columns separate organic acids and weakly ionized anions by an anion exclusion mechanism. Dilute mineral acids are the typical mobile phases for the separation. Acetonitrile may be used as an organic modifier to decrease the retention of hydrophobic compounds.



Anion Exclusion Specifications	
<b>Composition:</b>	Highly sulfonated poly (styrene-divinylbenzene) cation exchanger
<b>Particle Size:</b>	10µm
<b>Mobile Phase Limits:</b>	<10% acetonitrile, no methanol <5% isopropyl or ethyl alcohols

Anion Exclusion Columns		
Packing	i.d. x Length	SS Part No.
Anion Exclusion, 10µm	7.8 x 100mm	<b>269068</b>
	7.8 x 300mm	<b>269006</b>

Anion Exclusion All-Guard™ Cartridges			
Description	Qty.	Part No.	
Anion Exclusion GIE-1	3	<b>38118</b>	
All-Guard™ Cartridge Holder*	ea	<b>80101</b>	

\*Direct-Connect™ column coupler included.

### related product

Save money with IC All-Guard™ Kits on page 98. Kit includes one holder and three cartridges.

