

## Chiral LC

Chiral LC Column Types.....	188
Polysaccharide Chiral Columns.....	301
<b>Lux</b> .....	301
Additional Chiral LC Columns	
Chirex .....	232
Ultron ES .....	354

## HPLC Column Selection

Column Selection Tree .....	189
Column Selection by Application .....	190
Column Selection by Manufacturer .....	191 -192
Column Selection by Separation Mode.....	193
Column Selection by USP Specifications .....	194-197
Column Selection by Ph. Eur. Listing .....	198-203

## HPLC Column Protection

Column Performance Check Standards .....	424-425
SecurityGuard Cartridge System.....	330

## HPLC/UHPLC Columns

<b>Aeris</b> .....	204
Aqua.....	208
<b>Axia Packed Columns</b> .....	384
BioSep .....	209
<b>Biozen</b> .....	210
Bondclone.....	231
Chirex.....	232
<b>Clarity</b> .....	404
<b>Gemini</b> .....	234
HyperClone.....	241
InertClone .....	243
Jupiter .....	244
<b>Kinetex</b> .....	246
LiChrosorb .....	275
LiChrospher .....	275
<b>Luna</b> .....	276
<b>Luna Omega</b> .....	290
<b>Lux</b> .....	301
<b>Lux AMP</b> .....	311
<b>Onyx</b> .....	313
<b>Phenogel</b> .....	315
PolymerX.....	321
PolySep-GFC-P .....	322
PREP/Preparative .....	383
Prodigy.....	323
<b>Rezex</b> .....	324

<b>SecurityGuard</b> .....	330
<b>SecurityGuard ULTRA</b> .....	335
Shodex.....	338
SphereClone .....	341
<b>Synergi</b> .....	343
Ultracarb .....	354
Ultremex.....	354
<b>Yarra</b> .....	356

## HPLC Accessories and Lab Safety .....

<b>SecurityCAP LC Solvent Safety Products</b> .....	417-418
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## Nano and Micro LC

<b>Biozen Nano</b> .....	225
Micro LC Columns, Traps, and Fittings.....	359

## Proteins/Peptides

Aeris .....	204
BioSep .....	209
Biozen .....	210
Jupiter .....	244
Yarra .....	356
Yarra PREP .....	358

## UHPLC Columns

Biozen for Analysis of Biologics .....	210
Kinetex 1.3 $\mu$ m, 1.7 $\mu$ m and 2.6 $\mu$ m Core-Shell Technology Columns.....	246
Luna Omega 1.6 $\mu$ m Fully Porous Columns .....	290
Aeris Core-Shell Technology for RP-LC of Proteins & Peptides.....	204
Clarity Core-Shell Columns for Synthetic DNA/RNA .....	404
SecurityGuard ULTRA Column Protection .....	335



186 - 362

“ At first, I honestly didn't believe the marketing claim that their Core-Shell 5 $\mu$  particles had greater efficiency than fully porous 3 $\mu$  particles. But wow! Now I can issue my awesome, cutting edge chromatography, and QC can have their jumbo, 5 $\mu$ , abuse-proof particles. Everybody wins.”

**Chester Chan**  
**Nexgen Pharma, USA**

The opinions stated herein are solely those of the speaker and not necessarily those of any company or organization.

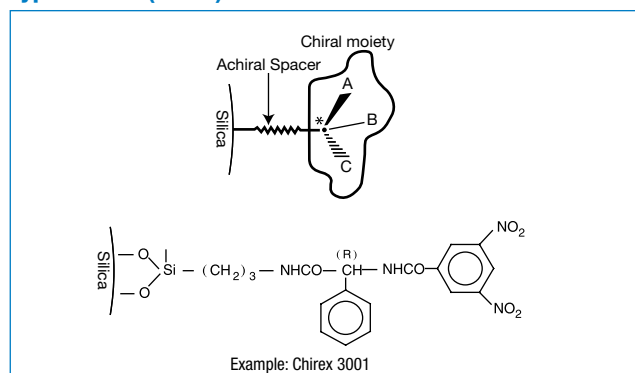
# Chiral LC Column Types

## LC Chiral Stationary Phase (CSP) Classification Diagram

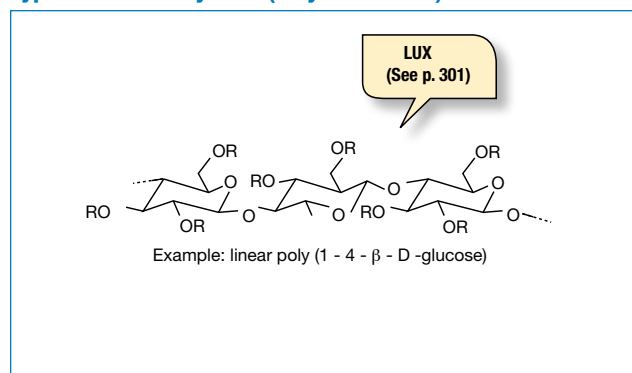
Type	Description	Chemistry	Mechanism	Brands	Page
I	Brush (Pirkle)	Low molecular weight chiral selectors Ionic or covalent bonding	Attractive interactions Hydrogen bonding Charge transfer ( $\pi$ - $\pi$ interaction) Dipole stacking	Chirex Sumichiral OA	232 Inquire
II	Helical Polymers	Cellulose and amylose derivatives	Attractive interactives Insertion complexes	Lux Cellulose and Amylose	301
III	Cavity	Cyclodextrins, Crown ether	Inclusion complexes	Chiral CD-Ph Sumichiral OA	Inquire Inquire
IV	Ligand Exchange	Amino acid-metal complex	Diastereomeric metal complex	Chirex Sumichiral OA	232 Inquire
V	Protein	$\alpha$ -acid glycoprotein Bovine Serum Albumin	Hydrophobic interactions Polar interactions	Ultron ES	354
VI	Macrocyclic	Antibiotics Glycopeptides	Hydrogen bonding Charge transfer ( $\pi$ - $\pi$ interaction) Inclusion complexation Ionic interactions Peptide bonding	None	

**Other Types** Carbon-Based (Hypercarb) and Ceramic-based (Ceramospher)

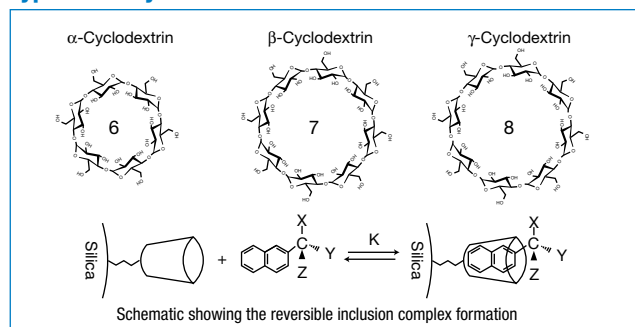
### Type I Brush (Pirkle)



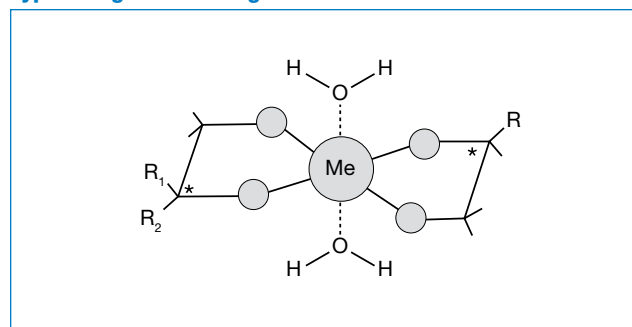
### Type II Helical Polymers (Polysaccharide)



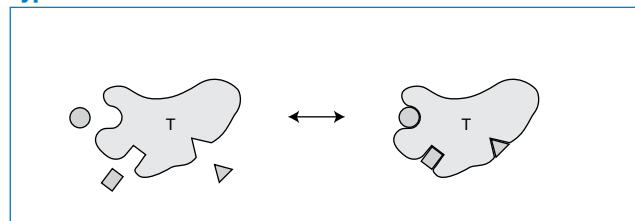
### Type III Cavity



### Type IV Ligand Exchange



### Type V Protein





# HPLC Column Selection Tree

Sample MW	Sample Solubility	Separation Mode	Our Recommended Column	Page
MW < 5000	Organic-Soluble	Hexane-Soluble	Normal Phase Adsorption	Kinetex HILIC _____ 246 Luna Silica(2) _____ 276
			Normal Phase Bonded	Luna CN, NH <sub>2</sub> , HILIC _____ 276
		Methanol/Methanol/H <sub>2</sub> O Soluble	Reversed Phase Bonded	Kinetex C18, EVO C18, XB-C18, C8, Phenyl-Hexyl, Biphenyl, F5, Polar C18, PS C18 _____ 246
				Synergi Max-RP, Fusion-RP _____ 343 Luna C8(2), C18(2) _____ 276
		THF-Soluble	Chiral	Luna Omega C18, Omega PS C18, Omega Polar C18 _____ 290
	Gemini C18, NX-C18, C6-Phenyl _____ 234			
	Aqueous-Soluble	Non ionic	Gel Permeation GPC	Lux _____ 301
				Phenogel 50 Å, 100 Å _____ 315
			Reversed Phase	Kinetex C18, EVO C18, XB-C18, C8, Phenyl-Hexyl, Biphenyl, F5, Polar C18, PS C18 _____ 246
				Synergi Polar-RP, Hydro-RP _____ 343
				Luna C8(2), C18(2), Luna PFP(2) _____ 276
		Chiral	Luna Omega C18, Omega PS C18, Omega Polar C18 _____ 290	
			Gemini C18, NX-C18 _____ 234 Onyx C18 _____ 313	
		Ionic	Ion Pairing / Reversed Phase	Lux _____ 301
				Kinetex C18, EVO C18, XB-C18, C8, Polar C18, PS C18 _____ 246
Ion-Exchange			Synergi Max-RP, Hydro-RP _____ 343	
	Luna C8(2), C18(2) _____ 276			
	Luna Omega C18, Omega PS C18, Omega Polar C18 _____ 290			
HILIC	Gemini C18, NX-C18 _____ 234			
	Onyx C18 _____ 313			
Peptides	Chiral	Biozen WCX _____ 210		
		Luna SCX, NH <sub>2</sub> _____ 276 PhenoSphere SAX _____ Inquire		
MW > 5000	Organic-Soluble	Gel Permeation Chromatography (GPC)	Kinetex HILIC _____ 246	
			Luna HILIC, NH <sub>2</sub> , Silica(2) _____ 276	
			Biozen Glycan _____ 210	
			Luna Omega SUGAR _____ 290	
			Lux _____ 301 Chirex _____ 232	
	Aqueous-Soluble	Gel Filtration Aqueous GFC/SEC	Unknown MW Range	Biozen Peptide PS-C18, XB-C18 _____ 210
				Aeris PEPTIDE _____ 204
			Jupiter Proteo _____ 244	
			Known MW Range	Phenogel Linear (2) _____ 315
				Shodex GPC _____ Inquire
		Specific Pore: Phenogel _____ 315 Shodex GPC _____ Inquire		
		Ion-Exchange	pH 2-7.5	Biozen dSEC-2 _____ 210
				Yarra SEC Series _____ 355
			pH > 7.5	BioSep-SEC-S Series _____ 209
				PolySep-GFC-P _____ 322
Cation-Exchange	Biozen WCX _____ 210			
Anion-Exchange	Luna SCX _____ 276			
	Shodex IEC DEAE _____ 338			
Reversed Phase	pH 2-9	Biozen Intact XB-C8 _____ 210		
		Aeris WIDEPOR C4, XB-C8, XB-C18 _____ 204		
	Jupiter 300 C4, C5, C18 _____ 244			
Hydrophobic Interaction (HIC)	pH > 9	Hamilton PRP-3 _____ Inquire		
		Shodex HIC _____ 338		



# HPLC Column Selection by Application

This table is to aid you in selecting the right column for your application. For application notes or method development assistance please call your technical representative.

Amino Acids	Page
Phenomenex Chirex (chiral)	232
Phenomenex Lux (chiral)	301
Phenomenex Kinetex EVO C18 ( FMOC or OPA derivatized)	246
Anions	
Phenomenex Luna NH <sub>2</sub>	276
Phenomenex Lux (chiral)	301
Phenomenex PhenoSphere SAX	Inquire
Hamilton PRP	Inquire
Shodex IC	338
Phenomenex Rezex ROA-Organic Acid	324
Antibiotics	
Phenomenex Kinetex	246
Phenomenex Gemini / Gemini NX	234
Phenomenex Luna	276
Phenomenex Luna Omega	290
Phenomenex Synergi	343
Biotechnology/Life Sciences	
Phenomenex Aeris WIDEPORE/PEPTIDE	204
Phenomenex Biozen WidePore C4	210
Phenomenex Biozen Intact XB-C8	210
Phenomenex Clarity	404
Phenomenex Jupiter 300/Jupiter Proteo	244
Phenomenex Biozen dSEC-2	210
Phenomenex BioSep-SEC-S	209
Phenomenex Yarra SEC	355
Phenomenex PolySep-GFC-P	322
Phenomenex Luna SCX	276
Phenomenex Biozen Peptide PS-C18/XB-C18	210
Phenomenex Luna NH <sub>2</sub>	276
Phenomenex Biozen Glycan	210
Phenomenex Biozen WCX	210
Shodex GFC, KW	338
Carbohydrates	
Phenomenex Rezex	324
Phenomenex Luna Omega SUGAR	290
Phenomenex Luna NH <sub>2</sub>	276
Shodex SUGAR	338
Cations	
Phenomenex Luna SCX	276
Phenomenex Biozen WCX	210
Hamilton PRP	Inquire
Enantiomers (Chiral)	
Phenomenex Lux	301
Phenomenex Chirex	232
Environmental (Carbamates, PAHs, Explosives)	
Phenomenex Zebron (GC)	87
Phenomenex Kinetex	246
Phenomenex Gemini / Gemini NX	234
Phenomenex Luna	276
Phenomenex Luna Omega	290
Phenomenex Synergi	343
Foods, Flavors and Fragrances	
Phenomenex Rezex	324
Phenomenex Kinetex	246
Phenomenex Gemini / Gemini NX	234
Phenomenex Luna	276
Phenomenex Luna Omega SUGAR	290
Phenomenex Lux (chiral)	301
Phenomenex Synergi	343
Phenomenex Zebron (GC)	87

Nucleosides and Nucleotides	Page
Phenomenex Kinetex EVO C18	246
Phenomenex Luna NH <sub>2</sub> , SCX	276
Phenomenex Luna Omega Polar C18, Luna Omega PS C18	290
Phenomenex Synergi Polar-RP	343
Phenomenex PhenoSphere SAX	Inquire
Oligonucleotides	
Phenomenex Biozen Oligo	210
Phenomenex Clarity Oligo-XT	404
Phenomenex Clarity Oligo-RP	404
Phenomenex Clarity Oligo-MS	404
Phenomenex Aeris WIDEPORE	204
Organic Acids	
Phenomenex Luna Omega PS C18	290
Phenomenex Rezex	324
Phenomenex Synergi Hydro-RP	343
Peptides/Proteins	
Phenomenex Aeris WIDEPORE/PEPTIDE	204
Phenomenex Biozen Peptide PS-C18/XB-C18	210
Phenomenex Biozen WidePore C4	210
Phenomenex Jupiter 300/Jupiter Proteo	244
Phenomenex Biozen dSEC-2	210
Phenomenex Biozen Glycan	210
Phenomenex Biozen Intact	210
Phenomenex Luna SCX, NH <sub>2</sub>	276
Phenomenex Yarra SEC	355
Phenomenex BioSep-SEC-S	209
Phenomenex Biozen WCX	210
Pesticides, Herbicides, and Dioxins	
Phenomenex Kinetex	246
Phenomenex Gemini / Gemini NX	234
Phenomenex Synergi	343
Phenomenex Luna	276
Phenomenex Luna Omega	290
Phenomenex Zebron (GC)	87
Pharmaceuticals	
Phenomenex Kinetex	246
Phenomenex Gemini / Gemini NX	234
Phenomenex Synergi	343
Phenomenex Luna	276
Phenomenex Luna Omega	290
Phenomenex Lux (chiral)	301
Phenomenex Chirex (chiral)	232
Polymers, Plastics, Rubber	
Phenomenex Zebron (GC)	87
Phenomenex Phenogel	315
Vitamins	
Phenomenex Kinetex	246
Phenomenex Gemini / Gemini NX	234
Phenomenex Synergi	343
Phenomenex Luna	276
Phenomenex Luna Omega	290
Taxanes	
Phenomenex Kinetex F5	246
Phenomenex Luna PFP(2)	276
Textiles/Dyes	
Phenomenex Kinetex	246
Phenomenex Gemini / Gemini NX	234
Phenomenex Synergi	343
Phenomenex Luna	276
Phenomenex Luna Omega	290
Phenomenex Phenogel GPC	315

# HPLC Column Selection by Manufacturer

In recognizing the tremendous difficulty the chromatographer has in choosing from literally hundreds of columns and to aid in your selection of alternative materials from different manufacturers, an HPLC column selection guide is presented below.

This selection is, neither in terms of manufacturers nor in terms of their products, a complete list, and the accuracy of the data is not guaranteed.

