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### Ultra Columns: 3µm or 5µm particles; 100Å pore size

Our broadest selection of stationary phases, including unique phases. High density bondings, for maximum retention. High-purity, Type B silica gives excellent peak shapes for a wide range of compounds.

#### Ultra C18 Columns (USP L1)

##### Excellent for a wide range of analyses

###### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 20%

endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

###### Chromatographic Properties:

A retentive, high-purity packing that exhibits excellent peak shape for a wide range of compounds. Excellent general-purpose reversed phase column.

Length	1.0mm ID	2.1mm ID	3.2mm ID	4.0mm ID	4.6mm ID
	cat.#	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>					
30mm	9174331	9174332	9174333	—	9174335
50mm	9174351	9174352	9174353	—	9174355
100mm	9174311	9174312	9174313	—	9174315
<b>5µm Columns</b>					
30mm	9174531	9174532	9174533	—	9174535
50mm	9174551	9174552	9174553	—	9174555
100mm	9174511	9174512	9174513	9174514	9174515
150mm	9174561	9174562	9174563	9174564	9174565
200mm	9174521	9174522	9174523	—	9174525
250mm	9174571	9174572	9174573	—	9174575

#### Ultra C8 Columns (USP L7)

##### Excellent for a wide range of analyses

###### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 12%

endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

###### Chromatographic Properties:

A retentive, high-purity, base-deactivated reversed phase packing that exhibits excellent peak shape for a wide range of compounds. Less retention for neutral, hydrophobic compounds, compared to the Ultra C18 column.

Length	1.0mm ID	2.1mm ID	3.2mm ID	4.0mm ID	4.6mm ID
	cat.#	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>					
30mm	9103331	9103332	9103333	—	9103335
50mm	9103351	9103352	9103353	—	9103355
100mm	9103311	9103312	9103313	—	9103315
<b>5µm Columns</b>					
30mm	9103531	9103532	9103533	—	9103535
50mm	9103551	9103552	9103553	—	9103555
100mm	9103511	9103512	9103513	9103514	9103515
150mm	9103561	9103562	9103563	9103564	9103565
200mm	9103521	9103522	9103523	—	9103525
250mm	9103571	9103572	9103573	—	9103575



**Heather Johnson**  
Special Events  
Coordinator  
11+ years of service!

## Ultra Aqueous C18 Columns (USP L1)

## Physical Characteristics:

particle size: 3µm or 5µm, spherical  
 pore size: 100Å  
 carbon load: 15%

endcap: no  
 pH range: 2.5 to 7.5  
 temperature limit: 80°C

## Chromatographic Properties:

Highly retentive and selective for reversed phase separations of polar analytes. Highly base-deactivated. Compatible with highly aqueous (up to 100%) mobile phases.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	cat.#	cat.#	cat.#	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>								
30mm	9178331		9178332		9178333		9178335	
50mm	9178351		9178352		9178353		9178355	
100mm	9178311		9178312		9178313		9178315	
<b>5µm Columns</b>								
30mm	9178531		9178532		9178533		9178535	
50mm	9178551		9178552		9178553		9178555	
100mm	9178511		9178512		9178513		9178515	
150mm	9178561		9178562		9178563		9178565	
200mm	9178521		9178522		9178523		9178525	
250mm	9178571		9178572		9178573		9178575	

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also available

More chromatograms!

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HPLC COLUMNS

## Ultra IBD Columns

## Specialized Columns for Mixed Polar and Nonpolar Compounds

## Physical Characteristics:

particle size: 3µm or 5µm, spherical  
 pore size: 100Å  
 carbon load: 12%

endcap: no  
 pH range: 2.5 to 7.5  
 temperature limit: 80°C

## Chromatographic Properties:

An intrinsically base-deactivated (IBD) phase, containing a polar group within, or intrinsic to, the hydrocarbon bonded phase. Unique selectivity and a high level of base deactivation, while reducing or eliminating the need for mobile phase additives.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	cat.#	cat.#	cat.#	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>								
30mm	9175331		9175332		9175333		9175335	
50mm	9175351		9175352		9175353		9175355	
100mm	9175311		9175312		9175313		9175315	
<b>5µm Columns</b>								
30mm	9175531		9175532		9175533		9175535	
50mm	9175551		9175552		9175553		9175555	
100mm	9175511		9175512		9175513		9175515	
150mm	9175561		9175562		9175563		9175565	
200mm	9175521		9175522		9175523		9175525	
250mm	9175571		9175572		9175573		9175575	

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## ordering note

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 337.

