


Pharmacopeia Application eBook

SMALL MOLECULE ANALYSIS



Improve United States Pharmacopeia
(USP) method performance with
updated allowable adjustments

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This guide provides analysts with solutions to standard USP monographs and allows the incorporation of cutting edge and reproducible HPLC column technology to provide shorter separation times and improved resolution while meeting all the quality standards of the USP for years to come!

LC – Isocratic Elution

Component	United States Pharmacopeia (USP)
Stationary Phase	No change of the identity of the substituent permitted. <ul style="list-style-type: none"> No replacement of C18 by C8 Other physico chemical characteristics must be similar Change from totally porous (TPP) to superficially porous particles (SPP) is allowed
Particle Size and Column Length	Particle size (dp) and/or column length (L) can be adjusted, if the L/dp ratio remains constant or in the range between -25 % and +50 %. When switching to Core-Shell particles, other combinations of L and dp can be used, if the number of theoretical plates (N) is between -25 % and +50 % of the original column.
Column Internal Diameter	Can be adjusted as wanted. <ul style="list-style-type: none"> If a smaller internal diameter (ID) or particle size is used, extra column band broadening may need to be minimized by factors such as instrument connection, detector cell volume, sampling rate and injection volume
Flow Rate	± 50 % (after the adjustment due to changes in column ID and particle size) <ul style="list-style-type: none"> When particle size or column internal diameter is changed (e.g. from 4.6 mm ID and 5 µm at 1.0 mL/min to 3.0 mm ID and 3 µm), the flow rate is adjusted using the following equation: $F_2 = F_1 \times \frac{dc_2^2 \times dp_1}{dc_1^2 \times dp_2} = 1.0 \times \frac{3.0^2 \times 5}{4.6^2 \times 3} = 0.71 \text{ mL/min}$
Column Temperature	± 10 °C (where the operating temperature is specified).
Composition of the Mobile Phase	± 30 % (relative) for minor components, but no component is altered by more than 10 % absolute. A minor component comprises less or equal than (100/n) %, n being the total number of components of the mobile phase.
Mobile Phase pH	± 0.2
Concentration of Salts in the Buffer	± 10 %
Detector Wavelength	No adjustment permitted.
Injection Volume	When the column dimensions are changed, the following equation may be used for adjusting the injection volume: $V_{inj2} = V_{inj1} \times \frac{L_2 \times dc_2^2}{L_1 \times dc_1^2}$ Even in the absence of any column dimension change, it may be varied if the system suitability criteria remain within their established acceptability limits.

Source: European Pharmacopeia 11.0, Chapter 2.2.46. Chromatographic separation techniques, p. 86-96 and USP-NF 2022, General Chapter <621> Chromatography.