Column	Phenomenex Alternative*	Phenomenex Recommended Alternative**
<b>Agilent Technologies / Varian / Polymer Labs</b>		
Advanced AAA	Gemini	Kinetex EVO
Advanced Bio Glycan	Biozen Glycan	—
Advanced Bio SEC	Yarra	Biozen dSEC-2
Advanced Bio PEPTIDE plus	Biozen Peptide XB-C18	Biozen Peptide PS-C18
Advanced Bio RP-Ab	Aeris WIDEPORE	Biozen WidePore C4
Advanced Bio Oligonucleotide	Clarity Oligo-XT	Biozen Oligo
Bio MAb (WCX)	Biozen WCX	—
Bio SEC	BioSep-SEC-S	Biozen dSEC-2
Chiradex	Shiseido Chiral CD-pH	—
HC-C18(2)	Luna C18(2)	Synergi Hydro-RP
MetaSil	Prodigy	Luna
MetaSil AQ C18	Aqua C18	Synergi Hydro-RP
Microsorb	Luna	Synergi
Microsorb 300 Å	Jupiter 300	Aeris WIDEPORE
PL-Aquagel-OH	PolySep GFC-P	Shodex OHPak SB-800H
PLgel	Phenogel	Phenogel
PL Hi-PLEX	Rezex	Rezex
PLRP-S	PolymerX RP-1	Gemini NX-C18
PLRP-S 300 Å	Hamilton PRP-3	Aeris WIDEPORE
PlusPore	Phenogel	Phenogel
Polaris C18 Amide, C8 Ether	Luna Omega Polar C18	Synergi Fusion-RP
Poroshell 300	Aeris WIDEPORE	Biozen WidePore C4
Poroshell 120	Kinetex	Kinetex
ProSEC 300S	Yarra	Biozen dSEC-2
Pursuit	Luna	Synergi
Pursuit DiPhenyl	Kinetex Biphenyl	Gemini C6-Phenyl
Pursuit PAH	Kinetex PAH	—
Pursuit XRs	Luna	Kinetex
Taxsil (1, 2, 3)	Luna PFP(2)	Kinetex F5
TC-C18(2)	Synergi Hydro-RP	Luna C18(2)
ZORBAX Eclipse AAA	Gemini C18	Kinetex EVO
ZORBAX Eclipse-XDB	Luna	Kinetex
ZORBAX Eclipse Plus	Gemini	Kinetex EVO C18
ZORBAX Rapid Resolution HT	Kinetex	Luna Omega
ZORBAX PrepHT	Luna(3) 10 µm	Luna 10 µm PREP
ZORBAX Rx	HyperClone	Luna
ZORBAX SB 80 Å	Kinetex XB-C18	Luna
ZORBAX SB 300 Å	Jupiter 300	Aeris WIDEPORE / Biozen Intact
ZORBAX SB Aq	Synergi Hydro-RP	Synergi Hydro-RP
ZORBAX GF (BioSeries)	BioSep-SEC-S	Biozen dSEC-2
ZORBAX Extend-C18	Gemini NX-C18	Kinetex EVO C18
ZORBAX 300 Extend	Jupiter 300	Aeris WIDEPORE
ZORBAX Bonus RP	Synergi Fusion-RP	Synergi Hydro-RP
ZORBAX Oligo	Clarity Oligo-RP	Clarity Oligo-MS
ZORBAX Carbohydrate	Luna NH <sub>2</sub> / Luna Omega SUGAR	Rezex
<b>Hichrom Ltd.</b>		
Alltima	Luna	Luna Omega
Alltima HP	Luna	Kinetex
Apex	Luna	Kinetex
Apollo	Luna	Kinetex
Genesis	Luna	Gemini
Prevail	Synergi	Luna Omega Polar
Vydac	Jupiter	Aeris
<b>Bio-Rad</b>		
Aminex	Rezex	Rezex
Macro-Prep	Biozen WCX	Shodex IEC
Nuvia	—	Shodex IEC
UNOsphere	Biozen WCX	Shodex IEC

\* Alternative - This category indicates an alternative column which will likely give a similar selectivity.

\*\* Recommended Alternative - This category indicates an alternative column which may yield somewhat different selectivity but may also lead to improved resolution.

Phenomenex

Column	Phenomenex Alternative*	Phenomenex Recommended Alternative**
<b>Chiral Technologies/DAICEL Corporation</b>		
CHIRALCEL AY-H	—	Lux Cellulose-2
CHIRALCEL OD-H	Lux Cellulose-1	Lux Cellulose-2
CHIRALCEL OJ-H	Lux Cellulose-3	Lux Cellulose-4
CHIRALCEL OX-H	Lux Cellulose-4	Lux Cellulose-2
CHIRALCEL OZ-H	Lux Cellulose-2	Lux Cellulose-4
CHIRALPAK AD-H	Lux Amylose-1	—
CHIRALPAK IA	Lux i-Amylose-1	—
CHIRALPAK IC	Lux i-Cellulose-5	—
CHIRALPAK IG	Lux i-Amylose-3	—
<b>E.S. Industries</b>		
Aquasep	Synergi Fusion-RP	Synergi Hydro-RP
Chromegabond	Nucleosil	Luna
Chromegabond HC	Ultrasorb ODS (30)	Synergi Hydro-RP
Chromegabond BAS	Synergi Fusion-RP	Synergi Hydro-RP
Chromegabond WR	Luna	Gemini
Chromegapore	Yarra	Biozen dSEC-2
Epic	Synergi 2.5 µm	Kinetex
Epic Polar	Kinetex Biphenyl	Synergi Hydro-RP
FluoroSep-RP Phenyl	Luna Phenyl-Hexyl	Kinetex Phenyl-Hexyl
FluoroSep-RP Octyl	—	Kinetex C8
Gammabond C1	PhenoSphere C1	—
Gammabond C8, C18	Luna C8(2), C18(2)	Kinetex C8, C18
MacroSep BIO-Gold	Aeris	Biozen
MacroSep	Jupiter	Aeris WIDEPORE
Protec-RP	Synergi Fusion-RP	Synergi Hydro-RP
RingSep	Kinetex PAH	—
<b>GL Sciences</b>		
Inertsil ODS-Prep-100 Å	Luna 10 µm PREP C18(2)	Luna 10 µm C18(2)
Inertsil ODS(2)	Prodigy ODS(2)	Luna C18(2)
Inertsil ODS(3)	Prodigy ODS(3)	Luna C18(2)
Inertsil ODS(4)	Kinetex XB-C18	Synergi Max-RP
Inertsil Peptide C18	Aeris PEPTIDE	Luna Omega PS C18
Inertsil 300 Å WP300 C8	Jupiter C5	Aeris WIDEPORE C8 / Biozen Intact XB-C8
InertSustain	Gemini NX-C18	Kinetex EVO C18
InertSustain AQC18	Luna Omega Polar C18	Kinetex Polar C18
InertSustain Swift C18 (200Å)	Gemini NX-C18	Kinetex EVO C18
<b>MAC-MOD/Bischoff/ACT/Advanced Materials Technology</b>		
ACE C18	Gemini NX-C18	Kinetex XB-C18
ACE-AQ	Synergi Fusion-RP	Luna Omega Polar C18
ACE-300 A	Jupiter 300	Aeris WIDEPORE
ACE Excel	Gemini NX-C18	Kinetex EVO
ACE Ultracore	Kinetex	Luna Omega
HALO	Kinetex	Luna Omega
HALO Bioclass	Aeris	Biozen
HALO Glycan	Biozen Glycan	Biozen Glycan
HALO Peptide ES-C18	Aeris WIDEPORE XB-C18	Biozen Peptide
HALO Protein	Aeris WIDEPORE	Biozen WidePore C4
HALO Penta-HILIC	Kinetex HILIC	Luna HILIC
Hydrobond	Synergi Fusion-RP	Luna Omega Polar C18
Pronto Pearl	Luna Omega	Kinetex
ProntoSIL 120 Å	Luna C18(2)	Kinetex
ProntoSIL 300 Å	Jupiter 300	Aeris WIDEPORE
ProntoSIL Aq 120 Å	Synergi Hydro-RP	—
ProntoSIL Aq PLUS	Synergi Hydro-RP	Luna Omega Polar C18
ProntoSIL SH 120 Å	Gemini NX-C18	Luna C18(2)
ProntoSIL ACE-EPS	Synergi Hydro-RP	Luna Omega Polar C18
ProntoSIL Chiral AX	—	Chirex
ProntoSIL C30	Develosil C30	Luna Phenyl-Hexyl
Partisil	Luna	Synergi
Partisphere	Luna	Synergi
Ultrasphere	Luna	Synergi
<b>Restek</b>		
Allure	Ultrasorb ODS (30)	Luna C18(2)
Force	Luna Omega	Kinetex
Pinnacle DB	HyperClone	Luna C18(2)
Pinnacle Ultra C18	Ultrasorb ODS (20)	Luna C18(2)
Pinnacle II	HyperClone BDS	Luna C18(2)
Roc	Luna	Luna Omega
Raptor	Kinetex	Synergi
Ultra Aqueous	Synergi Hydro-RP	Luna Omega Polar C18
Ultra Aromax	Luna Phenyl-Hexyl	Kinetex Biphenyl
Ultra II	Kinetex	Synergi
Viva	Aeris WIDEPORE	Biozen WidePore C4

continued

# HPLC Column Selection by Manufacturer

This selection is, neither in terms of manufacturers nor in terms of their products, a complete list, and the accuracy of the data is not guaranteed.

Column	Phenomenex Alternative*	Phenomenex Recommended Alternative**
<b>Supelco / Sigma-Aldrich / MilliporeSigma / Sepax Technologies</b>		
Ascentis	Synergi	Gemini NX-C18
Ascentis Express	Kinetex	Luna Omega
Ascentis Peptide	Biozen Peptide	Aeris PEPTIDE
Astec	Lux	—
BIOShell	Aeris WIDEPORE	Jupiter
Chromolith	Onyx	Onyx
Discovery Bio	Biozen Intact	Aeris WIDEPORE
Discovery HSF5	Luna PFP(2)	Kinetex F5
Discovery HSC18	Luna C18(2)	Kinetex C18
Discovery C18	Luna C18(2)	Kinetex C18
Discovery RP C16 Amide	Synergi Fusion-RP	Synergi Fusion-RP
Discovery (C18, C16)	Synergi Hydro-RP	Luna Omega
Supelco ABZ, ABZ+	Luna C8(2)	Luna C18(2)
Supelco LC-18-T	Prodigy (3)	Luna C18(2)
Supelco LC-18-S	Prodigy (3)	Luna C18(2)
Supelco LC-F	Luna PFP(2)	Kinetex F5
Supelco LC-PAH	—	Synergi Hydro-RP
Supelcosil LC	Luna C18(2)	Synergi Hydro-RP
Supelcogel	Rezex	Rezex
Supelcogel ODP-50	Asahipak ODP-50	Luna C18(2)
Supelcosil LC-DB	HyperClone BDS	Synergi Hydro-RP
Supelcosil LC-304/308/318	Jupiter 300	Aeris WIDEPORE
Supelcosil LC-NH <sub>2</sub> -NP	—	Luna NH <sub>2</sub>
Supelcosil LC-PCN	Luna CN	—
Supelcosil LC-SAX	PhenoSphere SAX	—
Supelcosil LC-SCX	PhenoSphere SCX	Luna SCX
Titan	Luna Omega	Kinetex
Unix SEC	Yarra	Yarra
SRT GFC	Yarra	Yarra
Zenix GFC	Yarra	Yarra
<b>Thermo Fisher Scientific / Thermo Scientific Dionex</b>		
Acclaim 120	Luna	Kinetex
Acclaim 300	Jupiter	Aeris WIDEPORE
Acclaim HILIC-10	Luna HILIC	Kinetex HILIC
Acclaim PA	Synergi Fusion-RP	Luna Omega Polar C18
Acclaim PA 2	Synergi Fusion-RP	Luna Omega Polar C18
Acclaim PepMap 300Å	Biozen	Aeris
Acclaim OA	Synergi Hydro-RP	Synergi Fusion-RP
Acclaim Surfactant	—	Gemini
Accucore	Kinetex	Luna Omega PS C18
Accucore Vanquish C18+	Kinetex EVO	Luna Omega PS C18
AminoPac PA	—	—
Aquasil	Synergi Hydro-RP	—
BetaBasic	Luna	Kinetex
BioBasic SEC	Yarra	Biozen dSEC-2
BioBasic IEX	Shodex IEC	Biozen WCX
BioBasic RP	Jupiter 300	Aeris WIDEPORE
BETASIL	Prodigy (3)	Luna
BetaMax	Luna	Gemini
BETASIL Phenyl-Hexyl	Luna Phenyl-Hexyl	Kinetex Phenyl-Hexyl
Carbamate	Synergi Fusion-RP	Synergi Hydro-RP
CarboPac (MA, PA)	—	Rezex
Deltabond	Luna C18(2)	Synergi Max-RP
DNAPac	Asahipak IEC	—
DNASwift	Clarity Oligo-RP	Biozen Oligo
Fluophase	Luna PFP(2)	Kinetex F5
GlycanPac	Biozen Glycan	Biozen Glycan
Hypercarb	—	Gemini
HyperREZ XP	Rezex	Rezex
HyperSIL GOLD	Luna	Kinetex
HyperSIL GOLD aQ C18	Luna Omega Polar C18	Synergi Hydro-RP
HyperSIL Green	—	Synergi Hydro-RP
HyperSIL	HyperClone	Synergi Max-RP
HyPURITY	Luna	Kinetex
HyPURITY ADVANCE	Synergi Fusion-RP	Luna Omega
HyPURITY AQUASTAR	Synergi Fusion-RP	Luna Omega

Column	Phenomenex Alternative*	Phenomenex Recommended Alternative**
<b>Thermo Fisher Scientific / Thermo Scientific Dionex (cont'd)</b>		
Ionpac AS series	—	Shodex IC series
IonPac CS series	Shodex IC series	Hamilton PRP-X200
IonPac ICE AS series	Rezex ROA	Rezex ROA
MAB Pac SEC-1	Biozen dSEC-2	Yarra
OmniPac	—	Luna SCX
Pep Map 300	Biozen Intact	Aeris
Prism RP	Synergi Hydro-RP	Luna Omega Polar C18, PS C18
ProPac	Biozen WCX	Shodex IEC
Syncronis	Luna	Kinetex
<b>Waters</b>		
ACQUITY APC	—	Phenogel
ACQUITY BEH	Luna Omega C18	Synergi 2.5 µm
ACQUITY CSH	Luna Omega PS C18	Kinetex EVO
ACQUITY Protein BEH SEC	Yarra	Yarra
ACQUITY UPC2	—	Kinetex
ACQUITY UPLC Glycan BEH Amide	Biozen Glycan	—
ACQUITY UPLC PEPTIDE BEH	Biozen Peptide XB-C18	Aeris PEPTIDE XB-C18
ACQUITY UPLC PEPTIDE CSH	Biozen Peptide PS-C18	Aeris PEPTIDE XB-C18
ACQUITY UPLC Oligonucleotide BEH C18	Clarity	Biozen Oligo
Atlantis	Synergi Fusion-RP	Synergi Hydro-RP
BioSuite IEX	Shodex IEC	—
BioSuite SEC	Yarra	Biozen dSEC-2
BioSuite RPC	—	Jupiter 300
Carbamate	—	Synergi Hydro-RP
Carbohydrate	Luna NH <sub>2</sub>	Luna Omega SUGAR
CORTECS	Kinetex	Kinetex
Deltapak 100A	—	Luna
Deltapak 300A	Aeris	Biozen Intact
GST	—	Luna HILIC
IC-pak	Hamilton PRP-X100	—
µBondapak	Bondclone	Synergi Hydro-RP
µPorasil	Bondclone Silica	Luna Silica
µStyragel	Phenogel	Phenogel
Novapak 4 µm	—	Synergi Hydro-RP
OST	Clarity Oligo-XT	Biozen Oligo
PAH C18	Kinetex PAH	—
Protein-Pak IEC	Shodex IEC	—
Protein-Pak SW	Yarra	Biozen dSEC-2
PrST	Aeris WIDEPORE	Biozen WidePore C4
PST	Aeris PEPTIDE	Biozen Peptide
Resolve	PhenoSphere	Luna
Spherisorb	SphereClone	Synergi Hydro-RP
Sugar-pak	Rezex	Rezex
SunFire	Luna	Kinetex
Symmetry C18, C8	Luna C18(2), C8(2)	Synergi Max-RP
Symmetry Shield C18, C8	Synergi Fusion-RP	Synergi Hydro-RP
Symmetry 300	Jupiter	Biozen WidePore
Styragel	Phenogel	Phenogel
UltraStyragel	Phenogel	Phenogel
Ultrahydrogel	PolySep-GFC-P	Shodex OHpak SB
XBridge	Gemini NX-C18	Kinetex EVO C18
XBridge Glycan BEH Amide	Biozen Glycan	—
XBridge Oligonucleotide BEH C18	Clarity	Clarity
XSelect	Luna Omega PS C18	Kinetex
XTerra MS	Gemini	Kinetex EVO C18
XTerra RP	Gemini	Kinetex EVO C18

\* Alternative - This category indicates an alternative column which will likely give a similar selectivity.

\*\* Recommended Alternative - This category indicates an alternative column which may yield somewhat different selectivity but may also lead to improved resolution.



# HPLC Column Selection by Separation Mode

This table is to aid you in selecting the right column from Phenomenex for the separation mode you desire. For specific application notes or method development assistance please call your Phenomenex technical consultant.