For guard cartridges for these columns, see page 339.

# Ultra C4 and C1 Columns

## Ultra C4 Columns (USP L26)

### Physical Characteristics:

particle size: 3 $\mu$ m or 5 $\mu$ m, spherical  
pore size: 100Å  
carbon load: 9%

endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

### Chromatographic Properties:

Exceptionally stable C4 packing, with high bonding coverage and base deactivation. Less retention than C18 or C8 phases.

Length	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
	cat.#	cat.#	cat.#	cat.#
<b>3<math>\mu</math>m Columns</b>				
30mm	9102331	9102332	9102333	9102335
50mm	9102351	9102352	9102353	9102355
100mm	9102311	9102312	9102313	9102315
<b>5<math>\mu</math>m Columns</b>				
30mm	9102531	9102532	9102533	9102535
50mm	9102551	9102552	9102553	9102555
100mm	9102511	9102512	9102513	9102515
150mm	9102561	9102562	9102563	9102565
200mm	9102521	9102522	9102523	9102525
250mm	9102571	9102572	9102573	9102575

## Ultra C1 Columns (USP L13)

### Physical Characteristics:

particle size: 3 $\mu$ m or 5 $\mu$ m, spherical  
pore size: 100Å  
carbon load: 5%

pH range: 2.5 to 7.5  
temperature limit: 80°C

### Chromatographic Properties:

Exceptionally stable C1 phase. Least retentive reversed phase hydrocarbon packing.

Length	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
	cat.#	cat.#	cat.#	cat.#
<b>3<math>\mu</math>m Columns</b>				
30mm	9101331	9101332	9101333	9101335
50mm	9101351	9101352	9101353	9101355
100mm	9101311	9101312	9101313	9101315
<b>5<math>\mu</math>m Columns</b>				
30mm	9101531	9101532	9101533	9101535
50mm	9101551	9101552	9101553	9101555
100mm	9101511	9101512	9101513	9101515
150mm	9101561	9101562	9101563	9101565
200mm	9101521	9101522	9101523	9101525
250mm	9101571	9101572	9101573	9101575

## ordering note

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 337.

For guard cartridges for these columns, see page 339.

also available

Application chromatograms!

Visit [www.restek.com](http://www.restek.com).

**Ultra Cyano Columns (USP L10)****Physical Characteristics:**

particle size: 3µm or 5µm, spherical  
 pore size: 100Å  
 carbon load: 8%

endcap: fully endcapped  
 pH range: 2.5 to 7.5  
 temperature limit: 80°C

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Antiarrhythmics . . . . .	545

**Chromatographic Properties:**

High-purity cyano phase with few silanol sites. Often a better choice than C18 phases for basic pharmaceuticals, especially regarding peak shape and selectivity. Cyano phases are more rugged than bare silica for normal phase analyses because they are less sensitive to small amounts of water in the mobile phase.

Length	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9106331	9106332	9106333	9106335
50mm	9106351	9106352	9106353	9106355
100mm	9106311	9106312	9106313	9106315
<b>5µm Columns</b>				
30mm	9106531	9106532	9106533	9106535
50mm	9106551	9106552	9106553	9106555
100mm	9106511	9106512	9106513	9106515
150mm	9106561	9106562	9106563	9106565
200mm	9106521	9106522	9106523	9106525
250mm	9106571	9106572	9106573	9106575

**Ultra Phenyl Columns (USP L11)****Physical Characteristics:**

particle size: 3µm or 5µm, spherical  
 pore size: 100Å  
 carbon load: 10%

endcap: fully endcapped  
 pH range: 2.5 to 7.5  
 temperature limit: 80°C

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Guafenesin, Codeine . . . . .	559

**Chromatographic Properties:**

High-purity, highly retentive, base-deactivated phase with alternative selectivity to straight chain hydrocarbon phases, especially for aromatic analytes.