LC – Gradient Elution

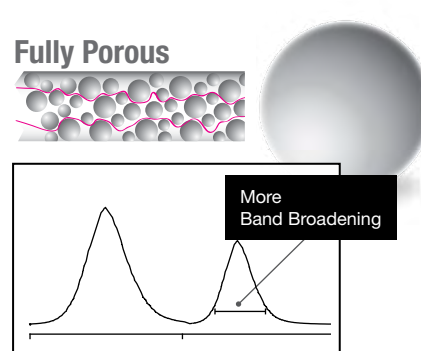
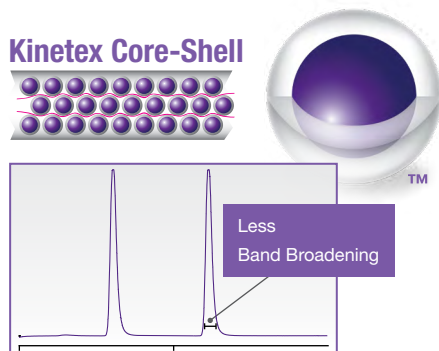
Component	United States Pharmacopeia (USP)
Stationary Phase	No change of the identity of the substituent permitted.
Particle Size and Column Length	Particle size (dp) and/or column length (L) can be adjusted, if the L/dp ratio remains constant or in the range between -25 % and +50 %. <ul style="list-style-type: none"> When switching to Core-Shell particles, other combinations of L and dp can be used, if the ratio (tr/Wh)² is between -25 % and +50 % of the original column, for each peak used to test the system suitability.
Column Internal Diameter	Can be adjusted as wanted.
Flow Rate	Is adjusted if column internal diameter and particle size is changed. <ul style="list-style-type: none"> When changing the column from 4.6 mm ID with 5 µm particle size at 2.0 mL/min to 2.1 mm ID with 3 µm particle size, the flow rate is adjusted using the following equation: $F_2 = F_1 \times \frac{dc_2^2 \times dp_1}{dc_1^2 \times dp_2} = 2.0 \times \frac{2.1^2 \times 5}{4.6^2 \times 3} = 0.7 \text{ mL/min}$
Gradient Volume	When changing the column dimension, each gradient segment volume is adjusted by means of the gradient time using the following equation: $t_{G2} = t_{G1} \times \frac{F_1}{F_2} \times \frac{L_2 \times dc_2^2}{L_1 \times dc_1^2} = 3 \text{ min} \times \frac{2.0}{0.7} \times \frac{100 \times 2.1^2}{150 \times 4.6^2} = 3 \text{ min} \times 0.4 = 1.2 \text{ min}$
Column Temperature	± 5 °C (where the operating temperature is specified).
Composition of the Mobile Phase + Gradient	Adjustments of the composition of the mobile phase and the gradient are acceptable, if: <ul style="list-style-type: none"> The system suitability criteria are fulfilled The principal peak(s) elute(s) within ± 15 % of the indicated retention time(s). This requirement does not apply when the column dimensions are changed The first peaks are sufficiently retained and the last peaks are eluted
Mobile Phase pH	± 0.2
Concentration of Salts in the Buffer	± 10 %
Dwell Volume	Gradient time points (t in min) can be adapted to compensate differences in dwell volume between the system used for method development (D ₀ in mL) and that actually used (D in mL). The adapted time points (t _c in min) at the current flow rate (F in mL/min) can be calculated using the following equation: $t_c = t - \frac{(D - D_0)}{F} = 1 \text{ min} - \frac{(1.0 \text{ mL} - 0.5 \text{ mL})}{1 \text{ mL/min}} = 0.5 \text{ min}$
Detector Wavelength	No adjustment permitted.
Injection Volume	When the column dimensions are changed, the following equation may be used for adjusting the injection volume: $V_{inj2} = V_{inj1} \times \frac{L_2 \times dc_2^2}{L_1 \times dc_1^2}$ Even in the absence of any column dimension change, injection volume may be varied if the system suitability criteria remain within their established acceptability limits When the injection volume is decreased, special attention is given to (limit of) detection and repeatability of the peak response(s). An increase is permitted, if the linearity and resolution of the peak(s) to be determined remain satisfactory

Why Choose Kinetex Core-Shell Columns?


- Performance Gains on Any LC System
- System-to-System and Lab-to-Lab Reproducibility
- Improve the Productivity of Older, Established Methods




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USP Technical Notes

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 [Robust Separation of Hydrochlorothiazide and Chlorothiazide in Hydrochlorothiazide Tablets Using Kinetex 5 µm C1](#)


 [Limit of Free Salicylic Acid in Aspirin Tablets Using Kinetex 5 µm C18 Under USP Allowable Adjustments](#)


 [Robust Separation of Hydroxychloroquine and Chloroquine in Hydroxychloroquine Sulfate Tablets Using Kinetex 5 µm C18](#)


 [Separation of Ibuprofen and Valerophenone Using Kinetex 5 µm C18 and Under USP Allowable Adjustments](#)

 [Separation of Lovastatin and Related Impurity with Kinetex 5 µm C18 Under USP Allowable Adjustments](#)


 [Separation of Clavulanate and Amoxicillin Using Kinetex 5 µm C18 and Under USP Allowable Adjustments](#)

 [Separation of Doxapram Hydrochloride and its Organic Impurities per USP Monograph](#)


 [Separation of Zolmitriptan and its Organic Impurities per USP Monograph](#)


 [Separation of Miconazole Nitrate and its Organic Impurities per USP Monograph using Kinetex 2.6 µm Phenyl-Hexyl Column](#)


- Reduce Run Times Without Re-Validation
- Achieve Higher Resolution
- Stay Within Allowable Adjustment


 [Assay of Doxepin Hydrochloride According to USP Monograph Using Three Different HPLC Columns](#)


 [Purity of Trihexyphenidyl Hydrochloride Tablets per USP Monograph using Kinetex 2.6 µm XB C18 Column](#)


 [Meeting and Surpassing System Suitability for USP Sildenafil Tablets Assay and Organic Impurities Using Kinetex Core-Shell and Luna™ Omega HPLC/UHPLC Columns](#)

 [Meeting and Surpassing System Suitability for USP Sildenafil Citrate Assay and Organic Impurities Using Kinetex Core-Shell and Luna Omega HPLC/UHPLC Columns](#)