Separation Mode	Page
<b>Adsorption Chromatography</b>	
Phenomenex Kinetex HILIC	246
Phenomenex Luna Silica(2)	276
<b>Chiral Chromatography</b>	
Phenomenex Lux	301
Phenomenex Chirex	232
Shinwa Ultron ES	354
Sumika Sumichiral OA	Inquire
<b>Gel Filtration Chromatography</b>	
Phenomenex Biozen dSEC-2	210
Phenomenex Yarra SEC (silica)	355
Phenomenex BioSep SEC/GFC (silica)	209
Phenomenex PolySep GFC-P (polymer)	322
Shodex GFC OHpak SB, Sugar KS, Protein KW	338
<b>Gel Permeation Chromatography</b>	
Phenomenex Phenogel	315
<b>Hydrophilic Interaction Chromatography (HILIC)</b>	
Phenomenex Biozen Glycan	210
Phenomenex Kinetex HILIC	246
Phenomenex Luna HILIC	276
Phenomenex Luna NH <sub>2</sub>	276
Phenomenex Luna Silica(2)	276
Phenomenex Luna Omega SUGAR	290
<b>Hydrophobic Interaction Chromatography (HIC)</b>	
Shodex HIC	338
<b>Ion-Exclusion Chromatography</b>	
Phenomenex Rezex	324
Shodex RSpak, SUGAR	338
<b>Ion-Exchange Chromatography</b>	
Phenomenex Biozen WCX	210
Phenomenex Luna SCX, Luna NH <sub>2</sub>	276
Phenomenex PhenoSphere SAX	Inquire
Phenomenex Rezex	324
Macherey-Nagel Nucleosil SAX, SB	Inquire
Shodex IEC	Inquire
Shodex RSpak KC-811	338

Separation Mode	Page
<b>Ion Chromatography</b>	
Hamilton PRP	Inquire
Shodex IC	338
<b>Ligand Exchange Chromatography</b>	
Phenomenex Rezex	324
Shodex SUGAR	338
<b>Multi-Mode Chromatography</b>	
Phenomenex Luna SCX	276
Phenomenex Luna NH <sub>2</sub>	276
<b>Normal Phase Chromatography</b>	
Phenomenex Kinetex HILIC	246
Phenomenex Luna CN, NH <sub>2</sub> , Silica(2)	276
<b>Reversed Phase Chromatography</b>	
Phenomenex Kinetex	246
Phenomenex Luna Omega	290
Phenomenex Luna	276
Phenomenex Biozen	210
Phenomenex Gemini	234
Phenomenex Synergi	343
Phenomenex Aeris	204
Phenomenex Bondclone	231
Phenomenex Clarity	404
Phenomenex Gemini NX	234
Phenomenex HyperClone	241
Phenomenex Jupiter	244
Phenomenex Onyx	313
Phenomenex PolymerX	321
Phenomenex Prodigy	323
Phenomenex SphereClone	341
GL Sciences Inertsil	Inquire
Hamilton PRP	Inquire
Macherey-Nagel Nucleosil	Inquire
Merck KGaA LiChrospher, Superspher	275

# HPLC Column Selection by USP Listing

For each United States Pharmacopeia (USP) column specification, you will find listed the most suitable Phenomenex column.

It is widely understood that all HPLC packings are not alike, and no single column can perform a myriad of desired separations. HPLC packings differ in hydrophobicity, surface coverage, surface area, pore size and particle shape.

The USP does give chromatographers the flexibility to make adjustments to Monographs. As you can read below, column manufacturers or sources and materials stated in USP Monographs are only recommendations. Chromatographers can and should change and adapt the Monograph's specifications to yield the most satisfactory analytical results.

USP Column Classification	Recommended Phenomenex Column	Particle Shape	Page
L1 Octadecyl silane chemically bonded to porous or non-porous silica or ceramic microparticles, 1.5 to 10 µm in diameter, or a monolithic rod.	Kinetex™ C18	Core-Shell	246
	Kinetex EVO C18	Core-Shell	246
	Kinetex Polar C18	Core-Shell	246
	Kinetex PS C18	Core-Shell	246
	Kinetex XB-C18	Core-Shell	246
	Luna™ C18(2)	Spherical	276
	Luna Omega C18	Spherical	290
	Luna Omega PS C18	Spherical	290
	Luna Omega Polar C18	Spherical	290
	Gemini™ NX-C18	Spherical	234
	Gemini C18	Spherical	234
	Synergi™ Hydro-RP	Spherical	343
	Synergi Fusion-RP	Spherical	343
	Biozen™ Peptide PS-C18	Spherical	210
	Onyx™ C18	Monolith	313
	Jupiter™ C18	Spherical	244
	Clarity™ Oligo-RP	Spherical	404
Clarity Oligo-MS	Core-Shell	404	
Clarity Oligo-XT	Core-Shell	404	
Aeris™ WIDEPORE XB-C18	Core-Shell	204	
Biozen Peptide XB-C18	Core-Shell	210	
L2 Octadecyl silane chemically bonded to silica gel of a controlled surface porosity that has been bonded to a solid spherical core, 30 to 50 µm in diameter.			
L3 Porous silica particles, 1.5 to 10 µm in diameter, or a monolithic silica rod.	Kinetex HILIC	Core-Shell	246
	Luna Silica(2)	Spherical	276
L4 Silica gel of controlled surface porosity bonded to a solid spherical core, 30 to 50 µm in diameter.			
L5 Alumina of controlled surface porosity bonded to a solid spherical core, 30 to 50 µm in diameter.			
L6 Strong cation-exchange packing: sulfonated fluorocarbon polymer coated on a solid spherical core, 30 to 50 µm in diameter.			
L7 Octyl silane chemically bonded to totally or superficially porous silica particles, 1.5 to 10 µm in diameter, or a monolithic silica rod.	Kinetex C8	Core-Shell	246
	Luna C8(2)	Spherical	276
	Biozen Intact XB-C8	Core-Shell	210
L8 An essentially monomolecular layer of aminopropyl-silane chemically bonded to totally porous silica gel support, 1.5 to 10 µm in diameter, or a monolithic silica rod.	Luna NH <sub>2</sub>	Spherical	276
	Luna Omega SUGAR	Spherical	290
L9 Irregular or spherical, totally porous silica gel having a chemically bonded, strongly acidic cation-exchange coating, 3 to 10 µm in diameter.	Luna SCX	Spherical	276
L10 Nitrile groups chemically bonded to porous silica particles or superficially porous particles, 1.5 to 10 µm in diameter, or a monolithic silica rod.	Luna CN	Spherical	276
L11 Phenyl groups chemically bonded to porous silica particles or superficially porous particles, 1.5 to 10 µm in diameter, or a monolithic silica rod.	Kinetex Biphenyl	Core-Shell	246
	Kinetex Phenyl-Hexyl	Core-Shell	246
	Synergi Polar-RP	Spherical	343
	Luna Phenyl-Hexyl	Spherical	276
	Gemini C6-Phenyl	Spherical	234
	Prodigy PH-3	Spherical	323
L12 Strong anion-exchange packing made by chemically bonding a quaternary amine to a solid silica spherical core, 30 to 50 µm in diameter.			
L13 Trimethylsilane chemically bonded to porous silica particles, 3 to 10 µm in diameter.	Develosil® TMS-UG (C1) 130 Å	Spherical	Inquire
L14 Silica gel having a chemically bonded, strongly basic quaternary ammonium anion-exchange coating, 5 to 10 µm in diameter.	PhenoSphere™ SAX	Spherical	Inquire
L15 Hexyl silane chemically bonded to totally porous silica particles, 3 to 10 µm in diameter.	PhenoSphere C6	Spherical	Inquire
L16 Dimethyl silane chemically bonded to porous silica particles, 5 to 10 µm in diameter.			
L17 Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the hydrogen form, 6 to 12 µm in diameter.	Rezex™ RHM-Monosaccharide	Spherical	324
	Rezex ROA-Organic Acid	Spherical	324
L18 Amino and cyano groups chemically bonded to porous silica particles, 3 to 10 µm in diameter.			
L19 Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the calcium form, 5 to 15 µm in diameter.	Rezex RCM-Monosaccharide	Spherical	324
	Rezex RCU-Sugar Alcohols	Spherical	324
L20 Dihydroxypropane groups chemically bonded to porous silica or hybrid particles, 1.5 to 10 µm in diameter, or a monolithic silica rod.	Luna HILIC	Spherical	276
	BioSep™-SEC-S	Spherical	209
	Biozen dSEC-2	Spherical	355
L21 A rigid, spherical styrene-divinylbenzene copolymer, 3 to 30 µm in diameter.	PolymerX™ RP-1	Spherical	321
	Phenogel™ 100 Å	Spherical	315
L22 A cation-exchange resin made of porous polystyrene gel with sulfonic acid groups, 5 to 15 µm in diameter.	Rezex ROA-Organic Acid	Spherical	324
L23 An anion-exchange resin made of porous polymethacrylate or polyacrylate gel with quaternary ammonium groups, 7-12 µm in size.	Shodex® IEC OA-825	Spherical	Inquire
L24 Polyvinylalcohol chemically bonded to porous silica particles, 5 µm in diameter.			
L25 Packing having the capacity to separate compounds with a MW range from 100 to 5000 daltons (as determined by polyethylene oxide), applied to neutral, anionic, and cationic water-soluble polymers. A polymethacrylate resin base, crosslinked with poly-hydroxylated ether (surface contained some residual carboxyl functional groups) was found suitable.	PolySep™-GFC-P2000	Spherical	322
	Shodex OHpak SB-802.5HQ	Spherical	338

# HPLC Column Selection by USP Listing

USP Column Classification	Recommended Phenomenex Column	Particle Shape	Page
L26 Butyl silane chemically bonded to totally or superficially porous silica particles, 1.5 to 10 µm in diameter.	Jupiter 300 C4	Spherical	244
	Biozen WidePore C4	Core-Shell	210
L27 Porous silica particles, 30 to 50 µm in diameter.	Sepra Silica	Irregular	401
L28 A multifunctional support, which consists of a high purity, 100Å, spherical silica substrate that has been bonded with anionic exchanger, amine functionality in addition to a conventional reversed phase C8 functionality.			
L29 Gamma alumina, reversed phase, low carbon percentage by weight, alumina-based polybutadiene spherical particles, 5 µm diameter with a pore volume of 80Å.			
L30 Ethyl silane chemically bonded to a totally porous silica particle, 3 to 10 µm in diameter.			
L31 A hydroxide-selective, strong anion-exchange resin-quaternary amine bonded on latex particles attached to a core of 8.5 µm macroporous particles having a pore size of 2000Å and consisting of ethylvinylbenzene cross-linked with 55% divinyl benzene.			
L32 A chiral ligand-exchange resin packing-L-proline copper complex covalently bonded to irregularly shaped silica particles, 5 to 10 µm in diameter.			
L33 Packing having the capacity to separate dextrans by molecular size over a range of 4,000 to 500,000 daltons. It is spherical, silica-based and processed to provide pH stability.	Yarra SEC-2000 / SEC-3000	Spherical	355
	BioSep-SEC-S2000 / SEC-S3000	Spherical	209
L34 Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the lead form, 7 to 9 µm in diameter.	Rezex RPM-Monosaccharide	Spherical	324
L35 A zirconium-stabilized spherical silica packing with a hydrophilic (diol-type) molecular monolayer bonded phase having a pore size of 150Å.	(BioSep-SEC-S2000 or Yarra SEC-2000 may be used)	Spherical	209
		Spherical	355
L36 3,5-dinitrobenzoyl derivative of L-phenylglycine covalently bonded to 5 µm aminopropyl silica.			
L37 Polymethacrylate gel packing having the capacity to separate proteins by molecular size over a range of 2,000 to 40,000 daltons.	PolySep-GFC-P3000	Spherical	322
	Shodex OHPak SB-803HQ	Spherical	338
L38 Methacrylate-based size-exclusion packing for water-soluble samples.	PolySep-GFC-P series	Spherical	322
	Shodex OHPak SB-800HQ	Spherical	338
L39 Hydrophilic polyhydroxymethacrylate gel of totally porous spherical resin.	PolySep-GFC-P series	Spherical	322
	Shodex OHPak SB-800HQ series	Spherical	338
	Shodex RSpak DM-614	Spherical	338
L40 Cellulose tris-3,5-dimethylphenylcarbamate coated porous silica particles, 3 µm to 20 µm in diameter.	Lux Cellulose-1	Spherical	301
L41 Immobilized α <sub>1</sub> -acid glycoprotein on spherical silica particles, 5 µm in diameter.			
L42 Octylsilane and octadecylsilane groups chemically bonded to porous silica particles, 5 µm in diameter.			
L43 Pentafluorophenyl groups chemically bonded to silica particles or superficially porous particles, by a propyl spacer, 1.5 to 10 µm in diameter.	Kinetex F5	Core-Shell	246
	Luna PFP(2)	Spherical	276
L44 A multifunctional support, which consists of a high purity, 60Å, spherical silica substrate that has been bonded with a cationic exchanger, sulfonic acid functionality in addition to a conventional reversed phase C8 functionality.			
L45 Beta cyclodextrin, R, S-hydroxypropyl ether derivative, bonded to porous silica particles, 3 to 10 µm in diameter	Shiseido Chiral CD-Ph	Spherical	Inquire
L46 Polystyrene/divinylbenzene substrate agglomerated with quaternary amine functionalized latex beads, about 9 to 11 µm in diameter.			
L47 High capacity anion-exchange microporous substrate, fully functionalized with a trimethylamine group, 8 µm in diameter.			
L48 Sulfonated, cross-linked polystyrene with an outer layer of submicron, porous, anion-exchange microbeads, 5 to 15 µm in diameter.			
L49 A reversed phase packing made by coating a thin layer of polybutadiene on to spherical porous zirconia particles, 3 to 10 µm in diameter.			
L50 Multifunction resin with reversed phase retention and strong anion-exchange functionalities. The resin consists of ethylvinylbenzene, 55% cross-linked with divinylbenzene copolymer, 3 to 15 µm in diameter, and a surface area of not less than 350 m <sup>2</sup> /g. Substrate is coated with quaternary ammonium functionalized latex particles consisting of styrene cross-linked with divinylbenzene.			
L51 Amylose tris-3,5-dimethylphenylcarbamate-coated, porous, spherical, silica particles, 3 to 10 µm in diameter.	Lux Amylose-1	Spherical	301
L52 A strong cation-exchange resin made of porous silica with sulfopropyl or sulfoethyl groups, 1 to 10 µm in diameter.			
L53 Weak cation-exchange resin consisting of ethylvinylbenzene, 55% cross-linked with divinylbenzene copolymer, 3 to 15 µm diameter. Substrate is surface grafted with carboxylic acid and/or phosphoric acid functionalized monomers. Capacity not less than 500 µEq/column.			
L54 A size exclusion medium made of covalent bonding of dextran to highly cross-linked porous agarose beads, 5 to 15 µm in diameter.			
L55 A strong cation-exchange resin made of porous silica coated with polybutadiene-maleic acid copolymer, about 5 µm in diameter.			
L56 Propyl silane chemically bonded to totally or superficially porous silica particles, 3 to 10 µm in diameter.			
L57 A chiral-recognition protein, ovomucoid, chemically bonded to silica particles, about 5 µm in diameter, with a pore size of 120Å.	Ultron ES-OVM	Spherical	354
L58 Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the sodium form, about 6 to 30 µm in diameter.	Rezex RNM-Carbohydrate	Spherical	324
L59 Size-exclusion separations of proteins (separation by molecular weight) over the range of 5 to 7000 kDa. Spherical (1.5 to 10 µm), silica or hybrid packing with a hydrophilic coating.	Yarra SEC-2000	Spherical	355
	BioSep-SEC-S2000	Spherical	209
	Yarra SEC-3000	Spherical	355
	BioSep-SEC-S3000	Spherical	209
L60 Spherical, porous silica gel, 10 µm or less in diameter, surface has been covalently modified with alkyl amide groups and endcapped.			
L61 Hydroxide-selective, strong anion-exchange resin consisting of a highly cross-linked core of 13 µm microporous particles, pore size less than 10Å, and consisting of ethylvinylbenzene cross-linked with 55% divinylbenzene with a latex coating composed of 85 nm diameter microbeads bonded with alkanol quaternary ammonium ions (6%).			