Length	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9105331	9105332	9105333	9105335
50mm	9105351	9105352	9105353	9105355
100mm	9105311	9105312	9105313	9105315
<b>5µm Columns</b>				
30mm	9105531	9105532	9105533	9105535
50mm	9105551	9105552	9105553	9105555
100mm	9105511	9105512	9105513	9105515
150mm	9105561	9105562	9105563	9105565
200mm	9105521	9105522	9105523	9105525
250mm	9105571	9105572	9105573	9105575



**Vernon Bartlett**  
 HPLC Senior Innovations  
 Chemist  
 10+ years of service!

**a plus 1 story**

"After the disaster of 9/11, Diazald®, a highly explosive compound used in herbicide analysis, was immediately controlled by the U.S. government which made shipment impossible. Restek was instrumental in helping me to develop an isocratic HPLC method that did not require the use of Diazald®. This method is not only safer, but it saves us time and money. Thanks, Restek!"

Chris Domaradzki, Organics Manager, Environmental Testing Laboratories

# Ultra Amino and PFP Columns

## Ultra Amino Columns (USP L8)

### Physical Characteristics:

particle size: 3 $\mu$ m or 5 $\mu$ m, spherical  
 pore size: 100Å  
 carbon load: 2%  
 encap: no  
 pH range: 2.5 to 7.5  
 temperature limit: 80°C

### Chromatographic Properties:

Recommended for normal phase analyses of mono- and disaccharides, or similar compounds.

## also available

### Application chromatograms!

Visit [www.restek.com](http://www.restek.com).

Length	1.0mm ID cat.#	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>3<math>\mu</math>m Columns</b>				
30mm	9107331	9107332	9107333	9107335
50mm	9107351	9107352	9107353	9107355
100mm	9107311	9107312	9107313	9107315
<b>5<math>\mu</math>m Columns</b>				
30mm	9107531	9107532	9107533	9107535
50mm	9107551	9107552	9107553	9107555
100mm	9107511	9107512	9107513	9107515
150mm	9107561	9107562	9107563	9107565
200mm	9107521	9107522	9107523	9107525
250mm	9107571	9107572	9107573	9107575

## Ultra PFP Columns (USP L43)

### Unique Selectivity

### Physical Characteristics:

particle size: 3 $\mu$ m or 5 $\mu$ m, spherical  
 pore size: 100Å  
 carbon load: 7%  
 endcap: fully endcapped  
 pH range: 2.5 to 7.5  
 temperature limit: 80°C

### Chromatographic Properties:

A pentafluorophenyl phase. Unique selectivity for compounds containing organohalogens or other basic functional groups.

Length	1.0mm ID cat.#	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>3<math>\mu</math>m Columns</b>				
30mm	9176331	9176332	9176333	9176335
50mm	9176351	9176352	9176353	9176355
100mm	9176311	9176312	9176313	9176315
<b>5<math>\mu</math>m Columns</b>				
30mm	9176531	9176532	9176533	9176535
50mm	9176551	9176552	9176553	9176555
100mm	9176511	9176512	9176513	9176515
150mm	9176561	9176562	9176563	9176565
200mm	9176521	9176522	9176523	9176525
250mm	9176571	9176572	9176573	9176575

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**Randy Romesberg**  
 HPLC Senior Innovations  
 Chemist  
 13+ years of service!

## ordering note

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 337.

For guard cartridges for these columns, see page 339.