 [USP Tadalafil Assay on Luna 5 µm C8\(2\) and Kinetex 5 µm C8](#)

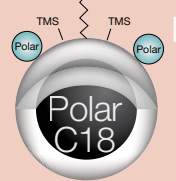
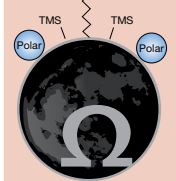
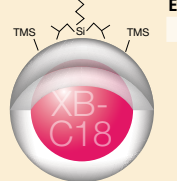

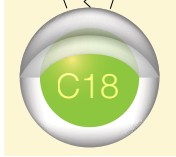

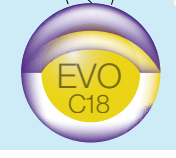
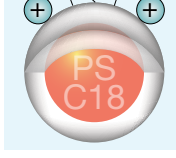

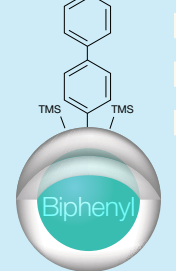
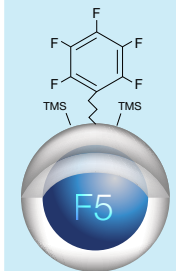
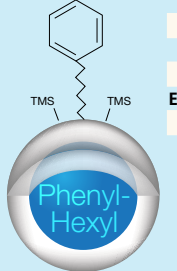
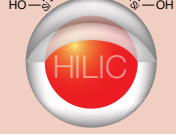


 [USP Colchicine Assay on Luna 5 µm C8\(2\) and Kinetex 5 µm C8](#)

 [Irbesartan Organic Impurities/Related Substances](#)

 [USP Albuterol Inhalation Solution Assay Using a Kinetex 2.6 µm C18 and Organic Impurities](#)

From UHPLC to HPLC Selectivity Recommendations

Kinetex Core-Shell Technology and Luna Omega Thermally Modified Particle Technology are the perfect combination to improve efficiency and resolution, while offering a wide selection of column chemistries to boost performance for UHPLC, HPLC, and Preparative HPLC methods.

Polar Acids		Acidic Compounds	
<p>Kinetex™ Polar C18</p> <p>pH Range: 1.5 - 8.5*</p> <p>USP Classification: L1</p> <p>Effective Carbon Load: 9 %</p> 	<p>Luna™ Omega Polar C18</p> <p>pH Range: 1.5 - 8.5*</p> <p>USP Classification: L1</p> <p>Effective Carbon Load: 9 %</p> 	<p>Kinetex XB-C18</p> <p>pH Range: 1.5 - 8.5*</p> <p>USP Classification: L1</p> <p>Effective Carbon Load: 10 %</p> 	
Hydrophobic Compounds		Extremely Hydrophobic	
<p>Luna Omega C18</p> <p>pH Range: 1.5 - 8.5*</p> <p>USP Classification: L1</p> <p>Effective Carbon Load: 11 %</p> 	<p>Kinetex C18</p> <p>pH Range: 1.5 - 8.5*</p> <p>USP Classification: L1</p> <p>Effective Carbon Load: 12 %</p> 	<p>Kinetex C8</p> <p>pH Range: 1.5 - 8.5*</p> <p>USP Classification: L7</p> <p>Effective Carbon Load: 8 %</p> 	
Alkaline Conditions		Polar Bases	
<p>Kinetex EVO C18</p> <p>pH Range: 1 - 12*</p> <p>USP Classification: L1</p> <p>Effective Carbon Load: 11 %</p> 	<p>Kinetex PS C18</p> <p>pH Range: 1.5 - 8.5*</p> <p>USP Classification: L1</p> <p>Effective Carbon Load: 9 %</p> 	<p>Luna Omega PS C18</p> <p>pH Range: 1.5 - 8.5*</p> <p>USP Classification: L1</p> <p>Effective Carbon Load: 9 %</p> 	
Closely Related Compounds & Aromatic Hydrocarbons			
<p>Kinetex Biphenyl</p> <p>pH Range: 1.5 - 8.5*</p> <p>USP Classification: L11</p> <p>Effective Carbon Load: 11 %</p> 	<p>Kinetex F5</p> <p>pH Range: 1.5 - 8.5*</p> <p>USP Classification: L43</p> <p>Effective Carbon Load: 9 %</p> 	<p>Kinetex Phenyl-Hexyl</p> <p>pH Range: 1.5 - 8.5*</p> <p>USP Classification: L11</p> <p>Effective Carbon Load: 11 %</p> 	
Extremely Polar		PAH Compounds	
<p>Kinetex HILIC</p> <p>pH Range: 2.0 - 7.5</p> <p>USP Classification: L3</p> <p>Effective Carbon Load: —</p> 	<p>Kinetex PAH</p> <p>pH Range: 1.5 - 8.5*</p> <p>USP Classification: L118</p> <p>Effective Carbon Load: 12 %</p> 	<p>Luna Omega SUGAR</p> <p>pH Range: 2.0 - 7.0</p> <p>USP Classification: L8</p> <p>Effective Carbon Load: < 2%</p> 	