# HPLC Column Selection by USP Listing

USP Column Classification	Recommended Phenomenex Column	Particle Shape	Page
L62 C30 silane bonded phase on a fully porous spherical silica or superficially porous particles, 3 to 15 µm in diameter.	FlexFire Fusion C30	Spherical	Inquire
L63 Glycopeptide teicoplanin linked through multiple covalent bonds to a 100Å spherical silica.			
L64 Strongly basic anion-exchange resin consisting of 8% crosslinked styrene divinylbenzene copolymer with a quaternary ammonium group in the chloride form, 45 to 180 µm in diameter.			
L65 Strongly acidic cation-exchange resin consisting of 2% sulfonated crosslinked styrene divinylbenzene copolymer with a sulfonic acid group in the hydrogen form, 63 to 250 µm in diameter.			
L66 A crown ether coated on a 5 µm particle size silica gel substrate. The active site is (S)-18-crown-6-ether.			
L67 Porous vinyl alcohol copolymer with a C18 alkyl group attached to the hydroxyl group of the polymer, 2 to 10 µm in diameter.	Asahipak ODP-50	Spherical	Inquire
L68 Spherical, porous silica, 10 µm or less in diameter, the surface of which has been covalently modified with alkyl amide groups and not endcapped.			
L69 Ethylvinylbenzene/divinylbenzene substrate agglomerated with quaternary amine functionalized 130 nm latex beads, about 6.5 µm in diameter.			
L70 Cellulose tris (phenyl carbamate) coated on 5 µm silica.			
L71 A rigid, spherical polymethacrylate 4 to 6 µm in diameter.	Shodex RSpak DE-413 Shodex RSpak DE-613	Spherical Spherical	338 338
L72 (S)-phenylglycine and 3,5-dinitroaniline urea linkage covalently bonded to silica.			
L73 A rigid, spherical polydivinylbenzene particle 5 to 10 µm in diameter.			
L74 A strong anion-exchange resin consisting of a highly cross-linked core of 7 µm macroporous particles having a 100Å average pore size and consisting of ethylvinylbenzene cross-linked with 55% divinylbenzene and an anion-exchange layer grafted to the surface, which is functionalized with alkyl quaternary ammonium ions.			
L75 A chiral-recognition protein, bovine serum albumin (BSA), chemically bonded to silica particles, about 7 µm in diameter, with a pore size of 300Å.			
L76 Silica-based weak cation-exchange material, 5 µm in diameter. Substrate is surface polymerized polybutadiene-maleic acid to provide carboxylic acid functionalities. Capacity not less than 29 µEq/column.			
L77 Weak cation-exchange resin consisting of ethylvinylbenzene, 55% cross-linked with divinylbenzene copolymer, 6 to 9 µm diameter. Substrate is surface grafted with carboxylic acid functionalized groups. Capacity not less than 500 µEq/column (4 mm x 25 cm).			
L78 A silane ligand that consists of both reversed phase (an alkyl chain longer than C8) and anion-exchange (primary, secondary, tertiary, or quaternary amino groups) functional groups chemically bonded to porous or non-porous or ceramic micro-particles, 1.0 to 50 µm in diameter or a monolithic rod.			
L79 A chiral-recognition protein, human serum albumin (HSA), chemically bonded to silica particles, about 5 µm in diameter.			
L80 Cellulose tris(4-methylbenzoate)-coated, porous, spherical, silica particles, 5 to 20 µm in diameter.	Lux Cellulose-3	Spherical	301
L81 A hydroxide-selective, strong anion-exchange resin consisting of a highly cross-linked core of 9 µm porous particles having a pore size of 2000Å units and consisting of ethylvinylbenzene cross-linked with 55% divinylbenzene with a latex coating composed of 70 nm diameter microbeads (6% crosslinked) bonded with alkanol quaternary ammonium ions.			
L82 Polyamine chemically bonded to cross-linked polyvinyl alcohol polymer, 4 - 5 µm in diameter	Asahipak NH <sub>2</sub> P-50	Spherical	Inquire
L83 A hydroxide-selective, strong anion-exchange resin-quaternary amine bonded on latex particles attached to a core of 10.5 µm microporous particles having a pore size of 10Å and consisting of ethylvinylbenzene cross-linked with 55% divinylbenzene.			
L84 Weak cation-exchange resin consisting of ethylvinylbenzene, 55% cross-linked with divinylbenzene copolymer, 5 µm diameter. Substrate is surface grafted with carboxylic acid functionalized groups. Capacity not less than 8400 µEq column (5 mm x 25 cm).			
L85 A silane ligand that consists of both reversed phase (an alkyl chain longer than C8) and weak cation-exchange (carboxyl groups) functional groups chemically bonded to porous or non-porous particles, 1.0 to 50 µm in diameter.			
L86 Fused core particle with a highly polar ligand possessing multiple hydroxyl groups tethered to the silica gel outer layer.			
L87 Dodecyl silane chemically bonded to porous or superficially porous silica particles, 1.5 to 10 µm in diameter.	Synergi Max-RP	Spherical	343
L88 Glycopeptide vancomycin linked through multiple covalent bonds to 100 Å spherical silica.			
L89 Packing having the capacity to separate compounds with a molecular weight range from 100 - 3000 dalton (as determined by polyethylene oxide), applied to neutral and anionic water-soluble polymers. A polymethacrylate resin base, cross-linked with polyhydroxylate ether (surface contains some residual cationic functional groups).	Shodex OHpak SB-802.5 HQ	Spherical	338
L90 Amylose tris-[(S)-alpha-methylbenzylcarbamate] coated on porous, spherical silica particles, 3 to 10 µm in diameter.			
L91 Strong anion-exchange resin consisting of monodisperse porous polystyrene/divinylbenzene beads coupled with quaternary amine. Bead size is 3 to 10 µm.			
L92 A strong anion-exchange resin consisting of a highly cross-linked core of 5-9 µm macroporous particles having a 100Å average pore size and consisting of ethylvinylbenzene cross-linked with 55% divinylbenzene and an anion-exchange layer grafted to the surface, which is functionalized with alkanol quaternary ammonium ions.			
L93 Cellulose tris (3,5-dimethylphenylcarbamate) reversed phase chiral stationary phase coated on 3 or 5 µm silica gel particles.	Lux Cellulose-1	Spherical	301
L94 A strong anion-exchange resin consisting of highly cross-linked 15 µm microporous particles functionalized with very low cross-linked latex (0.5%) to provide alkanol quaternary ammonium ion-exchange sites.			
L95 Highly polar alkyl ligand comprising five hydroxyl groups that are chemically bonded to totally porous or superficially porous silica, or a monolithic silica rod.			
L96 Alkyl chain, reversed phase bonded to totally or superficially porous silica designed to retain hydrophilic and other polar compounds when using highly aqueous mobile phases, including 100% aqueous, 1.5 µm to 10 µm in diameter.	Kinetex Polar C18 Luna Omega Polar C18 Synergi Hydro-RP Synergi Fusion-RP	Core-Shell Core-Shell Spherical Spherical	246 246 290 290
L97 Weak cation-exchange resin consisting of a highly cross-linked core of 5.5 µm porous particles having a pore size of 2000Å and consisting of ethylvinylbenzene cross-linked with 55% divinylbenzene. Substrate is surface grafted with carboxylic acid functionalized groups. Capacity not less than 2400 µEq/column (4 mm x 25 cm).			

# HPLC Column Selection by USP Listing

USP Column Classification	Recommended Phenomenex Column	Particle Shape	Page
<b>L98</b> Weak cation-exchange resin consisting of a highly cross-linked core of 8 µm microporous particles having an average pore size of 10Å and consisting of ethylvinylbenzene cross-linked with 55% divinylbenzene. Substrate is surface grafted with carboxylic acid functionalized groups. Capacity not less than 46 µEq/column (4 mm x 5 cm).			
<b>L99</b> Amylose tris-(3,5- dimethylphenylcarbamate), immobilized on porous, spherical, silica particles, 3 to 5 µm in diameter	Lux i-Amylose-1	Spherical	301
<b>L100</b> A 55% cross-linked, microporous, hydrophobic resin core (9 µm microporous particles having a pore size of 10Å) that consists of a bilayer of anion and cation-exchange latex. The first layer is fully sulfonated (140 nm) and the second layer is fully aminated (76 nm).			
<b>L101</b> Cholesteryl groups chemically bonded to porous or non-porous silica or ceramic micro-particles, 1.5 to 10 µm in diameter, or a monolithic rod.			
<b>L102</b> (Naproxen, (S,S)Wheik-0 1) 1-(3,5- dinitrobenzamido)-1,2,3,4- tetrahydrophenanthrene covalently bonded to porous spherical silica particles, 5 to 10 µm in diameter.			
<b>L103</b> A hydroxide-selective, strong anion-exchange resin consisting of a highly cross-linked core of 7.5 µm porous particles having a pore size of 2000Å and consisting of ethylvinylbenzene cross-linked with 55% divinylbenzene electrostatically bonded with hyperbranched alkanol quaternary ammonium ions.			
<b>L104</b> Triazole groups chemically bonded to porous silica particles, 1.5 to 10 µm in diameter.			
<b>L105</b> A strong anion-exchange resin consisting of a highly cross-linked 9 µm supermacroporous (2000 Å) particles functionalized with very low cross-linked latex (0.2%) to provide alkyl quaternary ammonium ion sites.			
<b>L106</b> Weak cation-exchange resin consisting of ethylvinylbenzene, 55% cross-linked with divinylbenzene copolymer, 5-8 µm diameter, macroporous particles having an average pore size of 100Å units. Substrate is surface grafted with carboxylic acid and phosphonic acid functional groups. Capacity not less than 2800 µEq/column (4 mm x 25 cm).			
<b>L107</b> Cellulose tris(4-methylbenzoate)-coated porous spherical particles, 3 to 5 µm in diameter, for use with reversed phase mobile phases.	Lux Cellulose-3	Spherical	301
<b>L108</b> A chiral-recognition protein, cellobiohydrolase (CBH), chemically bonded to silica particles, about 5 µm in diameter.			
<b>L109</b> Spherical particles of porous graphitic carbon, 1.5 to 30 µm in diameter.			
<b>L110</b> A strong anion-exchange resin consisting of a highly cross-linked 13 µm microporous (less than 10Å) particles coated with very low cross-linked latex (0.5%) to provide alkanol quaternary ammonium ion-exchange sites.			
<b>L111</b> Polyamine chemically bonded to porous spherical silica particles, 5 µm in diameter.			
<b>L112</b> A hydroxide-selective, strong anion-exchange resin consisting of a highly cross-linked core of 8.5 µm porous particles having a pore size of 2000Å units and consisting of ethylvinylbenzene cross-linked with 55% divinylbenzene with a latex coating composed of 65 nm diameter microbeads (5% cross-linked) bonded with alkanol quaternary ammonium ions.			
<b>L113</b> A hydroxide-selective, strong anion-exchange resin consisting of a highly cross-linked core of 7.5 µm porous particles having a pore size of 2000Å and consisting of ethylvinylbenzene cross-linked with 55% divinylbenzene with a latex coating composed of 65 nm diameter microbeads (5% crosslinked) bonded with alkanol quaternary ammonium ions.			
<b>L114</b> Sulfobetaine graft-polymerized to totally or superficially porous silica, 1.5 to 10 µm in diameter, or a monolithic rod. Packing having densely bonded zwitterionic groups with 1:1 charge balance.			
<b>L115</b> Ethylvinylbenzene/divinylbenzene substrate (55% cross-linked) agglomerated with quaternary amine functionalized 275 nm latex microbeads (6% cross-linked), about 8.5 µm in diameter.			
<b>L116</b> Sulfonated ethylvinylbenzene/divinylbenzene substrate agglomerated with hydrophilic quaternary amine functionalized glycidyl-derivative methacrylate microbeads, approximately 2 to 50 µm in diameter.			
<b>L117</b> A crown ether coated on a 5 µm particle size silica gel substrate. The active site is (R)-18-crown-6-ether.			
<b>L118</b> Aqueous polymerized C18 groups on silica particles, 1.2 to 5 µm in diameter.	Kinetex PAH	Core-Shell	246
<b>L119</b> Cellulose tris-(3,5-dichlorophenylcarbamate), immobilized on porous, spherical, silica particles, 3 to 5 µm in diameter.	Lux i-Cellulose-5	Spherical	301
<b>L120</b> A hydroxide-selective, strong anion-exchange resin consisting of a highly cross-linked core of 13 µm microporous particles having a pore size of less than 10 Å units and consisting of ethylvinylbenzene cross-linked with 55% divinylbenzene with a latex coating composed of 65 nm diameter microbeads (8% cross-linked) bonded with alkanol quaternary ammonium ions. Capacity not less than 10 µEq/column (4 mm x 5 cm).			
<b>L121</b> A hydroxide-selective, strong anion-exchange resin consisting of a highly cross-linked core of 11 µm porous particles having a pore size of less than 10Å units and consisting of ethylvinylbenzene cross-linked with 55% divinylbenzene electrostatically bonded with hyperbranched alkanol quaternary ammonium ions.			
<b>L122</b> Sulfobetaine graft-polymerized to totally or superficially porous hydrophilic polymer particles, 1.0 to 10 µm in diameter, or a monolithic rod. Packing having densely bonded zwitterionic groups with 1:1 charge balance.			
<b>L123</b> Cellulose tris(3-chloro-4-methylphenylcarbamate) coated porous silica particles, 3 to 20 µm in diameter.	Lux Cellulose-2	Spherical	301
<b>L124</b> Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the silver form, average 9 µm in diameter.	Rezex RSO-Oligosaccharide	Spherical	324
<b>L125</b> Polyvinyl alcohol polymer gel weak cation-exchange packing material, 5 µm porous particles. The surface is polymerized with polybutadiene-maleic acid to provide carboxylic acid functionalities. The Capacity is not less than 1 mEq/column.	Shodex IC YS-50	Spherical	338
<b>L126</b> Amylose tris (3-chlorophenylcarbamate), immobilized on porous, spherical, silica particles, 1 µm to 20 µm in diameter.			
<b>L127</b> A crown ether chemically bonded to a 5 µm particle size silica gel substrate. The active site is (S)- pseudo-18-crown-6-ether.	Sumichiral OA-8000	Spherical	Inquire
<b>L128</b> Porous particles of polystyrene divinyl benzene with linear molecular weight operating range from 200 to 2,000,000 g/mol (polystyrene equivalent), 5 µm in diameter.			
<b>L130</b> Cellulose tris(3,5-dimethylphenylcarbamate) coated on 10 Åm silica gel particles.	Lux Cellulose-1	Spherical	301

# HPLC Column Selection by Ph. Eur. Listing

The European Pharmacopoeia (*Ph. Eur.*), of the Council of Europe is a pharmacopoeia, listing a wide range of active substances and excipients used to prepare pharmaceutical products in Europe. It includes general and specific monographs that give quality standards for all the main medicines used in Europe. All medicines sold in the 38 Member States of the European Pharmacopoeia must comply with these quality standards so that consumers have a guarantee for products obtained from pharmacies and other legal suppliers.

It is widely understood that all HPLC packings are not alike, and no single column can perform a myriad of desired separations. HPLC packings differ in hydrophobicity, surface coverage, surface area, pore size, and particle shape.

For each European Pharmacopoeia (*Ph. Eur.*) description of the HPLC stationary phase, you will find listed the most suitable Phenomenex HPLC column. Other possible columns can also be used for these analyses. Please contact Phenomenex for your specific LC column needs.

Description According Pharm. Eur. 11 - 4.1.1. Reagents 2024	Number	Recommended Phenomenex Column	Page
Silica gel T1-acceptor / T1-Donor for chiral separations (1-(3,5-dinitrobenzamide)-1,2,3,4-tetrahydrophenanthrene).	1160100		
Silica gel AGP for chiral chromatography. (alpha 1-acid glycoprotein).	1148700		
Silica gel BC for chiral chromatography. (Beta-Cyclodextrin).	1161300	Sumichiral OA-7000	Inquire
Silica gel for chiral chromatography, urea type derivative: (R)-phenylglycin and 3, 5-dinitroaniline; 5 µm.	1181000	Chirex 3012	Inquire
Silica gel for chiral separation, amylose derivative of substituted amylose coated on very finely divided silica gel.	1171700	Lux Amylose-1	301
Silica gel for chiral separation, cellulose derivative of substituted cellulose coated on very finely divided silica gel.	1110300	Lux Cellulose-1, -2, -3 and -4	301
Silica gel for chromatography, human albumin coated.	1138500		
Silica gel for chiral separation, protein derivative of	1196300		
Silica gel for chiral separation, vancomycin-bonded	1205300		
Silica gel for CR+ for chiral chromatography (crown-ether)	1192400	Sumichiral OA-8000	Inquire
Silica gel for chiral separation, L-Penicillamine coated silica gel.	1200050	Sumichiral OA-5000L	Inquire
Silica gel for chromatography.	1076900	Kinetex HILIC Luna Silica(2)	246 276
Silica gel for chromatography, alkyl bonded for use with highly aqueous mobile phases.	1160200	Luna Omega Polar C18 Luna Omega PS C18 Synergi Hydro-RP Synergi Fusion-RP Gemini C18 Gemini NX-C18 Kinetex C18 Kinetex EVO C18 Kinetex XB-C18 Kinetex Polar C18 Kinetex PS C18	290 290 343 343 234 234 246 246 246 246 246
Silica gel for chromatography, alkyl bonded for use with highly aqueous mobile phases, endcapped. To minimize any interaction with basic compounds it is carefully endcapped to cover most of the remaining silanol groups.	1176900	Luna Omega Polar C18 Luna Omega PS C18 Synergi Hydro-RP Synergi Fusion-RP Gemini C18 Gemini NX-C18 Kinetex C18 Kinetex EVO C18 Kinetex XB-C18 Kinetex Polar C18 Kinetex PS C18	290 290 343 343 234 234 246 246 246 246 246
Silica gel for chromatography, alkylsilyl, solid core, endcapped. Spherical silica particles containing a non-porous solid silica core surrounded by a thinner outer porous silica coating with alkylsilyl groups. To minimize any interaction with basic compounds it is carefully endcapped to cover most of the remaining silanol groups.	1194300	Kinetex C18 Kinetex XB-C18 Kinetex EVO C18 Kinetex C8 Kinetex Polar C18	246 246 246 246 246
Silica gel for chromatography, amidoalkylsilyl	1205400		
Silica gel for chromatography, amidohexadecylsilyl.	1170400		
Silica gel for chromatography, amidohexadecylsilyl, endcapped	1201100		
Silica gel for chromatography, aminopropylmethylsilyl.	1102400	SphereClone NH <sub>2</sub> (Amino) PhenoSphere NH <sub>2</sub> (Amino)	341 Inquire
Silica gel for chromatography, aminopropylsilyl.	1077000	SphereClone NH <sub>2</sub> (Amino) PhenoSphere NH <sub>2</sub> (Amino)	341 Inquire
Silica gel for chromatography, aminopropylsilyl R1 particle size of ~55 µm.	1077001	Strata NH <sub>2</sub>	70
Silica gel for chromatography, amylose derivative of chemically modified at the surface by the bonding of an amylose derivative	1109800	Lux i-Amylose-1 Lux i-Amylose-3	301
Silica gel for chromatography, butylsilyl. Spheroidal 300 Å; pore volume: 0.6 cm <sup>3</sup> /g; area: 80 m <sup>2</sup> /g.	1076200	Biozen Intact C4 Aeris WIDEPORE C4	210 204
Silica gel for chromatography, butylsilyl, endcapped.	1170500	Biozen WidePore C4 Aeris WIDEPORE C4 Jupiter 300 C4	210 204 244
Silica gel for chromatography, carbamoylsilyl. Chemically modified at the surface by the bonding of carbamoylsilyl groups.	1210400		



