

IC Columns Introduction

Alltech® IC Column Specifications						
Column	Composition	pH Range	Applications	EPA Methods	Optimized for Suppressed or Non-Suppressed Conductivity	Page
Anion Exchange Columns						
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
Allsep™ A-2	polymer-based anion exchanger, 7µm	pH 2–11	inorganic anions, organic acids, suitable for both weak and strong anions in a single run	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
Cation Exchange Columns						
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
Organic Acid Columns						
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
Specialty Columns						
Transition Metal	silica-based reversed-phase, 3µm and 7µm	pH 2–7	high capacity, separates divalent transition metals and metal-cyano complexes more selectively than a cation exchange column	—	non-suppressed	104
Surfactant/R	polymer-based reversed-phase, 7µm	pH 1–14	anionic and cationic surfactants; separate short and long chain surfactants in one gradient run	—	both	105
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	38109
	Novosep™ A-2	GA-1	38109
	Anion/R, Anion/S	GA-1	38109
	Universal Cation	GC-2	27109
	Universal Cation HR	GC-3	23115
	Anion Exclusion	GIE-1	38117
	Transition Metal C18	GRP-2	38123
	Surfactant/R	GRP-1	38122
	Surfactant C8, C18	GRP-2	38123
	Dionex	IonPac® AS4A-SC, AS7, AS11, AS22, AS24, AS26, AS27	GA-1
IonPac® CS3, CS10, CS11		GC-1	38113
IonPac® CS12, CS14, CS15		GC-2	27109
IonPac® NS1		GRP-1	38122
IonPac® AS1, AS5		GIE-1	38117

Guard Reference Table (continued)

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

more info

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

Alltech® Anion Columns

Allsep™ Anion IC Columns

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

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

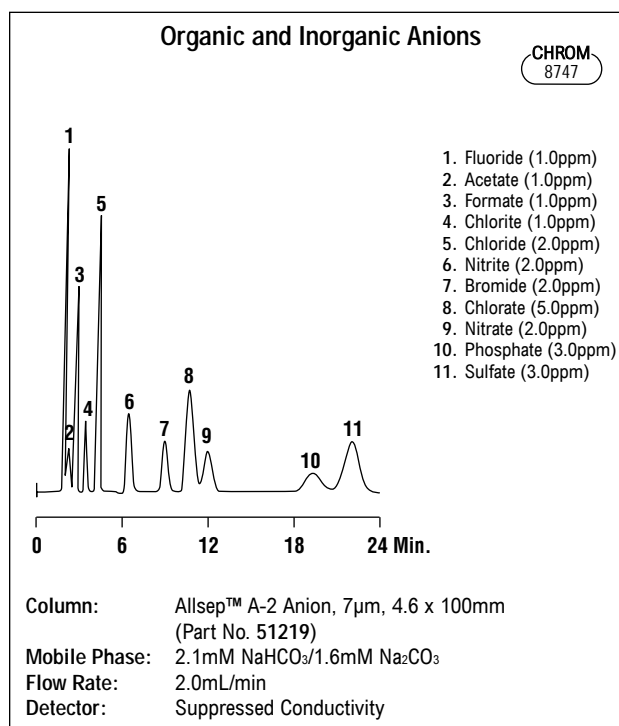
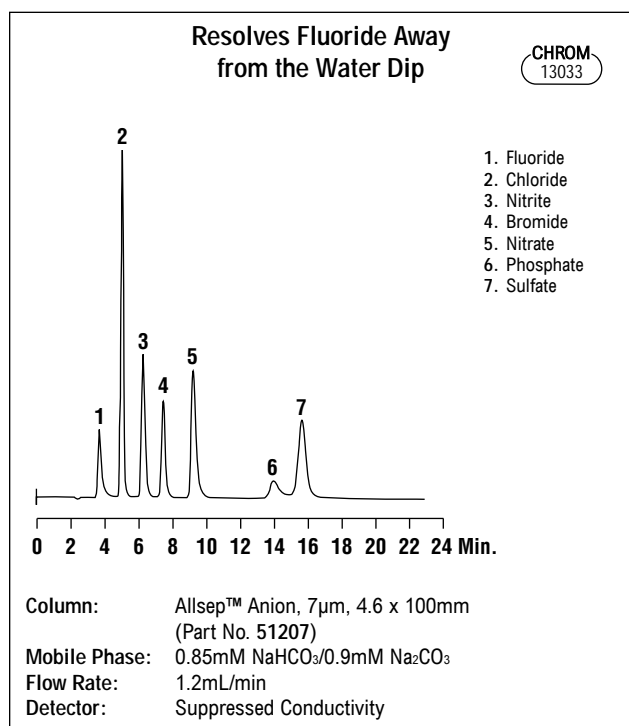
Use this column for performing EPA Method 300.0 Part A "Determination of Inorganic Anions in Water" per U.S. EPA guidelines.