*Columns are pH stable from 1.5-10 under isocratic conditions. Columns are pH stable 1.5-8.5 under gradient conditions.

5 µm Minibore Columns (mm)				SecurityGuard™ ULTRA Cartridges [†]	
Phases	30 x 2.1	50 x 2.1	100 x 2.1	150 x 2.1	3/pk
EVO C18	00A-4633-AN	00B-4633-AN	00D-4633-AN	00F-4633-AN	AJ0-9298
F5	—	00B-4724-AN	00D-4724-AN	00F-4724-AN	AJ0-9322
Biphenyl	00A-4627-AN	00B-4627-AN	00D-4627-AN	—	AJ0-9209
XB-C18	00A-4605-AN	00B-4605-AN	00D-4605-AN	—	AJ0-8782
C18	00A-4601-AN	00B-4601-AN	00D-4601-AN	00F-4601-AN	AJ0-8782
C8	—	00B-4608-AN	00D-4608-AN	—	AJ0-8784
Phenyl-Hexyl	—	00B-4603-AN	—	—	AJ0-8788
HILIC	—	00B-4606-AN	—	—	AJ0-8786

for 2.1 mm ID

5 µm MidBore™ Columns (mm)				SecurityGuard ULTRA Cartridges [†]	
Phases	30 x 3.0	50 x 3.0	100 x 3.0	150 x 3.0	3/pk
EVO C18	00A-4633-YO	00B-4633-YO	00D-4633-YO	00F-4633-YO	AJ0-9297
F5	—	—	00D-4724-YO	00F-4724-YO	AJ0-9321
Biphenyl	—	00B-4627-YO	00D-4627-YO	00F-4627-YO	AJ0-9208
XB-C18	—	00B-4605-YO	00D-4605-YO	00F-4605-YO	AJ0-8775
C18	00A-4601-YO	00B-4601-YO	00D-4601-YO	00F-4601-YO	AJ0-8775
C8	—	00B-4608-YO	00D-4608-YO	—	AJ0-8777
Phenyl-Hexyl	—	00B-4603-YO	00D-4603-YO	—	AJ0-8781

for 3.0 mm ID

5 µm Analytical Columns (mm)					SecurityGuard ULTRA Cartridges [†]
Phases	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	3/pk
EVO C18	00B-4633-E0	00D-4633-E0	00F-4633-E0	00G-4633-E0	AJ0-9296
F5	00B-4724-E0	00D-4724-E0	00F-4724-E0	00G-4724-E0	AJ0-9320
Biphenyl	00B-4627-E0	00D-4627-E0	00F-4627-E0	00G-4627-E0	AJ0-9207
XB-C18	00B-4605-E0	00D-4605-E0	00F-4605-E0	00G-4605-E0	AJ0-8768
C18	00B-4601-E0	00D-4601-E0	00F-4601-E0	00G-4601-E0	AJ0-8768
C8	00B-4608-E0	00D-4608-E0	00F-4608-E0	00G-4608-E0	AJ0-8770
Phenyl-Hexyl	00B-4603-E0	00D-4603-E0	00F-4603-E0	00G-4603-E0	AJ0-8774
HILIC	—	—	00F-4606-E0	00G-4606-E0	AJ0-8772

for 4.6 mm ID

5 µm Semi-Preparative Columns (mm)				SecurityGuard SemiPrep Cartridges***
Phases	100 x 10	150 x 10	250 x 10	10 x 10
EVO C18	—	00F-4633-NO	00G-4633-NO	AJ0-9306
F5	—	—	00G-4724-NO	AJ0-9323
C18	00D-4601-NO	00F-4601-NO	00G-4601-NO	AJ0-9278
Biphenyl	—	00F-4627-NO	00G-4627-NO	AJ0-9280
XB-C18	—	00F-4605-NO	00G-4605-NO	AJ0-9278