# HPLC Column Selection by Ph. Eur. Listing

Description According Pharm. Eur. 11 - 4.1.1. Reagents 2024	Number	Recommended Phenomenex Column	Page
Silica gel for chromatography compatible with 100 % aqueous mobile phase, octadecylsilyl, endcapped.	1188400	Luna Omega Polar C18 Synergi Hydro-RP Synergi Fusion-RP Kinetex EVO C18 Kinetex Polar C18	290 343 343 246 246
Silica gel for chromatography compatible with 100 % aqueous mobile phase, octadecylsilyl.	1203900	Luna Omega PS C18 Luna Omega Polar C18 Synergi Hydro-RP Synergi Fusion-RP Kinetex EVO C18 Kinetex Polar C18 Kinetex PS C18	290 290 343 343 246 246 246
Silica gel for chromatography compatible with highly aqueous mobile phase, octadecylsilyl diol, endcapped.	1207500		
Silica gel for chromatography, crown-ether.	1178000	Sumichiral OA-8000	Inquire
Silica gel for chromatography, cyanopropylsilyl, endcapped, base-deactivated pre-treated by various techniques before the bonding of cyanopropyl-silyl groups. To minimize any interaction with basic compounds, it's carefully endcapped to cover most of the remaining silanol groups.	1194200	Luna CN (Cyano)	276
Silica gel for chromatography, cyanosilyl.	1109900	Luna CN (Cyano) HyperClone CN (Cyano) PhenoSphere CN (Cyano)	276 241 Inquire
Silica gel for chromatography, cyanopropylsilyl, endcapped.	1195000	Luna CN (Cyano)	276
Silica gel for chromatography, cyanolsilyl, endcapped, base-deactivated.	1211200	Luna CN (Cyano)	276
Silica gel for chromatography, di-isobutyloctadecylsilyl.	1140000	Kinetex XB-C18	246
Silica gel for chromatography, diisopropylcyanopropylsilyl.	1168100		
Silica gel for chromatography, 4-dimethylaminobenzylcarbamidesilyl. Chemically modified at the surface by bonding of 4-dimethylaminobenzylcarbamidesilyl groups.	1204000		
Silica gel for chromatography, dimethyloctadecylsilyl, irregular; area: 300 m <sup>2</sup> /g.	1115100	Bondclone C18	231
Silica gel for chromatography, diol dihydroxypropyl, 100 Å; 10 µm.	1110000	Spherex OH (Diol)	Inquire
Silica gel for chromatography, dodecylsilyl, endcapped.	1179700	Synergi Max-RP	343
Silica gel for chromatography, hexadecylamidylsilyl with hexadecylcarboxamidopropyl dimethylsilyl groups; 5 µm.	1162500		
Silica gel for chromatography, hexadecylamidylsilyl, endcapped with hexadecylcarboxamidopropyl dimethylsilyl groups; 5 µm.	1172400		
Silica gel for chromatography, hexylsilyl.	1077100	SphereClone C6 PhenoSphere C6	341 Inquire
Silica gel for chromatography, octylsilyl R1 Bonding of octylsilyl and methyl groups (double bonded phase)	1077101	Luna C8(2) Prodigy C8 Hyperclone C8 (MOS) Sphereclone C8 Kinetex C8	278 323 241 341 246
Silica gel for chromatography, octylsilyl R2 ultrapure silica gel, chemically modified at the surface by the bonding of octylsilyl groups	1077102	Luna C8(2) Prodigy C8 Hyperclone C8 (MOS) Sphereclone C8 Kinetex C8	278 323 241 341 246
Silica gel for chromatography, hexylsilyl, endcapped.	1174400	SphereClone C6 PhenoSphere C6	341 Inquire
Silica gel for chromatography, (hybrid material), octadecylsilyl, ethylene-bridged, charged surface, endcapped. Synthetic, spherical ethylene-bridged hybrid particles with a charged surface, containing both inorganic (silica) and organic (organosiloxanes) components, chemically modified at the surface by bonding of octadecyl-silyl groups. To minimize any interaction with basic compounds it is carefully endcapped to cover most of the remaining silanol groups.	1202800	Kinetex EVO C18	246
Silica gel for chromatography, octadecylsilyl, ethylene-bridged (hybrid material), endcapped. Synthetic, spherical ethylene-bridged hybrid particles, containing both organic (organosiloxanes) and inorganic (silica) components.	1190500	Kinetex EVO C18 Gemini NX-C18	246 234
Silica gel for chromatography, octylsilyl (hybrid material), ethylene-bridged (hybrid material) endcapped. Synthetic, spherical ethylene-bridged hybrid particles with a charged surface, containing both inorganic (silica) and organic (organosiloxanes) components, chemically modified at the surface by bonding of octadecyl-silyl groups. To minimize any interaction with basic compounds it is carefully endcapped to cover most of the remaining silanol groups.	1208800		
Silica gel for chromatography, (hybrid material) octylsilyl, ethylene-bridged, endcapped. Synthetic, spherical ethylene-bridged hybrid particles with a charged surface, containing both inorganic (silica) and organic (organosiloxanes) components, chemically modified at the surface by bonding of octadecyl-silyl groups. To minimize any interaction with basic compounds it is carefully endcapped to cover most of the remaining silanol groups.	1204100		
Silica gel for chromatography, (hybrid material), phenylsilyl, ethylene-bridged, endcapped. Synthetic, spherical ethylene-bridged hybrid particles containing both organic (organosiloxanes) and inorganic (silica) components, chemically modified at the surface by bonding of phenylsilyl groups. To minimize the interaction with basic compounds it's carefully endcapped to cover most of the remaining silanol groups.	1200700	Gemini C6-Phenyl	234
Silica gel for chromatography, (hybrid material), polar-embedded, octadecylsilyl, ethylene-bridged, endcapped. Synthetic, spherical ethylene-bridged hybrid particles, containing both inorganic (silica) and organic (organosiloxanes) components, chemically modified at the surface by bonding of polar embedded octadecylsilyl groups. To minimize any interaction with basic compounds it is carefully endcapped to cover most of the remaining silanol groups.	1200800		
Silica gel for chromatography, hydrophilic surface has been modified to provide hydrophilic characteristics.	1077200	Luna HILIC Kinetex HILIC	276 246
Silica gel for chromatography, hydroxypropylsilyl chemically modified at the surface by bonding of hydroxypropylsilyl groups.	1210500		
Silica gel for chromatography, nitrile cyanopropylsilyl.	1077300	Luna CN (Cyano) HyperClone CN (Cyano) PhenoSphere CN (Cyano)	276 241 Inquire

# HPLC Column Selection by Ph. Eur. Listing

Description According Pharm. Eur. 11 - 4.1.1. Reagents 2024	Number	Recommended Phenomenex Column	Page
Silica gel for chromatography, nitrile R1 chemically bonded nitrile groups.	1077400	Luna CN (Cyano) HyperClone CN (Cyano) PhenoSphere CN (Cyano)	276 241 Inquire
Silica gel for chromatography, nitrile R2 ultrapure silica (<20 ppm metal) with cyanopropylsilyl groups.	1119500	Luna CN (Cyano) HyperClone CN (Cyano) PhenoSphere CN (Cyano)	276 241 Inquire
Silica gel for chromatography, nitrile, endcapped with cyanopropylsilyl groups.	1174500	Luna CN (Cyano)	276
Silica gel for chromatography, 4-nitrophenylcarbamidesilyl. A very finely divided silica gel, chemically modified at the surface by bonding with 4-nitrophenylcarbamide groups.	1185200		
Silica gel for chromatography, octadecanoylamino-propylsilyl amino-propylsilyl groups which are acylated with octadecanoyl groups.	1115200		
Silica gel for chromatography, octadecylsilyl, endcapped. A very finely divided silica gel, chemically modified at the surface by bonding of octadecylphenylsilyl groups. To minimize any interaction with basic compounds it is carefully endcapped to cover most of the remaining silanol groups.	1199300		
Silica gel for chromatography, octadecylsilyl.	1077500	Luna C18(2) Luna Omega C18 Luna Omega PS C18 Luna Omega Polar C18 Synergi Hydro-RP Synergi Fusion-RP Gemini C18 Gemini NX-C18 HyperClone C18 Kinetex C18 Kinetex EVO C18 Kinetex XB-C18 Kinetex Polar C18 Kinetex PS C18 SphereClone C18 ODS(1) or (2)	276 290 290 290 343 343 234 234 241 246 246 246 246 246 341
Silica gel for chromatography, octadecylsilyl R1. A very finely divided ultrapure silica gel, chemically modified at the surface by the bonding of octadecylsilyl groups.	1110100	Luna C18(2) Luna Omega C18 Luna Omega PS C18 Luna Omega Polar C18 Synergi Hydro-RP Synergi Fusion-RP Gemini C18 Gemini NX-C18 Jupiter C18 Kinetex C18 Kinetex EVO C18 Kinetex XB-C18 Kinetex Polar C18 Kinetex PS C18	276 290 290 290 343 343 234 234 244 246 246 246 246 246
Silica gel for chromatography, octadecylsilyl R2 ultrapure silica; 150 Å pore size; 20% C-load; optimized for the analysis of PAHs.	1115300	EnviroSep-PP	Inquire
Silica gel for chromatography, octadecylsilyl, base-deactivated pretreated by various techniques before the bonding of octadecylsilyl groups to minimize the interaction with basic components.	1077600	Luna C18(2) Luna Omega C18 Luna Omega Polar C18 Luna Omega PS C18 Gemini C18 Gemini NX-C18 Kinetex C18 Kinetex XB-C18 Kinetex EVO C18 Kinetex Polar C18 Kinetex PS C18	276 290 290 290 234 234 246 246 246 246 246
Silica gel for chromatography, octadecylsilyl, cross-linked, endcapped. Chemically modified at the surface by cross-linking and bonding of octadecylsilyl groups. To minimize any interaction with basic compounds it's carefully endcapped to cover most of the remaining silanol groups.	1204200	Kinetex PAH	246
Silica gel for chromatography, octadecylsilyl, endcapped. To minimize any interaction with basic compounds it's carefully endcapped to cover most of the remaining silanol groups.	1115400	Luna C18(2) Luna Omega C18 Luna Omega PS C18 Luna Omega Polar C18 Gemini C18 Gemini NX-C18 Kinetex C18 Kinetex EVO C18 Kinetex XB-C18 Kinetex Polar C18 Kinetex PS C18	276 290 290 290 234 234 246 246 246 246 246
Silica gel for chromatography, octadecylsilyl, endcapped R1 ultrapure silica, chemically modified by the bonding of octadecylsilyl groups. To minimize any interaction with basic compounds it's carefully endcapped to cover most of the remaining silanol groups.	1115401	Luna C18(2) Gemini C18 Gemini NX C18 Kinetex C18 Kinetex XB C18 Kinetex EVO C18 Kinetex Polar C18 Kinetex PS C18 Luna Omega C18 Luna Omega Polar C18 Luna Omega PS C18	276           

# HPLC Column Selection by Ph. Eur. Listing

Description According Pharm. Eur. 11 - 4.1.1. Reagents 2024	Number	Recommended Phenomenex Column	Page		
Silica gel for chromatography, octadecylsilyl, endcapped, base-deactivated; pretreated by various techniques before the bonding of octadecylsilyl groups. To further minimize any interaction with basic compounds it's carefully endcapped to cover most of the remaining silanol groups.	1108600	Luna C18(2)	276		
		Gemini C18	323		
		Gemini NX C18	234		
		Kinetex C18	234		
		Kinetex XB C18			
		Kinetex EVO C18			
		Kinetex Polar C18			
		Kinetex PS C18			
		Luna Omega C18			
		Luna Omega Polar C18			
		Luna Omega PS C18			
		Silica gel for chromatography, octadecylsilyl, extra-dense bonded, endcapped.	1188500	Luna C18(2)	276
				Luna Omega C18	290
Luna Omega PS C18	290				
Luna Omega Polar C18	290				
Gemini C18	234				
Gemini NX-C18	234				
Kinetex C18	246				
Kinetex EVO C18	246				
Kinetex XB-C18	246				
Kinetex Polar C18	246				
Kinetex PS C18	246				
Silica gel for chromatography, octadecylsilyl, for separation of polycyclic aromatic hydrocarbons. A very finely divided ultrapure silica gel, chemically modified at the surface by the bonding of octadecylsilyl groups, optimized for the analysis of polycyclic aromatic hydrocarbons.	1202900			Kinetex PAH	246
Silica gel for chromatography, octadecylsilyl, monolithic.	1154500			Onyx C18	313
Silica gel for chromatography, octadecylsilyl, endcapped, base-deactivated R1; pretreated before the bonding by careful washing and hydrolyzing most of the superficial siloxane bridges. To further minimize any interaction with basic compounds it's carefully endcapped to cover most of the remaining silanol groups.	1162600	Luna C18(2)	276		
		Luna Omega C18	290		
		Luna Omega PS C18	290		
		Luna Omega Polar C18	290		
		Gemini C18	234		
		Gemini NX-C18	234		
		Kinetex C18	246		
		Kinetex EVO C18	246		
		Kinetex XB-C18	246		
		Kinetex Polar C18	246		
		Kinetex PS C18	246		
		Silica gel for chromatography, octadecylsilyl, polar embedded, encapsulated silica gel chemically modified at the surface by the bonding of polar embedded octadecylsilyl groups. To minimize any interaction with basic compounds it's carefully encapsulated to cover most of the remaining silanol groups.	1206600		
		Silica gel for chromatography, octadecylsilyl, polar endcapped.	1205500	Synergi Hydro RP	343
Luna Omega Polar C18	290				
Silica gel for chromatography, octadecylsilyl, solid core.	1205600	Kinetex C18	246		
		Kinetex XB-C18	246		
		Kinetex EVO C18	246		
		Kinetex Polar C18	246		
		Kinetex PS C18	246		
		Aeris PEPTIDE XB-C18	204		
		Aeris WIDEPORE XB-C18	204		
		Silica gel for chromatography, octadecylsilyl, solid core, endcapped with spherical silica particles containing a non-porous solid silica core surrounded by a thin outer porous silica coating with octadecylsilyl groups. To minimize any interaction with basic compounds it is carefully endcapped to cover most of the remaining silanol groups.	1193900	Biozen Peptide XB C18	210
Kinetex C18	246				
Kinetex XB-C18	246				
Kinetex EVO C18	246				
Kinetex Polar C18	246				
Kinetex PS C18	246				
Aeris PEPTIDE XB-C18	204				
Aeris WIDEPORE XB-C18	204				
Silica gel for chromatography, octadecylsilyl, with polar embedded groups, endcapped; a very finely divided silica gel, chemically modified at the surface by the bonding of polar-embedded octadecylsilyl groups. To minimize any interaction with basic compounds, it is carefully endcapped to cover most of the remaining silanol groups.	1177900	Synergi Fusion-RP	343		
Silica gel for chromatography, octadecylsilyl, with extended pH range, endcapped (resistant to bases up to pH 11)	1196700	Gemini C18	234		
		Gemini NX-C18	234		
		Kinetex EVO C18	246		
Silica gel for chromatography, octadecylsilyl, with polar incorporated groups, endcapped; the particles are based on silica, chemically modified with a reagent providing a surface with chains having polar incorporated groups and terminating octadecyl groups.	1165100	Synergi Fusion-RP	343		
Silica gel for chromatography, octylsilyl.	1077700	Kinetex C8	246		
		Luna C8(2)	276		
		Prodigy C8	323		
		HyperClone C8 (MOS)	241		
		SphereClone C8	341		
		Silica gel for chromatography, octylsilyl R1. Bonding of octylsilyl and methyl groups (double bonded phase).	1077701	Kinetex C8	246
Luna C8(2)	276				
Prodigy C8	323				
HyperClone C8 (MOS)	241				
SphereClone C8	341				
Silica gel for chromatography, octylsilyl R2 ultrapure silica (<20 ppm metal); pore size 100Å; C-load: 19%.	1077702				
Silica gel for chromatography, octylsilyl R3 ultrapure silica, bonding of octylsilyl groups and sterically protected with branched hydrocarbons at the silanes.	1155200	Biozen Intact XB-C8	210		
Silica gel for chromatography, octylsilyl, base-deactivated pretreated by various techniques before the bonding of octylsilyl groups to minimize the interaction with basic components.	1131600	Luna C8(2)	276		
		Prodigy C8	323		
		HyperClone C8 (BDS)	241		
		Kinetex C8	246		