Allsep™ A-2 Anion IC Columns

- Separates both weak and strong acid anions in one run
- Resolves formate away from fluoride and chloride

The Allsep™ A-2 Anion Column separates both weakly retained organic and strongly retained inorganic anions in one run. The high capacity Allsep™ A-2 Anion Column is also suitable for the separation of chlorite and chlorate.



Allsep™ Anion Specifications	
Composition:	Methacrylate based w/quaternary ammonium functional groups
Particle Size:	7µm
Mobile Phase Limits:	pH 2–10, 0–100% organic modifier

Allsep™ A-2 Anion Specifications	
Composition:	Methacrylate based w/quaternary alkanol amine functional groups
Particle Size:	7µm
Mobile Phase Limits:	pH 2–11, 0–100% organic modifier

Allsep™ Anion Columns			
Packing	i.d. x Length	PEEK Part No.	SS Part No.
Allsep™ Anion	4.6 x 30mm	51217	51216
	4.6 x 50mm	51213	51214
	4.6 x 100mm	51207	51200
	4.6 x 150mm	51209	51208

Allsep™ A-2 Anion Columns			
Packing	i.d. x Length	PEEK Part No.	SS Part No.
Allsep™ A-2	4.6 x 50mm	51221	51220
	4.6 x 100mm	51219	51218

related product

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

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

*Direct-Connect™ column coupler included.

Alltech® 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

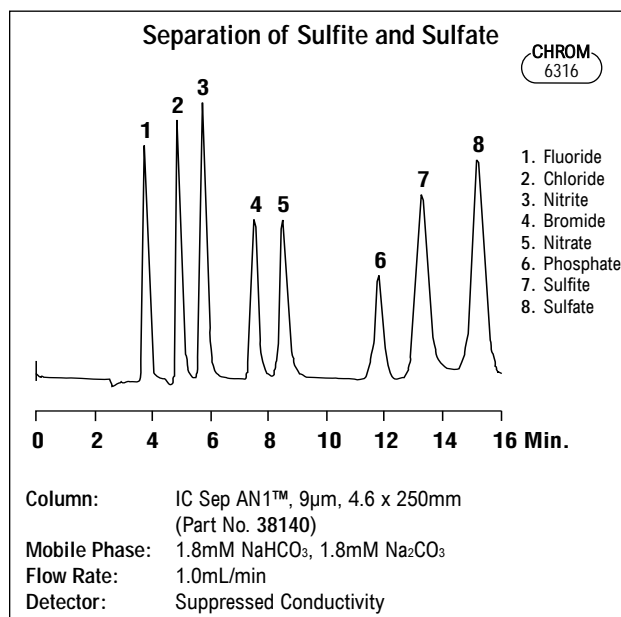
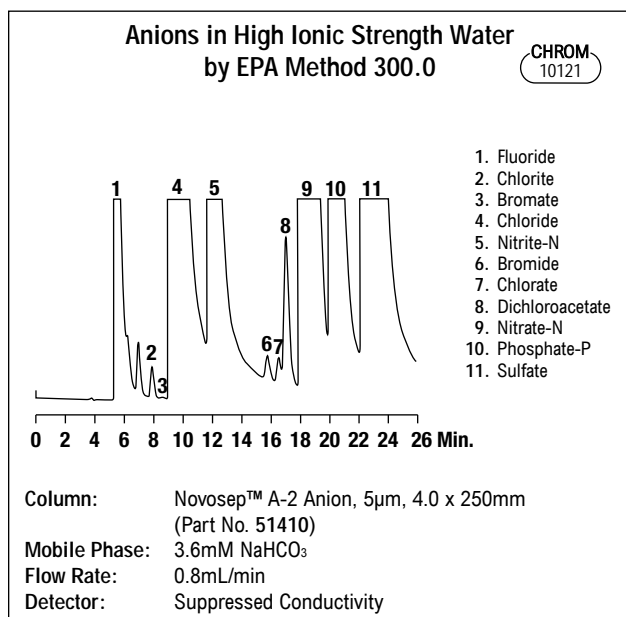
The Novosep™ A-2 Anion Column is ideal for the separation of 10 inorganic anions by suppressor-based ion chromatography using U.S. EPA Method 300.1. The column can also be used to determine inorganic anions in drinking water per U.S. EPA Method 300.0 and trace bromate in drinking water using U.S. EPA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