for 9-16 mm ID

5 µm Axia™ Packed Preparative Columns (mm)					SecurityGuard PREP Cartridges [†]
Phases	50 x 21.2	100 x 21.2	150 x 21.2	250 x 21.2	15 x 21.2
EVO C18	00B-4633-P0-AX	00D-4633-P0-AX	00F-4633-P0-AX	00G-4633-P0-AX	AJ0-9304
F5	—	—	00F-4724-P0-AX	00G-4724-P0-AX	AJ0-9324
Biphenyl	00B-4627-P0-AX	00D-4627-P0-AX	00F-4627-P0-AX	00G-4627-P0-AX	AJ0-9272
XB-C18	00B-4605-P0-AX	00D-4605-P0-AX	00F-4605-P0-AX	00G-4605-P0-AX	AJ0-9145
C18	00B-4601-P0-AX	00D-4601-P0-AX	00F-4601-P0-AX	00G-4601-P0-AX	AJ0-9145
C8	00B-4608-P0-AX	00D-4608-P0-AX	00F-4608-P0-AX	00G-4608-P0-AX	AJ0-9205
Phenyl-Hexyl	00B-4603-P0-AX	00D-4603-P0-AX	00F-4603-P0-AX	00G-4603-P0-AX	AJ0-9147
HILIC	—	00D-4606-P0-AX	00F-4606-P0-AX	00G-4606-P0-AX	AJ0-9277

for 18-29 mm ID

5 µm Axia Packed Preparative Columns (mm)					SecurityGuard PREP Cartridges**
Phases	50 x 30	100 x 30	150 x 30	250 x 30	15 x 30
EVO C18	00B-4633-U0-AX	00D-4633-U0-AX	00F-4633-U0-AX	00G-4633-U0-AX	AJ0-9305
F5	00B-4724-U0-AX	00D-4724-U0-AX	00F-4724-U0-AX	—	AJ0-9325
Biphenyl	—	—	00F-4627-U0-AX	00G-4627-U0-AX	AJ0-9273
XB-C18	00B-4605-U0-AX	00D-4605-U0-AX	00F-4605-U0-AX	00G-4605-U0-AX	AJ0-9204
C18	00B-4601-U0-AX	00D-4601-U0-AX	00F-4601-U0-AX	00G-4601-U0-AX	AJ0-9204
C8	00B-4608-U0-AX	00D-4608-U0-AX	00F-4608-U0-AX	00G-4608-U0-AX	AJ0-9217
Phenyl-Hexyl	00B-4603-U0-AX	00D-4603-U0-AX	00F-4603-U0-AX	00G-4603-U0-AX	AJ0-9216
HILIC	—	—	00D-4606-U0-AX	—	—

for 30-49 mm ID

3.5 µm Minibore, MidBore™, and Analytical Columns (mm)							SecurityGuard™ ULTRA Cartridges [†]		
Phases	50 x 2.1	150 x 2.1	100 x 3.0	100 x 4.6	150 x 4.6	250 x 4.6	3/pk	3/pk	3/pk
XB-C18	—	—	—	00D-4744-E0	00F-4744-E0	—	—	—	AJ0-8768
PAH	00B-4764-AN	00F-4764-AN	00D-4764-YO	00D-4764-E0	00F-4764-E0	00G-4764-E0	AJ0-9535	AJ0-9534	AJ0-9533

for 2.1 mm ID for 3.0 mm ID for 4.6 mm ID

[†] SecurityGuard ULTRA Cartridges require holder, Part No.: [AJ0-9000](#)
^{**} SemiPrep SecurityGuard Cartridges require holder, Part No.: [AJ0-9281](#)
^{**} PREP SecurityGuard Cartridges require holder, Part No.: [AJ0-9277](#)
^{**} PREP SecurityGuard Cartridges require holder, Part No.: [AJ0-9223](#)

2.6 µm Micro LC Columns (mm)						
Phases	30 x 0.3	50 x 0.3	100 x 0.3	150 x 0.3	50 x 0.5	150 x 0.5
Biphenyl	—	00B-4622-AC	—	00F-4622-AC	00B-4622-AF	—
C18	00A-4462-AC	00B-4462-AC	—	00F-4462-AC	00B-4462-AF	—
EVO C18	—	00B-4725-AC	—	00F-4725-AC	00B-4725-AF	—
F5	—	00B-4723-AC	00D-4723-AC	00F-4723-AC	00B-4723-AF	—
XB-C18	00A-4496-AC	00B-4496-AC	00D-4496-AC	00F-4496-AC	00B-4496-AF	00F-4496-AF