# HPLC Column Selection by Ph. Eur. Listing

Description According Pharm. Eur. 11 - 4.1.1. Reagents 2024	Number	Recommended Phenomenex Column	Page
Silica gel for chromatography, octylsilyl, endcapped. To minimize any interaction with basic compounds it's carefully endcapped to cover most of the remaining silanol groups.	1119600	Kinetex C8 Luna C8(2) Prodigy C8 HyperClone C8 (BDS)	246 276 323 241
Silica gel for chromatography, octylsilyl, endcapped, base-deactivated pretreated by various techniques before the bonding with octylsilyl groups. To further minimize any interaction with basic compounds it's carefully endcapped to cover most of the remaining silanol groups.	1148800	Luna C8(2) Prodigy C8 Kinetex C8 HyperClone C8 (BDS)	276 323 246 241
Silica gel for chromatography, octylsilyl, with embedded polar groups, endcapped; a very finely divided silica gel, chemically modified at the surface by the bonding of polar-embedded octylsilyl groups. To minimize any interaction with basic compounds, it is carefully endcapped to cover most of the remaining silanol groups.	1152600		
Silica gel for chromatography, octylsilyl, extra-dense bonded, endcapped.	1200900	Luna C8(2) Kinetex C8	276 246
Silica gel for chromatography, octylsilyl, solid core, endcapped. Silica gel with spherical silica particles containing a non-porous solid silica core surrounded by a thin outer porous silica coating with octyl-silyl groups. To minimize any interaction with basic compounds it's carefully endcapped to cover most of the remaining silanol groups.	1208600	Biozen Intact XB-C8 Kinetex C8 Aeris WIDEPORE XB-C8	210 246 204
Silica gel for chromatography, octylsilyl, solid core. Silica gel with spherical silica particles containing a non-porous solid silica core surrounded by a thin outer porous silica coating with octylsilyl groups.	1209900	Biozen Intact XB-C8 Kinetex C8 Aeris WIDEPORE XB-C8	210 246 204
Silica gel for chromatography, oxypropionitrilsilyl	1184700		
Silica gel for chromatography, palmitamidopropylsilyl, endcapped bonding with palmitamidopropyl groups and endcapped with acetamidopropyl groups.	1161900		
Silica gel for chromatography, pentafluorophenylpropylsilyl, solid core, endcapped.	1207600	Kinetex F5 Kinetex PFP	246 246
Silica gel for chromatography, phenylhexylsilyl.	1153900	Kinetex Phenyl-Hexyl Luna Phenyl-Hexyl Gemini C6-Phenyl	246 276 234
Silica gel for chromatography, phenylhexylsilyl, endcapped. To minimize any interaction with basic compounds it's carefully endcapped to cover most of the remaining silanol groups.	1170600	Kinetex Phenyl-Hexyl Luna Phenyl-Hexyl Gemini C6-Phenyl	246 276 234
Silica gel for chromatography, phenylhexylsilyl, solid core, endcapped. Silica gel with spherical silica particles containing a non-porous solid core surrounded by a thin outer porous silica coating with phenylhexylsilyl groups. To minimize any interaction with basic compounds it is carefully endcapped to cover most of the remaining silanol groups.	1198900	Kinetex Phenyl-Hexyl	246
Silica gel for chromatography, phenylsilyl.	1110200	Synergi Polar-RP Luna Phenyl-Hexyl Gemini C6-Phenyl Prodigy Phenyl-3 (PH3) Kinetex Biphenyl Kinetex Phenyl-Hexyl	343 276 234 323 246 246
Silica gel for chromatography, phenylsilyl, endcapped. To minimize any interaction with basic compounds it's carefully endcapped to cover most of the remaining silanol groups.	1154900	Synergi Polar-RP Luna Phenyl-Hexyl Gemini C6-Phenyl Prodigy Phenyl-3 (PH3) Kinetex Biphenyl Kinetex Phenyl-Hexyl	343 276 234 323 246 246
Silica gel for chromatography, phenylsilyl, endcapped, base-deactivated.	1197900	Synergi Polar-RP Luna Phenyl-Hexyl Gemini C6-Phenyl Prodigy Phenyl-3 (PH3) Kinetex Biphenyl Kinetex Phenyl-Hexyl	343 276 234 323 246 246
Silica gel for chromatography, phenylsilyl, extra-dense bonded, endcapped.	1207700	Synergi Polar-RP Luna Phenyl-Hexyl Gemini C6 Phenyl Prodigy Phenyl PH3 Kinetex Phenyl-Hexyl Kinetex Biphenyl	343 276 234 323 246 246
Silica gel for chromatography, propoxybenzene, endcapped.	1174600	Synergi Polar-RP	343
Silica gel for chromatography, propylsilyl.	1170700		
Silica gel for chromatography, strong anion-exchange bonding of quaternary ammonium groups; pH limit of use: 2 to 8.	1077800	PhenoSphere SAX	Inquire
Silica gel for chromatography, strong cation-exchange bonding of sulfonic acid groups.	1161400	Luna SCX	276
Silica gel for chromatography, trimethylsilyl.	1115500	Capcell Pak	Inquire
Silica for size-exclusion chromatography, 10 µm silica with a very hydrophilic surface. Pore size average: 30 nm; pH stability 2 to 8; exclusion range for proteins: 1 x 10 <sup>3</sup> to 3 x 10 <sup>5</sup> ; 10 µm.	1077900	BioSep-SEC-S3000 Yarra SEC-3000	209 355
Silica gel OC for chiral separations. Coated with cellulose tris (phenylcarbamate); 5 µm.	1146800		
Silica gel OD for chiral separations.	1110300	Lux Cellulose-1	301
Silica gel OJ for chiral separations. Coated with cellulose tris (4-methylbenzoate).	1179800	Lux Cellulose-3	301
Encapsulated octadecylsilyl silica gel for chromatography. Silica gel that is encapsulated to cover most of the silanol groups, then chemically modified at the surface by the bonding of octadecylsilyl groups	1218100	Capcell Pak (all C18)	
Organosilica polymer, amorphous, octadecylsilyl. Synthetic, spherical hybrid particles containing both inorganic (silica) and organic (organosiloxanes) components, chemically modified at the surface by trifunctionally bonded octadecylsilyl groups.	1144200	Kinetex EVO C18 Gemini C18 Gemini NX-C18	246 234 234



# HPLC Column Selection by Ph. Eur. Listing

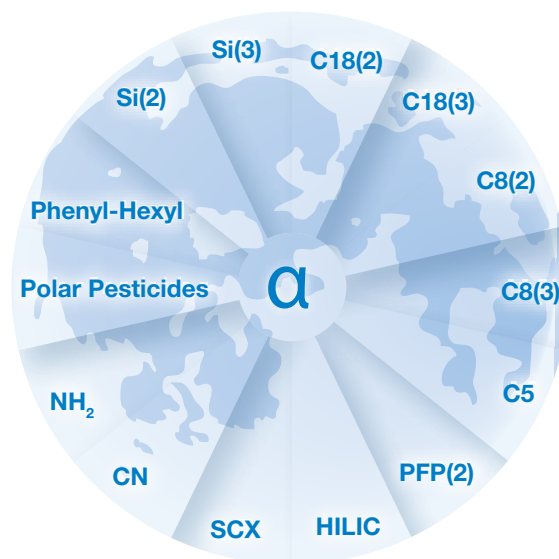
Description According Pharm. Eur. 11 - 4.1.1. Reagents 2024	Number	Recommended Phenomenex Column	Page
Organosilica polymer, amorphous, octadecylsilyl, endcapped. Synthetic, spherical hybrid particles containing both inorganic (silica) and organic (organosiloxanes) components, chemically modified at the surface by trifunctionally bonded octadecylsilyl groups. To minimize any interaction with basic compounds, it is carefully endcapped to cover most of the remaining silanol groups.	1178600	Kinetex EVO C18 Gemini C18 Gemini NX-C18	246 234 234
Organosilica polymer, amorphous, polar embedded, octadecylsilyl, endcapped. Synthetic, spherical hybrid particles containing both inorganic (silica) and organic (organosiloxanes) components, chemically modified at the surface by the bonding of polar embedded octadecylsilyl groups. To minimize any interaction with basic compounds, it is carefully endcapped to cover most of the remaining silanol groups.	1150600		
Organosilica polymer, amorphous, polar embedded propyl-2-phenylsilyl, endcapped. Synthetic, spherical hybrid particles containing both inorganic (silica) and organic (organosiloxanes) components, chemically modified at the surface by the bonding of polar embedded propyl-2-phenylsilyl groups. To minimize any interaction with basic compounds, it is carefully endcapped to cover most of the remaining silanol groups.	1178100		
Organosilica polymer for mass spectrometry, amorphous, octadecylsilyl, endcapped. Synthetic, spherical hybrid particles containing both inorganic (silica) and organic (organosiloxanes) components. To minimize any interaction with basic compounds, it is carefully endcapped to cover most of the remaining silanol groups.	1164900	Kinetex EVO C18 Gemini C18 Gemini NX-C18	246 234 234
Organosilica polymer compatible with 100% aqueous mobile phases, octadecylsilyl, solid core, endcapped.	1201700	Kinetex EVO C18	246
Organosilica polymer, multi-layered, octadecylsilyl, endcapped. Synthetic, spherical hybrid particles, multi-layered, containing both inorganic (silica) and organic (organosiloxanes) components, chemically modified at the surface by the bonding of octadecylsilyl groups. To minimize any interaction with basic compounds, it is carefully endcapped to cover most of the remaining silanol groups.	1202500	Kinetex EVO C18 Gemini C18 Gemini NX-C18	246 234 234
Vinyl polymer for chromatography, amino alkyl. Spherical particles (5 µm) of a vinyl alcohol copolymer, bonding of amino alkyl groups.	1191500	Asahipak NH <sub>2</sub> -P	Inquire
Vinyl polymer for chromatography, octadecyl. Spherical particles (5 µm) of a vinyl alcohol copolymer, bonding of octadecyl groups on the hydroxyl groups.	1155400	Asahipak ODP-50	Inquire
Vinyl polymer for chromatography, octadecylsilyl. Spherical particles (5 µm) of a vinyl alcohol copolymer bonded to an octadecylsilane. C-load: 17%.	1121600	Asahipak ODP-50	Inquire
Ion-exclusion resin for chromatography. A resin with sulfonic acid groups attached to a polymer lattice consisting of polystyrene cross-linked with divinylbenzene.	1131000	Rezex ROA-Organic Acid Rezex RHM-Monosaccharide	324 324
Cation-exchange resin, strong. Strong cation-exchange resin in protonated form with sulfonic acid groups attached to a polymer lattice consisting of polystyrene cross-linked with divinylbenzene.	1156800	Rezex ROA-Organic Acid Rezex RHM-Monosaccharide	324 324
Cation-exchange resin. A resin in protonated form with sulfonic acid groups attached to a polymer lattice consisting of polystyrene cross-linked with 8% divinylbenzene. Available as spherical beads.	1016700	Rezex ROA-Organic Acid Rezex RHM-Monosaccharide	324 324
Cation-exchange resin R1. A resin in protonated form with sulfonic acid groups attached to a polymer lattice consisting of polystyrene cross-linked with 4% divinylbenzene. Available as spherical beads.	1121900		
Cation-exchange resin R2. Resin containing strongly acidic propylsulfonic acid groups.	1195400		
Cation-exchange resin (Calcium form), strong. Resin in calcium form with sulfonic acid groups attached to a polymer lattice consisting of polystyrene cross-linked with 8% divinylbenzene	1104600	Rezex RCM-Monosaccharide Rezex RCU-USP Sugar Alcohols	324 324
Cation-exchange resin (Sodium form), strong. Resin in sodium form with sulfonic acid groups attached to a polymer lattice consisting of polystyrene cross-linked with divinylbenzene.	1176100	Rezex RNM-Carbohydrate	324
Cation-exchange resin, weak. Weak cation-exchange resin in pronated form with carboxylate functional groups attached to a polymer lattice consisting of polystyrene cross-linked with divinylbenzene.	1203200	Biozen WCX	210
Anion-exchange resin. Resin in chlorinated form containing quaternary ammonium groups [CH <sub>3</sub> N+(CH <sub>3</sub> ) <sub>3</sub> ] attached to a polymer lattice consisting of polystyrene cross-linked with 2% of divinylbenzene. Available as spherical beads.	1007200		
Anion-exchange resin R1. Resin containing quaternary ammonium groups [CH <sub>3</sub> N+(CH <sub>3</sub> ) <sub>3</sub> ] attached to a lattice consisting of methacrylate.	1123400		
Anion-exchange resin R2. Conjugate of homogeneous 10 µm hydrophilic polyether particles, and a quaternary ammonium salt, providing a matrix suitable for strong anion-exchange chromatography of proteins.	1141900		
Anion-exchange resin R3. Resin with quaternary ammonium groups attached to a lattice of ethylvinyl-benzene crosslinked with 55% of divinylbenzene.	1180900		
Anion-exchange resin for chromatography, strongly basic with quaternary ammonium groups attached to a lattice of latex cross-linked divinylbenzene.	1112700		
Anion-exchange resin for chromatography, strongly basic R1. Non-porous resin agglomerated with a 100 nm alkyl quaternary ammonium functionalized latex.	1187400		
Anion-exchange resin, weak resin with diethylaminoethyl groups attached to lattice consisting of poly(methyl methacrylate).	1146700		

## Explore Successful Separations

Your success begins with our commitment to provide the essential solutions to HPLC separations in the Luna brand. Some of the highest quality and performance standards are incorporated into Luna products, making them an indispensable platform for all areas of HPLC.

## Explore Resolution with Luna Selectivities

Phase selectivity has the strongest impact on overall chromatographic resolution. Choosing the optimal selectivity can drive your separation to success. Luna phases span through 10 different chemistries, each offering its own unique selectivity.



Luna Bonded Phase Selectivity Chart

Luna Phases	Description	Particle Sizes (µm)	Pore Size (Å)	Surface Area (m <sup>2</sup> /g)	Carbon Load (%)	pH Stability	Reversed Phase	Normal Phase	HILIC	IEX	USP Column Classification
<b>Silica(2)</b>	Unbonded silica	3, 5, 10, 10-PREP, 15	100	400	—	2.0 - 7.5		☾	☾		L3
<b>Silica(3)</b>	Unbonded silica	10-PREP	100	400	—	2.0 - 7.5		☾	☾		L3
<b>C5</b>	5 Carbon ligand	5, 10	100	440	12.5	1.5 - 9.0*	☾				—
<b>C8(2)</b>	C8 ligand optimized for improved peak shape	3, 5, 10, 10-PREP, 15	100	400	13.5	1.5 - 9.0*	☾				L7
<b>C8(3)</b>	C8 ligand optimized for improved peak shape	10-PREP	100	400	13	1.5 - 9.0*	☾				L7
<b>C18(2)</b>	C18 ligand optimized for improved peak shape	2.5, 3, 5, 10, 10-PREP, 15	100	400	17.5	1.5 - 9.0*	☾				L1
<b>C18(3)</b>	C18 ligand optimized for improved peak shape	10-PREP	100	400	17	1.5 - 9.0*	☾				L1
<b>CN</b>	Versatile CN phase	3, 5, 10	100	400	7.0	1.5 - 7.0	☾	☾			L10
<b>NH<sub>2</sub></b>	Rugged and reproducible NH <sub>2</sub>	3, 5, 10	100	400	9.5	1.5 - 11	☾	☾	☾	☾	L8
<b>Phenyl-Hexyl</b>	Phenyl phase attached to C6 (hexyl) ligand	3, 5, 10, 10-PREP, 15	100	400	17.5	1.5 - 9.0*	☾				L11
<b>SCX</b>	Benzene sulfonic acid	5, 10	100	400	0.55 % Sulfur Load, Binding Capacity: 0.15 meq/g	2.0 - 7.0				☾	L9
<b>HILIC</b>	Reproducible, cross-linked diol	3, 5	200	200	5.7	1.5 - 8.0			☾		L20
<b>PFP(2)</b>	Pentafluorophenyl with a C3 (propyl) linkage	3, 5	100	400	11.5	1.5 - 8.0	☾		☾		L43
<b>Polar Pesticides</b>	Proprietary	3	100	380	8	2-8	☾		☾		

\* pH range is 1.5 - 9 under gradient conditions. pH range is 1.5 - 10 under isocratic conditions.



### UHPLC

Try out Luna Omega 1.6 µm fully porous UHPLC columns to boost your UHPLC instrumentation performance (see page 290)



Try Gemini for 1.0 - 12.0 pH stability. (see page 234).



Increase lab safety with HPLC / UHPLC solvent protection, see SecurityCAP™ products on pp. 417-418



## Luna Silica

### A Backbone and Phase Designed for Long Column Lifetimes

Luna columns' excellent performance is not simply the result of ultra-pure metal-free silica (99.99% purity). Meticulous care is given to the quality control of surface smoothness, pore structure and pore consistency to ensure particles of uniform structure and enhanced mechanical strength. Either bonded or unbonded, Luna silica produces highly advanced HPLC columns:

- Low percentage of "fines" from damaged silica leading to lower backpressures and enhanced column performance and lifetimes
- High column bed stability enhanced by particle shape uniformity

### Incredible Silica Smoothness

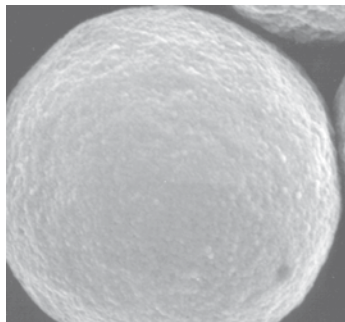
Luna silica is extremely smooth and spherical. For bonded phases, this provides a uniform bonding surface for consistent and even bonded phase coverage. The likelihood of silica particle shearing and breakage during bonding and packing is very low; thus, Luna columns have high efficiencies and long column lifetimes.

- Recommended for preparative and bulk packing into DAC systems, see page 395 for more information

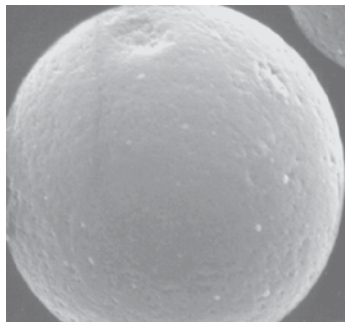
### Long Column Lifetimes and Excellent Performance

Ultra-pure, metal-free silica (99.99% purity) is the backbone of all Luna material. The resulting high quality particles have a surface smoothness, pore structure, and pore consistency to ensure a more uniform particle shape and greater reproducibility.