IC Sep AN1™ IC Column

- Separates anions with carbonate/bicarbonate and hydroxide mobile phases

The 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	
Composition:	Polyvinyl alcohol-based w/quaternary ammonium functional groups
Particle Size:	5µm
Mobile Phase Limits:	pH 3–12, 0–100% organic modifier, 10% modifier is practical upper limit

IC Sep AN1™ Specifications	
Composition:	Poly(styrene-divinylbenzene) alkyl dimethyl ethanol ammonium functional group
Particle Size:	9µm
Exchange Capacity:	0.05meq/g
Mobile Phase Limits:	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

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.

more applications

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

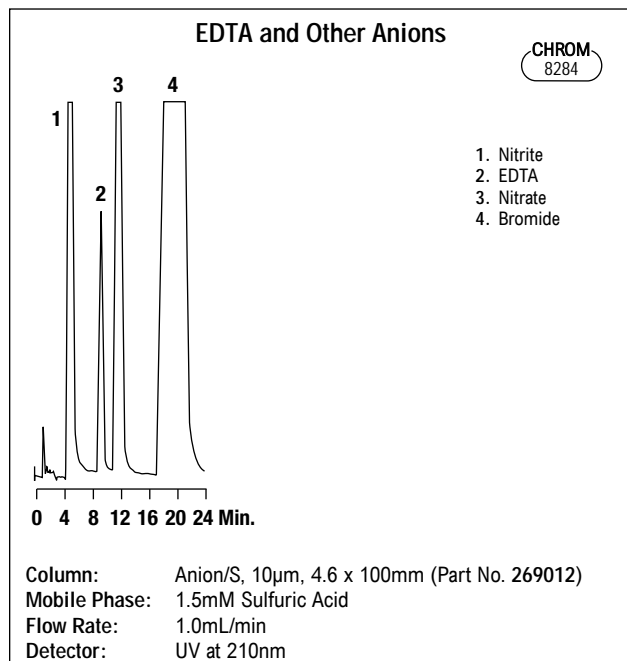
IC Sep Guards		
Description	Qty.	Part No.
Guard Column, 50 x 4.6mm	ea	38145
Guard Column Guard-Disc™	5	38146

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	
Composition:	Silica w/quaternary ammonium ion exchanger
Particle Size:	10µm
Exchange Capacity:	0.25meq/g
Mobile Phase Limits:	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	269011	269001

related product

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

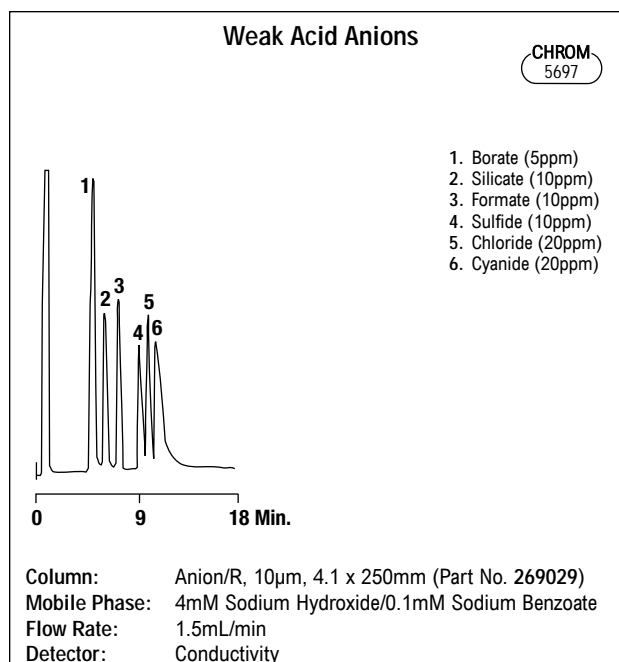
Alltech



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	
Composition:	Poly(styrene-divinylbenzene) Trimethylammonium
Particle Size:	10µm
Exchange Capacity:	0.19 ± 0.02meq/g
Mobile Phase Limits:	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