2.6 µm Microbore Columns (mm)			
Phases	50 x 1.0	100 x 1.0	150 x 1.0
C18	00B-4462-A0	—	—
XB-C18	00B-4496-A0	00D-4496-A0	00F-4496-A0

2.6 µm Minibore Columns (mm)						SecurityGuard ULTRA Cartridges [‡]
Phases	30 x 2.1	50 x 2.1	75 x 2.1	100 x 2.1	150 x 2.1	3/pk
EVO C18	00A-4725-AN	00B-4725-AN	—	00D-4725-AN	00F-4725-AN	AJ0-9298
PS C18	00A-4780-AN	00B-4780-AN	—	00D-4780-AN	00F-4780-AN	AJ0-8951
Polar C18	00A-4759-AN	00B-4759-AN	—	00D-4759-AN	00F-4759-AN	AJ0-9532
F5	00A-4723-AN	00B-4723-AN	—	00D-4723-AN	00F-4723-AN	AJ0-9322
Biphenyl	00A-4622-AN	00B-4622-AN	—	00D-4622-AN	00F-4622-AN	AJ0-9209
XB-C18	00A-4496-AN	00B-4496-AN	00C-4496-AN	00D-4496-AN	00F-4496-AN	AJ0-8782
C18	00A-4462-AN	00B-4462-AN	00C-4462-AN	00D-4462-AN	00F-4462-AN	AJ0-8782
C8	00A-4497-AN	00B-4497-AN	00C-4497-AN	00D-4497-AN	00F-4497-AN	AJ0-8784
HILIC	00A-4461-AN	00B-4461-AN	00C-4461-AN	00D-4461-AN	00F-4461-AN	AJ0-8786
Phenyl-Hexyl	00A-4495-AN	00B-4495-AN	00C-4495-AN	00D-4495-AN	00F-4495-AN	AJ0-8788

for 2.1 mm ID

2.6 µm MidBore™ Columns (mm)						SecurityGuard ULTRA Cartridges [‡]
Phases	30 x 3.0	50 x 3.0	75 x 3.0	100 x 3.0	150 x 3.0	3/pk
EVO C18	00A-4725-Y0	00B-4725-Y0	—	00D-4725-Y0	00F-4725-Y0	AJ0-9297
PS C18	00B-4780-Y0	00D-4780-Y0	—	00D-4780-Y0	00F-4780-Y0	AJ0-8950
Polar C18	—	00B-4759-Y0	—	00D-4759-Y0	00F-4759-Y0	AJ0-9531
F5	—	00B-4723-Y0	—	00D-4723-Y0	00F-4723-Y0	AJ0-9321
Biphenyl	—	00B-4622-Y0	—	00D-4622-Y0	00F-4622-Y0	AJ0-9208
XB-C18	00A-4496-Y0	00B-4496-Y0	00C-4496-Y0	00D-4496-Y0	00F-4496-Y0	AJ0-8775
C18	00A-4462-Y0	00B-4462-Y0	00C-4462-Y0	00D-4462-Y0	00F-4462-Y0	AJ0-8775
C8	00A-4497-Y0	00B-4497-Y0	00C-4497-Y0	00D-4497-Y0	00F-4497-Y0	AJ0-8777
HILIC	00A-4461-Y0	—	—	00D-4461-Y0	00F-4461-Y0	AJ0-8779
Phenyl-Hexyl	—	00B-4495-Y0	—	00D-4495-Y0	00F-4495-Y0	AJ0-8781

for 3.0 mm ID

2.6 µm Analytical Columns (mm)							SecurityGuard ULTRA Cartridges [‡]
Phases	30 x 4.6	50 x 4.6	75 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	3/pk
EVO C18	00A-4725-E0	00B-4725-E0	—	00D-4725-E0	00F-4725-E0	00G-4725-E0	AJ0-9296
PS C18	00A-4780-E0	00B-4780-E0	—	00D-4780-E0	00F-4780-E0	00G-4780-E0	AJ0-8949
Polar C18	00A-4759-E0	00B-4759-E0	—	00D-4759-E0	00F-4759-E0	—	AJ0-9532
F5	00A-4723-E0	00B-4723-E0	—	00D-4723-E0	00F-4723-E0	—	AJ0-9320
Biphenyl	—	00B-4622-E0	—	00D-4622-E0	00F-4622-E0	—	AJ0-9207
XB-C18	—	00B-4496-E0	00C-4496-E0	00D-4496-E0	00F-4496-E0	—	AJ0-8768
C18	00A-4462-E0	00B-4462-E0	00C-4462-E0	00D-4462-E0	00F-4462-E0	—	AJ0-8768
C8	—	00B-4497-E0	00C-4497-E0	00D-4497-E0	00F-4497-E0	—	AJ0-8770
HILIC	—	00B-4461-E0	00C-4461-E0	00D-4461-E0	00F-4461-E0	—	AJ0-8772
Phenyl-Hexyl	—	00B-4495-E0	00C-4495-E0	00D-4495-E0	00F-4495-E0	—	AJ0-8774