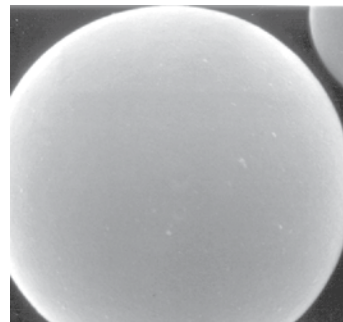
#### Superior Particle Smoothness



Agilent Technologies®  
ZORBAX® 5 µm SB-C18



Waters®  
Symmetry® 5 µm C18



Phenomenex  
Luna 5 µm C18

#### Luna Silica(2)

USP: L3

pH Stability: 2.0 – 7.5

Particle Size: 3 µm, 5 µm, 10 µm, 10 µm-PREP, and 15 µm

Phase: Unbonded silica

Application: Polar compounds

#### Luna Silica(3)

USP: L3

pH Stability: 2.0 – 7.5

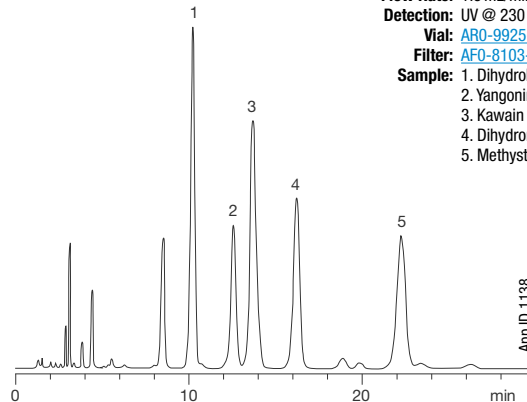
Particle Size: 10 µm-PREP

Phase: Unbonded silica

Application: Small Organic Molecules, Steroids, Nutraceuticals, Fat Soluble Vitamins, Tocopherols

#### Natural Products (Kava Kava)

Column: Luna 5 µm Silica(2)  
Dimensions: 150 x 4.6 mm  
Part No.: [00F-4274-E0](#)  
Guard Cartridge: [AJ0-4348](#)  
Guard Holder: [KJ0-4282](#)  
Mobile Phase: Hexane/Dioxane (85:15)  
Flow Rate: 1.5 mL/min  
Detection: UV @ 230 nm  
Vial: [AR0-9925-13](#)  
Filter: [AF0-8103-52](#)  
Sample: 1. Dihydrokavain  
2. Yangonin  
3. Kavain  
4. Dihydromethysticin  
5. Methysticin



App ID 1138



## Luna C18(2), C18(3), C8(2), C8(3), and C5

### Your Starting Point for Reversed Phase Methods

The Luna column has found a place as one of the world's top reversed phase columns because it provides a measurable improvement over many HPLC columns for two important chromatographic properties: resolution and peak shape. The high efficiencies and bonded phase surface coverage provide for sharp peaks. The result:

- Free exposed silanols virtually eliminated by complete bonding and endcapping
- Sharp peak shape for good method sensitivity
- pH stable from 1.5 to 10.0 for over 1,000 hours

#### Luna C18(2)

USP: L1

LC-MS Certified

**pH Stability:** 1.5-9.0\*

Particle Size: 2.5 µm, 3 µm, 5 µm, 10 µm, 10 µm-*PREP*, and 15 µm

Phase: C18, endcapped

Application: Small molecules

Strength: Wide pH stability provides longer column lifetime and greater method flexibility

#### Luna C18(3)

USP: L1

LC-MS Certified

**pH Stability:** 1.5-9.0\*

Particle Size: 10 µm-*PREP*

Phase: C18, endcapped

Application: Pharmaceuticals, Peptides, Nutraceuticals, Agrochemical, Vitamins, Basic Compounds, General Reversed Phase Applications

Strength: Media made for process and purification methods

#### Luna C8(2)

USP: L7

LC-MS Certified

**pH Stability:** 1.5-9.0\*

Particle Size: 3 µm, 5 µm, 10 µm, 10 µm-*PREP*, and 15 µm

Phase: C8, endcapped

Application: Small molecules when less retention and greater speed is desired

Strength: Lower silanol activity than C18(2) phase plus wide pH stability for longer column life and greater method flexibility

#### Luna C8(3)

USP: L7

LC-MS Certified

**pH Stability:** 1.5-9.0\*

Particle Size: 10 µm-*PREP*

Phase: C8, endcapped

Application: Pharmaceuticals, Peptides, Estrogens, Basic Compounds, General Reversed Phase Applications

Strength: Media made for process and purification methods

#### Luna C5

LC-MS Certified

**pH Stability:** 1.5-9.0\*

Particle Size: 5 µm, 10 µm

Phase: C5, endcapped

Application: Small molecules when less retention and greater speed is desired

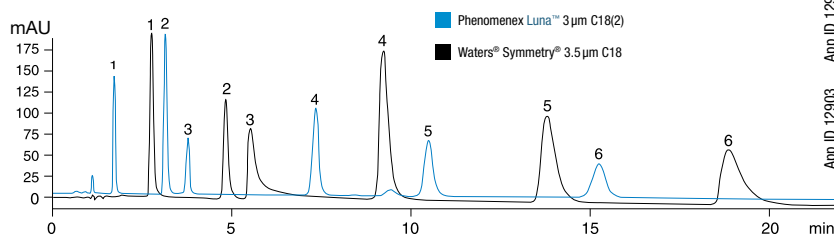
Strength: Greater hydrolytic and pH stability compared to most C4 phases

\* pH range is 1.5-10 under isocratic conditions. pH range is 1.5-9 under gradient conditions.



## Applications

### Polar, Acidic Drugs



App ID 12904  
App ID 12903

Conditions same for both columns:

**Dimensions:** 75 x 4.6 mm

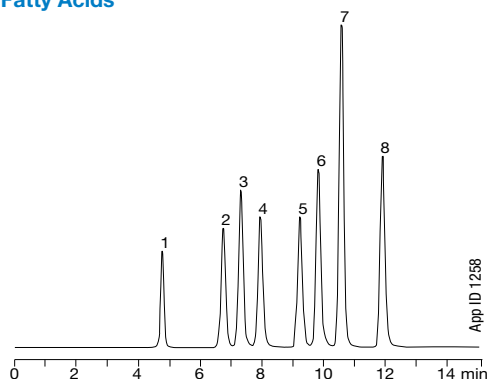
**Mobile Phase:** 20 mM KH<sub>2</sub>PO<sub>4</sub>/Acetonitrile(70:30)

**Flow Rate:** 0.75 mL/min

**Detection:** UV @ 202 nm

**Sample:** 1. Tolmetin  
2. Naproxen  
3. Diflunisal  
4. Fenoprofen  
5. Indomethacin  
6. Ibuprofen

### Fatty Acids



App ID 1258

**Columns:** Luna 5 µm C8(2)  
**Dimensions:** 150 x 4.6 mm  
**Part No.:** [00F-4249-E0](#)  
**Mobile Phase:** A: Acetonitrile  
B: Water (18 Mohms DI)  
**Gradient:** A/B (70:30) to A/B (90:10) in 10 min,  
A/B (90:10) to A/B (70:30) in 2 min,  
hold for 4 min  
**Flow Rate:** 0.3 mL/min  
**Detection:** Evaporative Light Scattering (ELSD)  
**Temperature:** 22 °C

**Sample:** 1. Lauric acid  
2. Myristic acid  
3. Palmitoleic acid  
4. Linoleic acid  
5. Palmitic acid  
6. Oleic acid  
7. Heptadecanoic acid  
8. Stearic acid

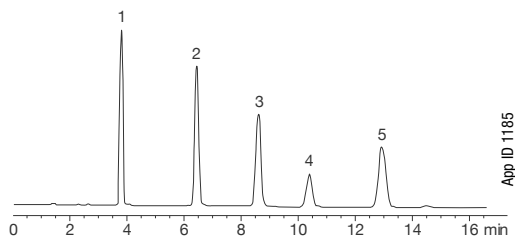
The comparative data presented here may not be representative for all applications.



## Luna C18(2), C18(3), C8(2), C8(3), C5 (cont'd)

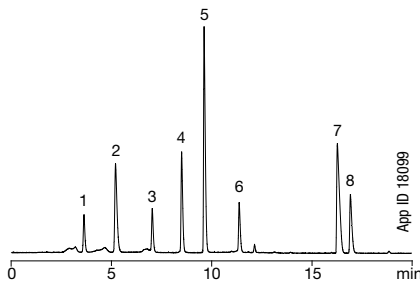
### Steroids

**Column:** Luna 5 µm C18(2)  
**Dimensions:** 150 x 4.6 mm  
**Part No.:** [00F-4252-E0](#)  
**Mobile Phase:** 0.1% H<sub>3</sub>PO<sub>4</sub> / Acetonitrile/Methanol (54:35:11)  
**Flow Rate:** 0.75 mL/min  
**Detection:** UV @ 254 nm  
**Sample:** 1. Hydrocortisone 3. 11- $\alpha$ -Hydroxyprogesterone  
 2. Corticosterone 4. Cortisone Acetate  
 5. 11-Ketoprogesterone



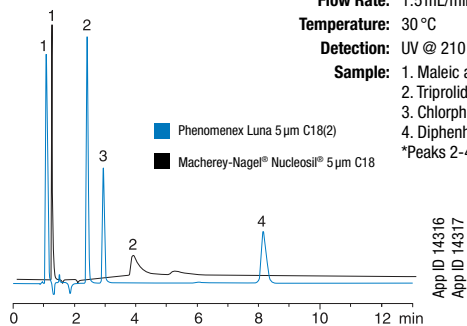
### Narcotics

**Columns:** Luna 5 µm C18(2) **Flow Rate:** 1.0 mL/min  
**Dimensions:** 150 x 4.6 mm **Temperature:** 45 °C  
**Part No.:** [00F-4252-E0](#) **Detection:** UV @ 254 nm (ambient)  
**Mobile Phase:** A: 10 mM NH<sub>4</sub>OAc, pH 5.5 **Sample:** 1. Normorphine 5. Codeine  
 B: Acetonitrile 2. Morphine 6. Hydrocodone  
**Gradient:** A/B (95:5) for 3 minutes, then A/B (95:5) to A/B (60:40) in 23 minutes 3. Hydromorphone 7. Cocaine  
 4. Norcodeine 8. Norcocaine



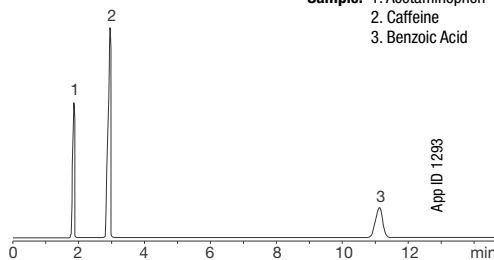
### Basic Compounds

Conditions same for both columns:  
**Dimensions:** 150 x 4.6 mm  
**Mobile Phase:** 20 mM Potassium phosphate, pH 2.5 / Acetonitrile (75:25)  
**Flow Rate:** 1.5 mL/min  
**Temperature:** 30 °C  
**Detection:** UV @ 210 nm  
**Sample:** 1. Maleic acid  
 2. Triprolidine\*  
 3. Chlorpheniramine\*  
 4. Diphenhydramine\*  
 \*Peaks 2-4 adsorb on Nucleosil C18



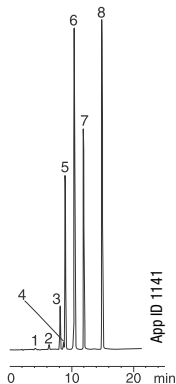
### Acetaminophen, USP Method

**Column:** Luna 5 µm C18(2)  
**Dimensions:** 150 x 4.6 mm  
**Part No.:** [00F-4252-E0](#)  
**Mobile Phase:** Water/Methanol/Acetic Acid (69:28:3)  
**Flow Rate:** 1.5 mL/min  
**Detection:** UV @ 275 nm  
**Sample:** 1. Acetaminophen  
 2. Caffeine  
 3. Benzoic Acid



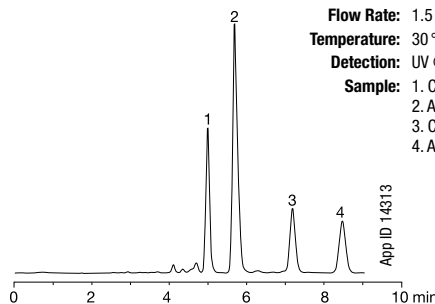
### Pharmaceutical Preservatives

**Column:** Luna 5 µm C5  
**Dimensions:** 150 x 4.6 mm  
**Part No.:** [00F-4043-E0](#)  
**Mobile Phase:** A: 0.5% Acetic acid in water/acetonitrile (80:20)  
 B: 0.5% Acetic acid in water/acetonitrile (20:80)  
**Gradient:** A/B (100:0) to A/B (0:100) in 30 min  
**Flow Rate:** 1 mL/min  
**Temperature:** 25 °C  
**Detection:** UV @ 254 nm  
**Sample:** 1. Propylparaben impurity  
 2. Benzyl alcohol  
 3. Phenol  
 4. Benzoic acid  
 5. Methylparaben  
 6. Benzaldehyde  
 7. Ethylparaben  
 8. Propylparaben



### $\alpha$ - and $\beta$ -acids in Hop Extract

**Column:** Luna 5 µm C18(2)  
**Dimensions:** 250 x 4.6 mm  
**Part No.:** [00G-4252-E0](#)  
**Mobile Phase:** Methanol with 0.1% H<sub>3</sub>PO<sub>4</sub> / Water with 0.1% H<sub>3</sub>PO<sub>4</sub> (90:10)  
**Flow Rate:** 1.5 mL/min  
**Temperature:** 30 °C  
**Detection:** UV @ 314 nm  
**Sample:** 1. Cohumulone  
 2. Ad-+humulone  
 3. Colupulone  
 4. Ad-+lupulone



## Luna Phenyl-Hexyl Engineered for Stability

Luna Phenyl-Hexyl columns provide separations not achievable on C18 or C8 columns; such as increased retention for polar, aromatic compounds as well as reversals in analyte elution order. Luna Phenyl-Hexyl columns are a reproducible, extremely stable phenyl phase. Most phenyl phases use a short propyl (3 carbon) linker, which limits phase stability. The Phenyl-Hexyl bonded phase employs a phenyl ring with a hexyl (6 carbon) linker and is densely bonded to Luna silica surface, reducing bonded phase hydrolysis and increasing chemical stability. The result:

- **Highly reproducible and stable phenyl phase**
- **Dual selectivity of both phenyl phase and a short alkyl phase (C5 or C8)**
- **Excellent retention of aromatic and polar, amine compounds**
- **Recommended for US EPA Method 8330B for explosives analysis**
- **1.5 to 10 pH stability for over 10000 hours**

### Luna Phenyl-Hexyl

USP: L11

LC-MS Certified

**pH Stability: 1.5-9.0\***

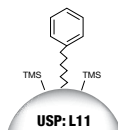
Particle Size: 3 µm, 5 µm, 10 µm, 10 µm-PREP, and 15 µm

Phase: Phenyl with Hexyl (C6) linker, endcapped

Application: Non-polar compounds

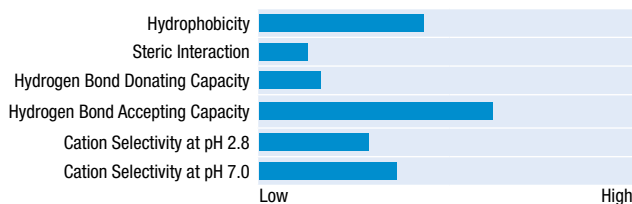
Strength: Aromatic selectivity enhanced by higher hydrophobicity due to hexyl linker

\* pH range is 1.5 - 10 under isocratic conditions.  
pH range is 1.5 - 9 under gradient conditions.



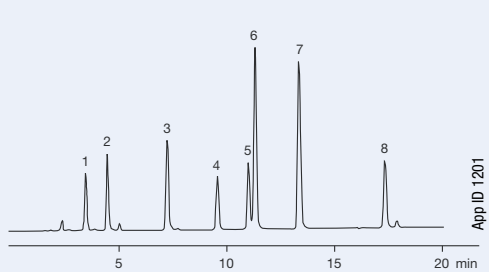
### Luna Phenyl-Hexyl

Our most hydrophobic phenyl column and it will also provide good hydrogen accepting functionality for acidic retention.

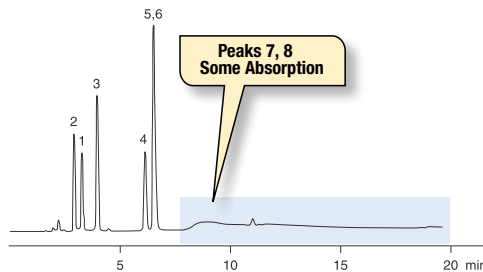


### Chromatographic Comparisons of Phenyl Columns

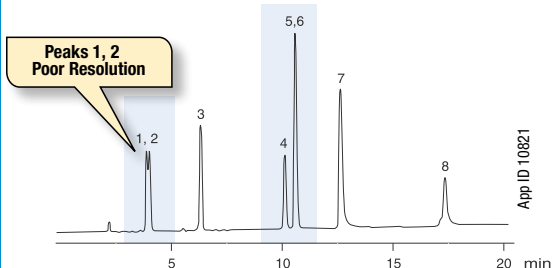
#### Luna 5 µm Phenyl-Hexyl



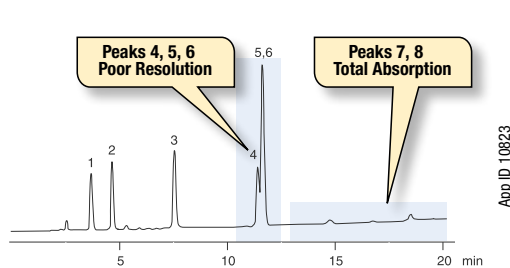
#### Waters® Spherisorb® 5 µm Phenyl



#### Agilent Technologies® ZORBAX® 5 µm SB-Phenyl



#### Agilent Technologies ZORBAX 5 µm Phenyl



### Antibacterials

Conditions for all columns:

**Dimensions:** 150 x 4.6 mm

**Mobile Phase:** A: 20 mM KH<sub>2</sub>PO<sub>4</sub>, pH 2.5

B: Acetonitrile

**Gradient:** A/B (80:20) to A/B (75:25) in 5 min to A/B (55:45) in 15 min

**Flow Rate:** 1.0 mL/min

**Detection:** UV @ 254 nm

**Sample:** 1. Carbadox                      4. Oxolinic Acid                      7. Nalidixic Acid  
2. Thiamphenicol                      5. Sulfadimethoxine                      8. Piromidic Acid  
3. Furazolidone                      6. Sulfaquinoxaline

Comparative separations may not be representative of all applications.