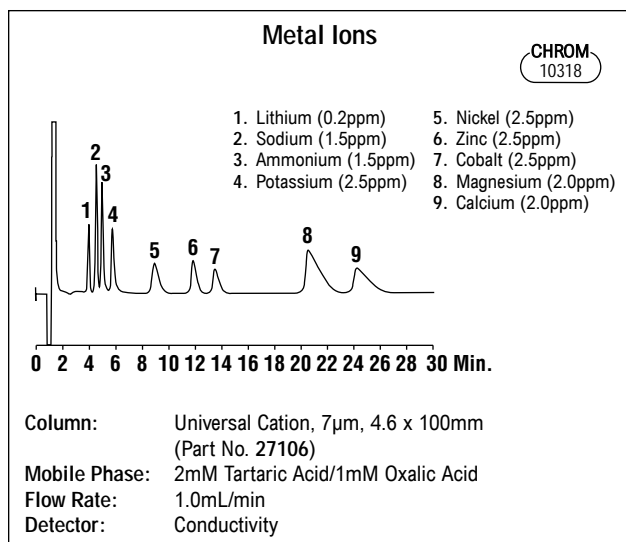
*Direct-Connect™ column coupler included.

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

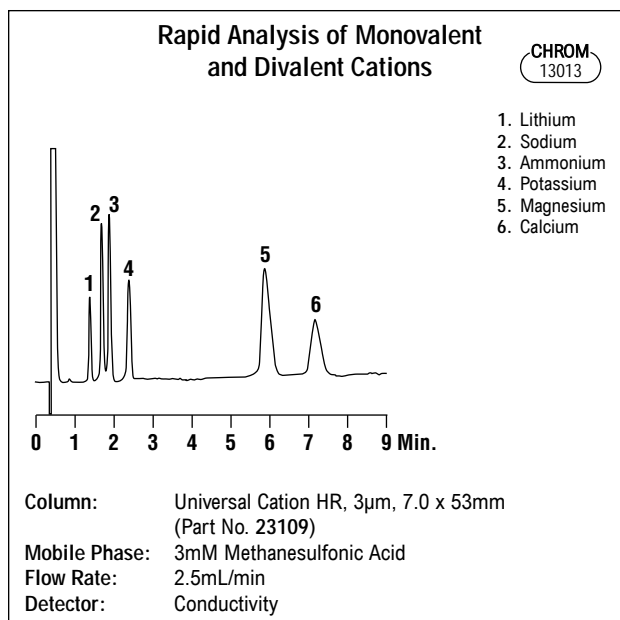
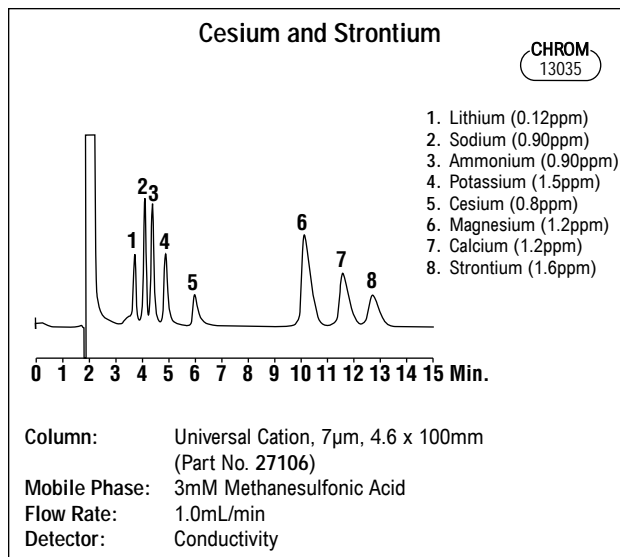
Universal Cation Columns			
Packing	i.d. x Length	PEEK Part No.	SS Part No.
7µm	4.6 x 100mm	27106	27100
3µm HR	4.6 x 100mm	—	23100
	7.0 x 53mm	—	23109

technical assistance

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

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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