**Ultra Silica Columns (USP L3)****Physical Characteristics:**

particle size: 3 $\mu$ m or 5 $\mu$ m, spherical  
 pore size: 100Å  
 carbon load: none

endcap: no  
 pH range: 2.5 to 7.5  
 temperature limit: 80°C

**Chromatographic Properties:**

High surface area, Type B silica packing.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3<math>\mu</math>m Columns</b>				
30mm	9100331	9100332	9100333	9100335
50mm	9100351	9100352	9100353	9100355
100mm	9100311	9100312	9100313	9100315
<b>5<math>\mu</math>m Columns</b>				
30mm	9100531	9100532	9100533	9100535
50mm	9100551	9100552	9100553	9100555
100mm	9100511	9100512	9100513	9100515
150mm	9100561	9100562	9100563	9100565
200mm	9100521	9100522	9100523	9100525
250mm	9100571	9100572	9100573	9100575

**Ultra Carbamate Columns****Physical Characteristics:**

particle size: 3 $\mu$ m or 5 $\mu$ m, spherical  
 pore size: 100Å

pH range: 2.5 to 7.5  
 temperature limit: 80°C

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**exclusive!**

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**Chromatographic Properties:**

Restek chemists developed the Ultra Carbamate column specifically for carbamates analysis. The unique packing separates 10 target carbamates in just over 10 minutes. The column is compatible with fluorescence or LC/MS detection.\* An Ultra Carbamate column can process as many as 3 to 4 samples per hour, versus less than 2 samples per hour on a general-purpose C18 column. In addition to increased sample throughput, this much faster analysis will significantly reduce solvent usage—and the costs of disposing of solvent waste.

	1.0mm ID	2.1mm ID	3.2mm ID	4.0mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#	cat.#
<b>3<math>\mu</math>m Columns</b>					
50mm	9177351	9177352	9177353	9177354	9177355
100mm	9177311	9177312	9177313	—	9177315
<b>5<math>\mu</math>m Columns</b>					
250mm	—	—	—	—	9177575

\*For post-column derivatization/fluorescence detection applications for a 4.6mm ID column the total system dead volume, including the post-column reactor, must be less than 650 $\mu$ L. For standard post-column reactor systems, we recommend a 250mm x 4.6mm, 5 $\mu$ m column. Call Restek technical service for more information.

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**innovation!**

**Faster analyses and reduced solvent use!**

An Ultra Carbamate column can process as many as 3 to 4 samples per hour, versus less than 2 samples per hour on a general-purpose C18 column.



also **available**

We also have syringe filters!  
 See **page 373**.

# Ultra Quat Columns

restek  
innovation!

An Ultra Quat column and Ultra Quat Reagent Solution eliminate the need for ion pairing reagents in paraquat/diquat analysis.

## Ultra Quat Columns

### Physical Characteristics:

particle size: 5 $\mu$ m, spherical  
pore size: 100Å

pH range: 2.5 to 7.5  
temperature limit: 80°C

restek  
exclusive!

### Chromatographic Properties:

A retentive, high-purity, base deactivated reversed phase packing. Ideal for the analysis of paraquat and diquat or other quaternary amines when used with Ultra Quat Reagent Solution mobile phase additive (cat.# 32441).

Length	4.6mm ID cat.#
5 $\mu$ m Column	
150mm	9181565

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### Ultra Quat Reagent Solution

Use with Ultra Quat HPLC column. Dilute to 1 liter water, per instructions.

In water, 20mL/bottle

cat. # 32441 (ea.)

### Paraquat & Diquat Calibration Mix

diquat dibromide                      paraquat dichloride  
1,000 $\mu$ g/mL each in water, 1mL/ampul  
cat. # 32437 (ea.)

## for more info

For more information about the Ultra Quat system, review the *Restek Advantage* 2004 vol. 3 at [www.restek.com](http://www.restek.com).

lit. cat.# 59051

## free literature

### Simple, Sensitive HPLC/UV Analysis for Paraquat and Diquat

Download your free copy from [www.restek.com](http://www.restek.com).

Applications Note  
lit. cat.# 580006

## Consistent resolution, retention times, and peak symmetry for paraquat and diquat on an Ultra Quat column.