for 4.6 mm ID

1.7 µm Minibore Columns (mm)						SecurityGuard™ ULTRA Cartridges [‡]
Phases	30 x 2.1	50 x 2.1	100 x 2.1	150 x 2.1	3/pk	
EVO C18	—	00B-4726-AN	00D-4726-AN	00F-4726-AN	AJ0-9298	
F5	—	00B-4722-AN	00D-4722-AN	00F-4722-AN	AJ0-9322	
Biphenyl	00A-4628-AN	00B-4628-AN	00D-4628-AN	00F-4628-AN	AJ0-9209	
XB-C18	00A-4498-AN	00B-4498-AN	00D-4498-AN	00F-4498-AN	AJ0-8782	
C18	00A-4475-AN	00B-4475-AN	00D-4475-AN	00F-4475-AN	AJ0-8782	
C8	00A-4499-AN	00B-4499-AN	00D-4499-AN	00F-4499-AN	AJ0-8784	
HILIC	00A-4474-AN	00B-4474-AN	00D-4474-AN	—	AJ0-8786	
Phenyl-Hexyl	—	00B-4500-AN	00D-4500-AN	00F-4500-AN	AJ0-8788	

for 2.1 mm ID

1.7 µm MidBore™ Columns (mm)				1.7 µm Microbore Columns (mm)				
Phases	30 x 3.0	50 x 3.0	100 x 3.0	3/pk	Phases	50 x 1.0	100 x 1.0	150 x 1.0
XB-C18	00A-4498-Y0	00B-4498-Y0	00D-4498-Y0	AJ0-8775	EVO C18	00B-4726-A0	00D-4726-A0	00F-4726-A0
C18	—	00B-4475-Y0	00D-4475-Y0	AJ0-8775	Biphenyl	00B-4628-A0	00D-4628-A0	—
C8	00A-4499-Y0	00B-4499-Y0	00D-4499-Y0	AJ0-8777				
Phenyl	—	—	00D-4500-Y0	AJ0-8781				
HILIC	—	00B-4474-Y0	—	AJ0-8779				

for 3.0 mm ID

1.3 µm Minibore Columns (mm)		
Phases	30 x 2.1	50 x 2.1
C18	00A-4515-AN	00B-4515-AN



1.6 µm Microbore Columns (mm)			
Phases	50 x 1.0	100 x 1.0	150 x 1.0
Polar C18	00B-4748-AQ	00D-4748-AQ	00F-4748-AQ
PS C18	—	00D-4752-AQ	—
C18	00B-4742-AQ	00D-4742-AQ	00F-4742-AQ

1.6 µm Minibore Columns (mm)				SecurityGuard™ ULTRA Cartridges*	
Phases	30 x 2.1	50 x 2.1	100 x 2.1	150 x 2.1	3/pk
Polar C18	00A-4748-AN	00B-4748-AN	00D-4748-AN	00F-4748-AN	AJ0-9505
PS C18	00A-4752-AN	00B-4752-AN	00D-4752-AN	00F-4752-AN	AJ0-9508
C18	00A-4742-AN	00B-4742-AN	00D-4742-AN	00F-4742-AN	AJ0-9502

for 2.1 mm ID

3 µm Micro LC Columns (mm)							Trap Column
Phases	50 x 0.30	100 x 0.30	150 x 0.30	50 x 0.50	100 x 0.50	150 x 0.50	20 x 0.30
Polar C18	00B-4760-AC	00D-4760-AC	00F-4760-AC	00B-4760-AF	00D-4760-AF	00F-4760-AF	—
PS C18	00B-4758-AC	00D-4758-AC	00F-4758-AC	00B-4758-AF	00D-4758-AF	00F-4758-AF	05M-4758-AC