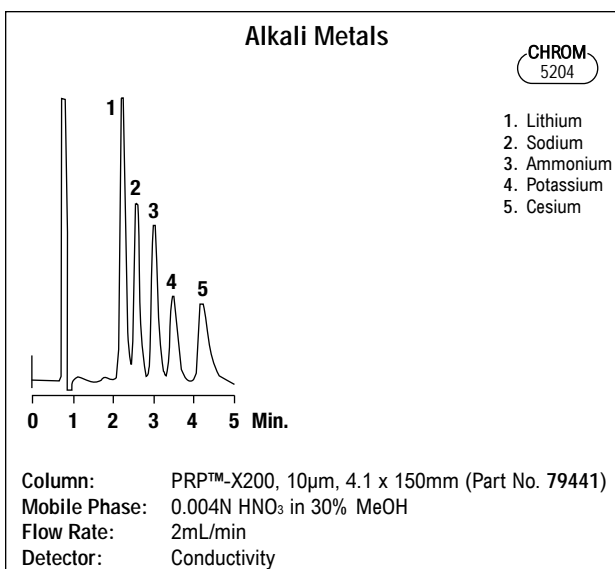
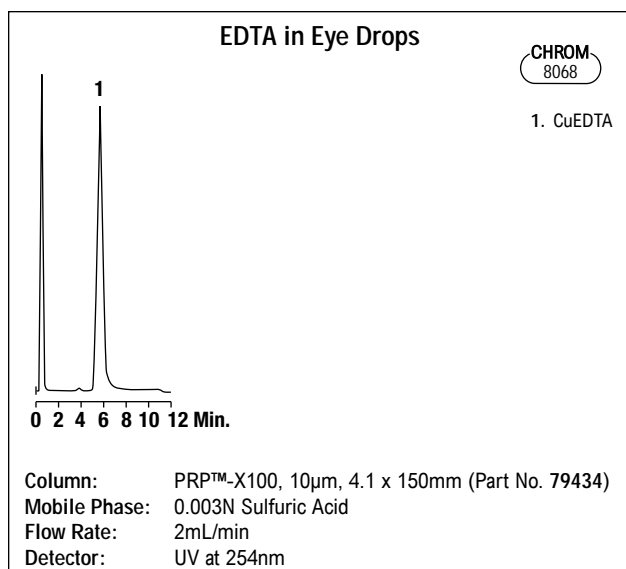
Composition:	Trimethylammonium psDVB copolymer
Particle Size:	10µm, spherical
Exchange Capacity:	0.19meq/g
Mobile Phase Limits:	pH 1–13, 0–100% organic modifier

Hamilton® PRP™-X200 Specifications

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

Hamilton® PRP™-X300 Specifications

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



Hamilton® PRP™-X100 Columns

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

Hamilton® PRP™-X200 Columns

Particle Size	i.d. x Length	Part No.
PRP™-X200	2.1 x 150mm	79394
	2.1 x 250mm	79347
	4.1 x 150mm	79441
	4.1 x 250mm	79442

Hamilton® PRP™-X300 Columns

Particle Size	i.d. x Length	Part No.
PRP™-X300, 3µm	4.1 x 150mm	79819
	4.1 x 150mm	79464
	4.1 x 250mm	79465
	4.6 x 150mm	79485

Hamilton® PRP™-X100 Guard Kits and Cartridges

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

Hamilton® PRP™-X200 Guard Kits and Cartridges

Description	Qty.	Part No.
Guard Column Starter Kit	ea	79456
PRP™-X200, 1 Holder, 2 Cartridges		
Replacement Guard Cartridges (Requires Hamilton® Guard Holder)	5	79449
PRP™-X200, 25 x 2.3mm		

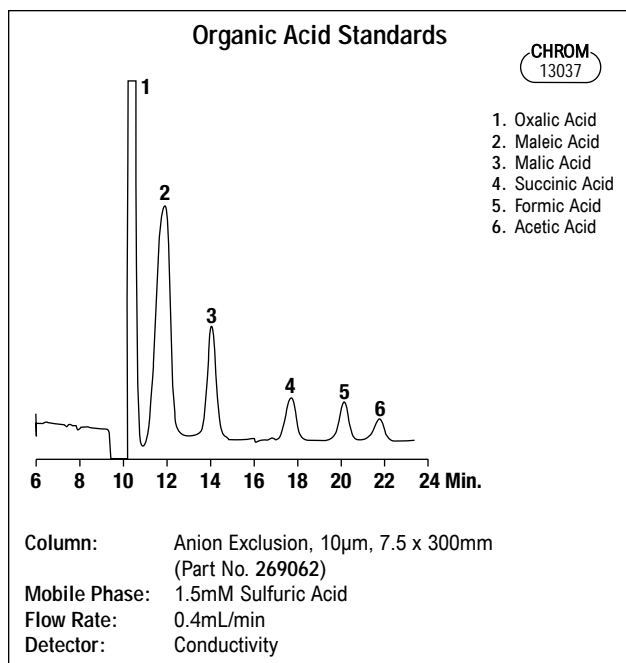
Hamilton® PRP™-X300 Guard Kits and Cartridges