3 µm Minibore Columns (mm)				SecurityGuard Cartridges (mm)	
Phases	30 x 2.1	50 x 2.1	100 x 2.1	150 x 2.1	4 x 2.0* /10 pk
Polar C18	00A-4760-AN	00B-4760-AN	00D-4760-AN	00F-4760-AN	AJ0-7600
PS C18	00A-4758-AN	00B-4758-AN	00D-4758-AN	00F-4758-AN	AJ0-7605
C18	—	00B-4784-AN	00D-4784-AN	00F-4784-AN	AJ0-7611
SUGAR	—	00B-4775-AN	00D-4775-AN	00F-4775-AN	AJ0-4496

for ID: 2.0-3.0 mm

3 µm MidBore™ Columns (mm) (cont'd)				SecurityGuard Cartridges (mm)	
Phases	50 x 3.0	100 x 3.0	150 x 3.0	4 x 2.0* /10 pk	
Polar C18	00B-4760-YO	00D-4760-YO	00F-4760-YO	AJ0-7600	
PS C18	00B-4758-YO	00D-4758-YO	00F-4758-YO	AJ0-7605	
C18	00B-4784-YO	00D-4784-YO	00F-4784-YO	AJ0-7611	
SUGAR	—	—	00F-4775-YO	AJ0-4496	

for ID: 2.0-3.0 mm

3 µm Analytical Columns (mm)				SecurityGuard Cartridges (mm)	
Phases	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	4 x 3.0* /10 pk
Polar C18	00B-4760-EQ	00D-4760-EQ	00F-4760-EQ	00G-4760-EQ	AJ0-7601
PS C18	00B-4758-EQ	00D-4758-EQ	00F-4758-EQ	00G-4758-EQ	AJ0-7606
C18	00B-4784-EQ	00D-4784-EQ	00F-4784-EQ	00G-4784-EQ	AJ0-7612
SUGAR	—	00D-4775-EQ	00F-4775-EQ	00G-4775-EQ	AJ0-4495

for ID: 3.2-8.0 mm

5 µm Minibore and MidBore™ Columns (mm)					SecurityGuard Cartridges (mm)		
Phases	50 x 2.1	100 x 2.1	150 x 2.1	50 x 3.0	100 x 3.0	150 x 3.0	4 x 2.0* /10 pk
Polar C18	00B-4754-AN	00D-4754-AN	00F-4754-AN	00B-4754-YO	00D-4754-YO	00F-4754-YO	AJ0-7600
PS C18	00B-4753-AN	00D-4753-AN	00F-4753-AN	00B-4753-YO	00D-4753-YO	00F-4753-YO	AJ0-7605

for ID: 2.0 - 3.0 mm

5 µm Analytical Columns (mm)				SecurityGuard Cartridges (mm)	
Phases	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	4 x 3.0* /10 pk
Polar C18	00B-4754-EQ	00D-4754-EQ	00F-4754-EQ	00G-4754-EQ	AJ0-7601
PS C18	00B-4753-EQ	00D-4753-EQ	00F-4753-EQ	00G-4753-EQ	AJ0-7606
C18	00B-4785-EQ	00D-4785-EQ	00F-4785-EQ	00G-4785-EQ	AJ0-7612

for ID: 3.2-8.0 mm

5 µm Semi-Preparative Columns (mm)		SecurityGuard Cartridges (mm)	
Phases	250 x 10	10 x 10** /3 pk	
Polar C18	00G-4754-NQ	AJ0-9519	
PS C18	00G-4753-NQ	AJ0-9520	

for ID: 9-16 mm

5 µm Axia™ Packed Preparative Columns (mm)				SecurityGuard Cartridges (mm)	
Phases	50 x 21.2	100 x 21.2	150 x 21.2	250 x 21.2	15 x 21.2** /ea
Polar C18	00B-4754-PQ-AX	00D-4754-PQ-AX	00F-4754-PQ-AX	00G-4754-PQ-AX	AJ0-7603
PS C18	00B-4753-PQ-AX	00D-4753-PQ-AX	00F-4753-PQ-AX	00G-4753-PQ-AX	AJ0-7608
C18	—	—	—	00G-4785-PQ-AX	—

for ID: 18-29 mm

5 µm Axia™ Packed Preparative Columns (mm) (cont'd)				SecurityGuard Cartridges (mm)	
Phases	100 x 30	150 x 30	250 x 30	250 x 50	15 x 30.0* /ea
Polar C18	00D-4754-UQ-AX	00F-4754-UQ-AX	00G-4754-UQ-AX	00G-4754-VQ-AX	AJ0-7604
PS C18	00D-4753-UQ-AX	00F-4753-UQ-AX	00G-4753-UQ-AX	00G-4753-VQ-AX	AJ0-7609

for ID: 30-49 mm

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