Description	Qty.	Part No.
Guard Column Starter Kit	ea	79460
PRP™-X300, 1 Holder, 2 Cartridges		
Replacement Guard Cartridges (Requires Hamilton® Guard Holder)	5	79453
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

Composition: Highly sulfonated poly (styrene-divinylbenzene) cation exchanger
Particle Size: 10 μ m
Mobile Phase Limits: <10% acetonitrile, no methanol <5% isopropyl or ethyl alcohols

Anion Exclusion Columns

Packing	i.d. x Length	PEEK Part No.	SS Part No.
Anion Exclusion, 10 μ m	7.5 x 100mm	269069	—
	7.5 x 300mm	269062	—
	7.8 x 100mm	—	269068
	7.8 x 300mm	—	269006

Anion Exclusion All-Guard™ Cartridges

Description	Qty.	Part No.
Anion Exclusion GIE-1	3	38118
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.

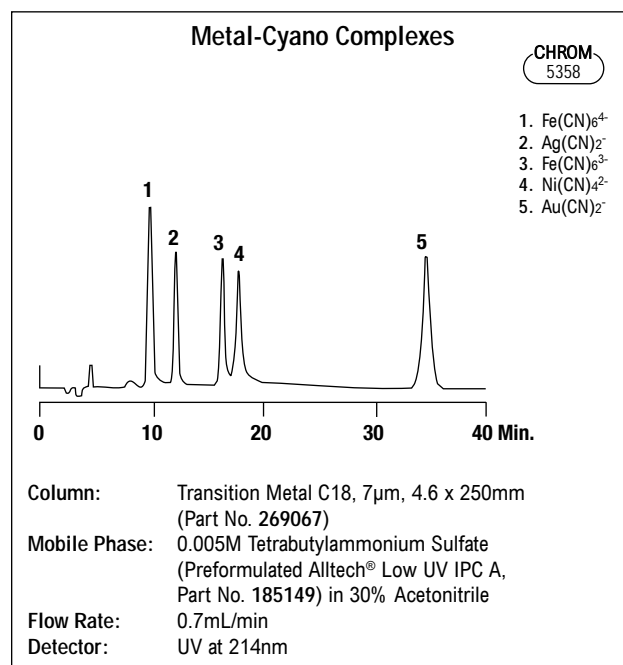


Alltech® Transition Metal Columns

- Separate divalent transition metals and metal-cyano complexes more selectively than a cation exchange column

To separate divalent transition metals, use conductivity detection for concentrations as low as 1ppm, or UV detection with post-column reaction for ppb-level concentrations

To separate metal-cyano complexes, use the Alltech® low UV IPC A (Part No. 185149) as the ion-pair reagent, and methanol or acetonitrile as the organic modifier.



Transition Metal Specifications

Composition: Silica-based with C18 bonded phase (20% Carbon)
Particle Size: 3 μ m and 7 μ m, spherical
Mobile Phase Limits: pH 2–7

Transition Metal Columns

Packing	i.d. x Length	PEEK Part No.
C18, 3 μ m	4.6 x 100mm	269064
C18, 7 μ m	4.6 x 250mm	269067

Transition Metal All-Guard™ Cartridges

Description	Qty.	Part No.
GRP-2 Revised Phase	3	38129
All-Guard™ Cartridge Holder*	ea	80101

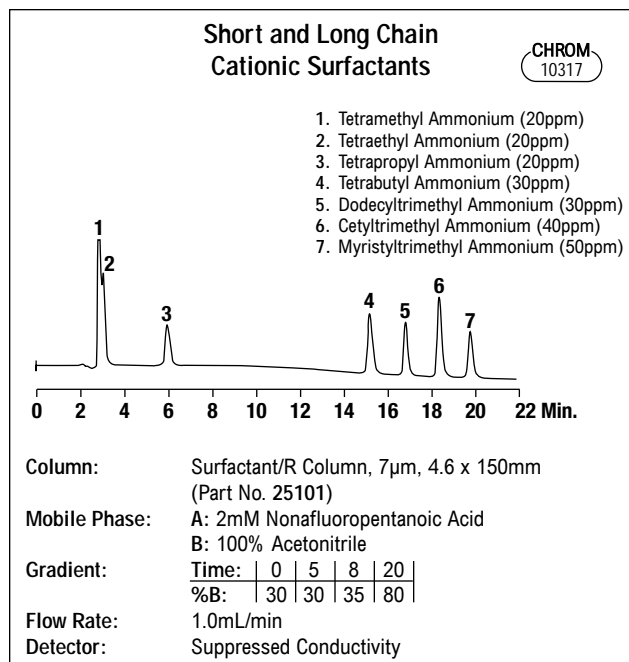
*Direct-Connect™ column coupler included.

Alltech® Surfactant Columns

Surfactant/R IC Columns

- Separate anionic and cationic surfactants
- Separate short and long chain surfactants in one gradient run

The Surfactant/R Column separates anionic and cationic surfactants by ion-pair chromatography along with suppressed conductivity detection. This column can also be used for other reversed-phase applications.



Surfactant/R Specifications	
Composition:	Polydivinylbenzene (DVB) based resin
Particle Size:	7 μ m
Mobile Phase Limits:	pH 1–14, 0–100% organic modifier

Surfactant/R Columns			
Packing	i.d. x Length	PEEK Part No.	SS Part No.
Surfactant/R, 7 μ m	4.6 x 150mm	25101	25100

Guards for Surfactant/R Columns		
Description	Qty.	Part No.
GRP-1 Revised Phase	3	38124
All-Guard™ Cartridge Holder*	ea	80101

*Direct-Connect™ column coupler included.

related product

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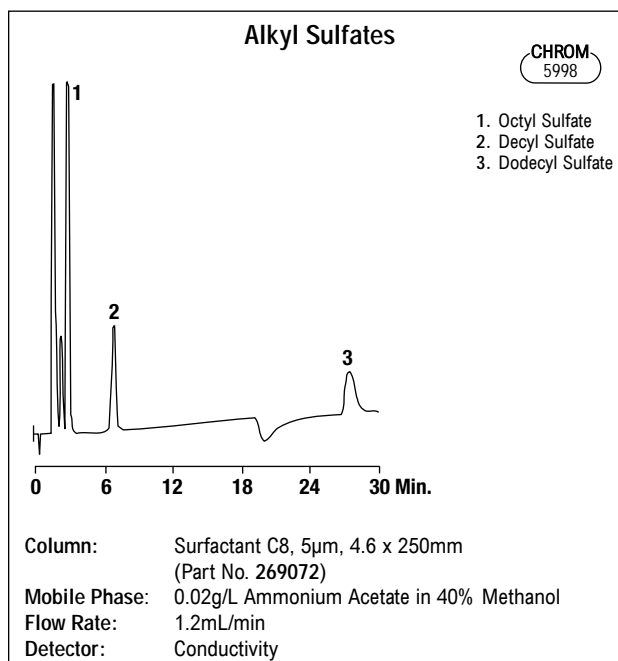


Surfactant/C IC Columns

- For non-suppressed analyses
- Silica-based for symmetrical peak shapes

Choose Surfactant C8 for short chain anionic surfactants such as alkyl sulfates and alkyl sulfonates.

Choose Surfactant C18 for long chain or aromatic surfactants such as xylene sulfonate and dodecyl benzene sulfonate.



Surfactant/C Specifications	
Composition:	Silica-based C8 or C18
Particle Size:	5 μ m
Mobile Phase Limits:	pH 2–7, 0–100% organic modifier

Surfactant/C Columns			
Packing	i.d. x Length	PEEK Part No.	SS Part No.
C8, 5 μ m	4.6 x 250mm	269072	269092
C18, 5 μ m	4.6 x 250mm	269071	269091

Guards for Surfactant/C Columns		
Description	Qty.	Part No.
GRP-2 Revised Phase	3	38129
All-Guard™ Cartridge Holder*	ea	80101

*Direct-Connect™ column coupler included.