## Luna CN (cyano)

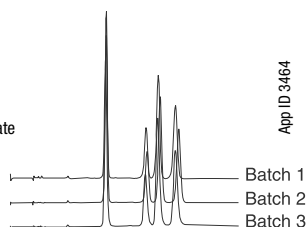
### Proven Reproducibility

For carboxyl, carbonyl, and amine containing compounds, Luna CN columns offer a unique polar selectivity in reversed phase and normal phase modes. Luna CN columns provide sharp peaks and great reproducibility run-to-run, column-to-column and batch-to-batch. State of the art modification of the silica surface ensures improved resistance to bonded phase hydrolysis providing one of the most stable CN phases on the market. The result:

- Excellent polar selectivity
- Improved peak shapes
- One of the most stable CN columns under reversed phase or normal phase conditions
- pH stable from 1.5 to 7.0

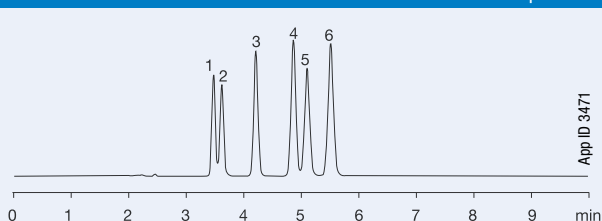
### Batch-to-Batch Reproducibility

**Column:** Luna 5 µm CN  
**Dimensions:** 150 x 4.6 mm  
**Mobile Phase:** A: Hexane, B: Methylene chloride/Methanol(80:20), A/B (80:20)  
**Flow Rate:** 2.0 mL/min  
**Detection:** UV @ 254 nm  
**Injection:** 1.0 µL  
**Temperature:** Ambient  
**Sample:** 1. Hydrocortisone  
 2. Prednisone  
 3. Cortisone  
 4. Hydrocortisone Acetate



### Chromatographic Comparisons of CN Columns

#### Luna 5 µm CN



#### Phthalate Esters

Normal Phase Conditions for all columns:  
**Dimensions:** 150 x 4.6 mm  
**Mobile Phase:** A: Hexane, B: Methylene chloride/Methanol (80:20), A/B (99:1)  
**Flow Rate:** 1.0 mL/min  
**Detection:** UV @ 254 nm  
**Temperature:** Ambient  
**Sample:** 1. Di-n-octyl phthalate  
 2. Bis (2-Ethylhexyl) phthalate  
 3. Butylbenzyl phthalate  
 4. Di-n-butyl phthalate  
 5. Diethyl phthalate  
 6. Dimethyl phthalate

## Luna CN

USP: L10

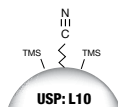
**pH Stability:** 1.5-7.0

**Particle Size:** 3 µm, 5 µm, and 10 µm

**Phase:** Cyano, endcapped

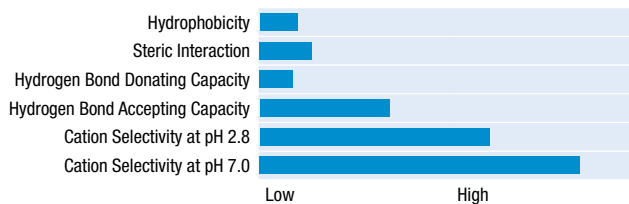
**Application:** Compounds with COOH, CO, NH<sub>2</sub>, NHR<sub>2</sub>, or NR<sub>2</sub>

**Strength:** Improved reproducibility for more consistent results run-to-run, column-to-column, batch-to-batch



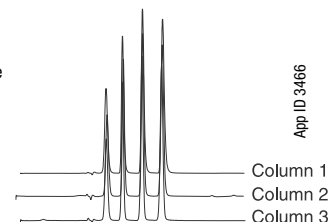
### Luna CN

Nitrile groups bound to the silica surface offer a unique polar selectivity under reversed phase or normal phase conditions.

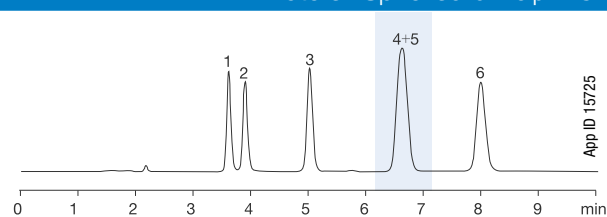


### Column-to-Column Reproducibility

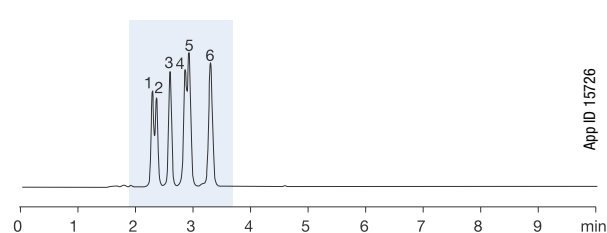
**Column:** Luna 5 µm CN  
**Dimensions:** 150 x 4.6 mm  
**Mobile Phase:** A: Hexane, B: Methylene chloride/Methanol(80:20), A/B (95:5)  
**Flow Rate:** 1.0 mL/min  
**Injection:** 5 µL  
**Detection:** UV @ 254 nm  
**Temperature:** Ambient  
**Sample:** 1. Dimethyl phthalate  
 2. Diethyl phthalate  
 3. Dibutyl phthalate  
 4. Dioctyl phthalate



#### Waters® Spherisorb® 5 µm CN



#### Agilent Technologies® ZORBAX® 5 µm SB-CN



## Luna NH<sub>2</sub> (amino)

### Developed for Ruggedness

Luna NH<sub>2</sub> columns were developed to provide improved amino column lifetime. Column life for most amino columns can be problematic as the amino bonding easily strips off the silica. Luna NH<sub>2</sub> columns, however, show good bonded phase stability under both normal and reversed phase modes and across a pH range of 1.5 to 11.0. Such a broad pH range indicates the bonded phase ruggedness and the density of the bonded phase coverage. The result:

- Long lifetimes and low phase bleed for more reproducible methods
- Excellent retention of simple sugars, complex sugars, sugar alcohols by reversed phase conditions, and hydrogen bonding compounds under normal phase conditions
- pH stable from 1.5 to 11.0
- Stable in 100% aqueous mobile phases

## Luna NH<sub>2</sub>

USP: L8

**pH Stability:** 1.5-11.0

Particle Size: 3 μm, 5 μm, and 10 μm

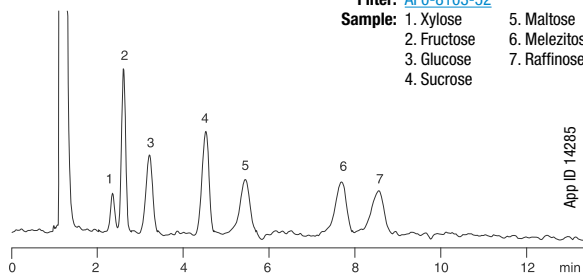
Phase: Amino

Application: Compounds with COOH, CO, NH<sub>2</sub>, NHR<sub>2</sub>, or NR<sub>2</sub>

Strength: Sugars by reversed phase, steroids by normal phase, oligonucleotides by ion exchange

### Simple Sugars

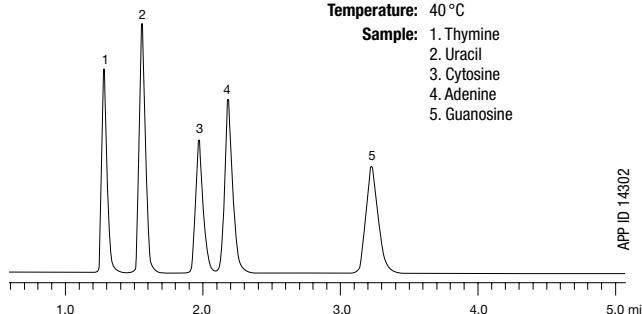
**Column:** Luna 5 μm NH<sub>2</sub>  
**Dimensions:** 250 x 4.6 mm  
**Part No.:** [00G-4378-E0](#)  
**Guard Cartridge:** [AJ0-4302](#)  
**Guard Holder:** [KJ0-4282](#)  
**Mobile Phase:** Acetonitrile/Water (80:20)  
**Flow Rate:** 3 mL/min  
**Temperature:** 40 °C  
**Detection:** RI  
**Vial:** [AR0-9925-13](#)  
**Filter:** [AF0-8103-52](#)  
**Sample:** 1. Xylose 5. Maltose  
 2. Fructose 6. Melezitose  
 3. Glucose 7. Raffinose  
 4. Sucrose



App ID 14285

### Nucleic Acid Bases

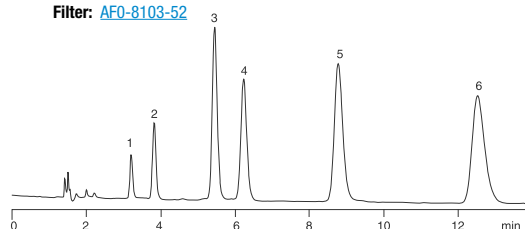
**Column:** Luna 5 μm NH<sub>2</sub>  
**Dimensions:** 150 x 4.6 mm  
**Part No.:** [00F-4378-E0](#)  
**Mobile Phase:** Acetonitrile/Water (80:20)  
**Flow Rate:** 1.0 mL/min  
**Detection:** UV @ 254 nm  
**Temperature:** 40 °C  
**Sample:** 1. Thymine  
 2. Uracil  
 3. Cytosine  
 4. Adenine  
 5. Guanosine



APP ID 14302

### Steroids

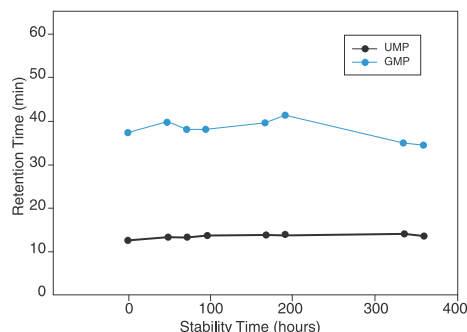
**Column:** Luna 5 μm NH<sub>2</sub>  
**Dimensions:** 250 x 4.6 mm  
**Part No.:** [00G-4378-E0](#)  
**Guard Cartridge:** [AJ0-4302](#)  
**Guard Holder:** [KJ0-4282](#)  
**Mobile Phase:** Hexane/Ethanol (85:15)  
**Flow Rate:** 2 mL/min  
**Temperature:** 22 °C  
**Detection:** UV @ 240 nm  
**Vial:** [AR0-9925-13](#)  
**Filter:** [AF0-8103-52](#)  
**Sample:** 1. 11-Ketoprogesterone  
 2. 11-Hydroxyprogesterone  
 3. Cortisone Acetate  
 4. Prednisolone 21-Acetate  
 5. Cortisone  
 6. Prednisolone



App ID 14299

### Stability in 100% Aqueous Mobile Phase

**Column:** Luna 5 μm NH<sub>2</sub>  
**Dimensions:** 250 x 4.6 mm  
**Part No.:** [00G-4378-E0](#)  
**Guard Cartridge:** [AJ0-4302](#)  
**Guard Holder:** [KJ0-4282](#)  
**Mobile Phase:** 20 mM Potassium Phosphate Buffer pH 2.7  
**Flow Rate:** 1.5 mL/min  
**Detector:** UV @ 254 nm  
**Vial:** [AR0-9925-13](#)  
**Filter:** [AF0-8103-52](#)  
**Temperature:** Ambient  
**Injection:** 2.5 μL  
**Conditions:** Continuously flushed at 1.0 mL/min using 100% 20 mM Potassium Phosphate Buffer pH 2.7 between injections





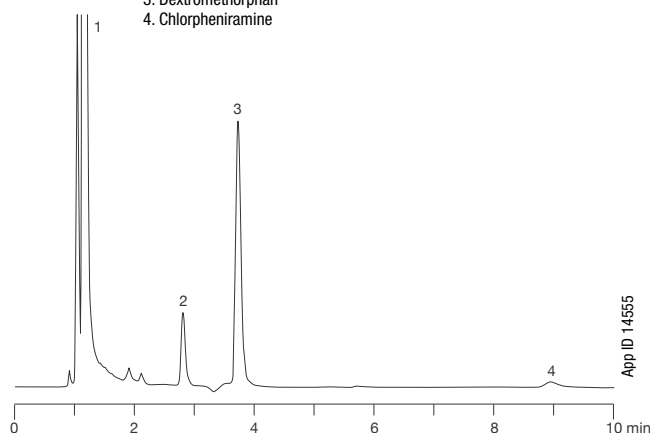
## Luna SCX (strong cation exchange) Develop Robust Methods

Luna SCX columns provide excellent resolution and peak shape of basic, cationic compounds. However, most SCX columns show poor peak shape and bad resolution causing many chromatographers to ignore this important phase for small molecule method development, until now. Luna SCX columns contain a benzene sulfonic acid ligand providing ion-exchange, reversed phase, and aromatic interactions. Such interactions make Luna SCX columns great as a first dimension for 2D LC applications as well as improved resolution for small molecules. The result:

- Resolving power and sharp peak shape to separate complex cationic/basic and nitrogen containing compounds
- 5 and 10µm columns and bulk media for analytical through preparative separations
- Benzene sulfonic acid ligand provides mixed-mode interaction improving separation for 2D peptide applications

### Childrens Tylenol Cold Syrup

**Column:** Luna 5µm SCX  
**Dimensions:** 150 x 4.6 mm  
**Part No.:** [00F-4398-E0](#)  
**Guard Cartridge:** [AJ0-4308](#)  
**Guard Holder:** [KJ0-4282](#)  
**Mobile Phase:** 50 mM KH<sub>2</sub>PO<sub>4</sub>, pH 2.5/Acetonitrile (35:65)  
**Injection Volume:** 1µL  
**Flow Rate:** 1.5 mL/min  
**Detection:** UV @ 210 nm  
**Vial:** [ARO-9925-13](#)  
**Filter:** [AF0-8103-52](#)  
**Sample Prep:** Dissolve 1 part Childrens Tylenol Cold in 10 parts Methanol  
**Sample:** 1. Acetaminophen  
 2. Pseudoephedrine  
 3. Dextromethorphan  
 4. Chlorpheniramine



App ID 14555



**SCX Method Development and pH:** The standard operating pH range for Luna SCX columns is 2.0 to 7.0. Most SCX methods are typically run between pH 2.0 and 5.0 for optimal performance. This ensures that nitrogen-containing analytes, especially those with adjacent conjugated system are protonated. Running in highly acidic (pH < 2.0) or basic (pH > 7.0) mobile phases may cause this phase to undergo degradation, as is common for all silica-based SCX phases.

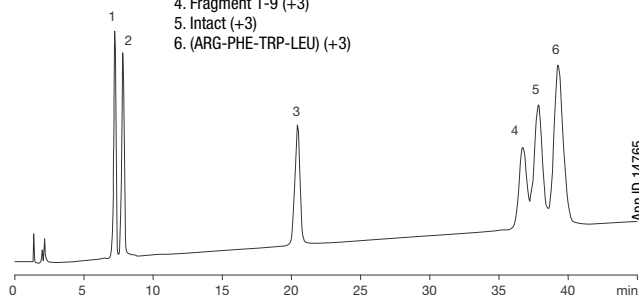
### Luna SCX

USP: L9

**pH Stability:** 2.0-7.0  
**Particle Size:** 5µm and 10µm  
**Phase:** Benzene Sulfonic Acid, Strong Cation Exchange  
**Application:** Amine and polyamine containing compounds  
**Strength:** Guaranteed to provide sharper peak shape and better resolution compared to traditional SCX columns

### Peptides

**Column:** Luna 5µm SCX  
**Dimensions:** 150 x 4.6 mm  
**Part No.:** [00F-4398-E0](#)  
**Guard Cartridge:** [AJ0-4308](#)  
**Guard Holder:** [KJ0-4282](#)  
**Mobile Phase:** A: 20 mM Potassium Phosphate, 25% Acetonitrile, pH 2.5  
 B: 20 mM Potassium Phosphate, 25% Acetonitrile, 400 mM Potassium Chloride, pH 2.5  
**Gradient:** A/B (95:5) to A/B (10:90) in 45 minutes  
**Flow Rate:** 1 mL/min  
**Temperature:** 35 °C  
**Detection:** UV @ 215 nm  
**Vial:** [ARO-9925-13](#)  
**Filter:** [AF0-8103-52](#)  
**Injection Volume:** 2µL (5µg on column)  
**Sample:** Peptide Mixture - Substance P  
 1. Fragment 5-11 (+1)  
 2. Fragment 4-11 (+1)  
 3. Fragment 2-11 (+2)  
 4. Fragment 1-9 (+3)  
 5. Intact (+3)  
 6. (ARG-PHE-TRP-LEU) (+3)

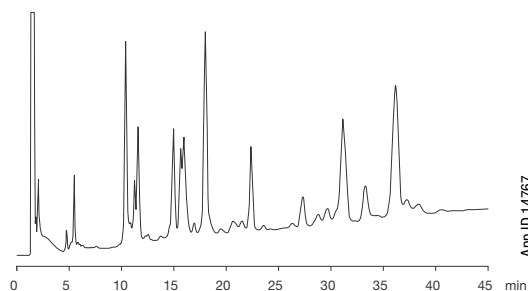


App ID 14765



### Tryptic Digest of Bovine Cytochrome c

**Column:** Luna 5µm SCX  
**Dimensions:** 150 x 4.6 mm  
**Part No.:** [00F-4398-E0](#)  
**Guard Cartridge:** [AJ0-4308](#)  
**Guard Holder:** [KJ0-4282](#)  
**Mobile Phase:** A: 20 mM Potassium Phosphate, pH 2.5 / 25% Acetonitrile  
 B: 20 mM Potassium Phosphate, pH 2.5 / 25% Acetonitrile / 350 mM Potassium Chloride  
**Gradient:** 100% A to 100% B in 50 minutes  
**Flow Rate:** 1 mL/min  
**Temperature:** 35 °C  
**Detection:** UV @ 215 nm  
**Vial:** [ARO-9925-13](#)  
**Filter:** [AF0-8103-52](#)  
**Injection Volume:** 50µL (20µg on column)  
**Sample:** Bovine Cytochrome c trypsin digest



App ID 14767

## Luna HILIC

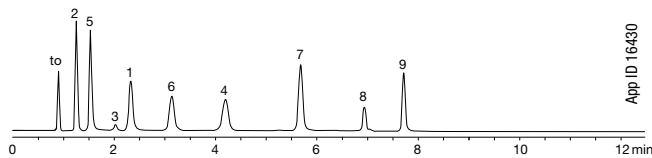
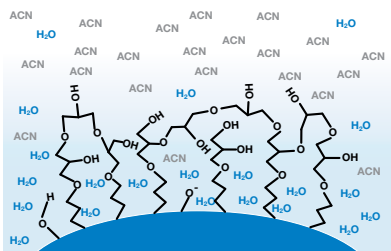
### Increase MS Sensitivity and Retention for Polar Compounds

Luna HILIC columns retain a water-enriched layer on the surface of the silica. This water layer facilitates the transfer of polar compounds onto the stationary phase for increased retention.

Hydrophilic Interaction Liquid Chromatography (HILIC) is a separation mode where the partitioning of polar solutes from the high concentration, water-miscible, organic mobile phase into the hydrophilic surface environment creates separations. Polar solutes exhibit increased retention and elute in the order of increasing hydrophilicity.

Finally, reproducible, robust HILIC separations!

- Made for retention of polar compounds
- Increase mass spectrometry sensitivity
- Increase laboratory throughput and productivity



**Column:** Luna 5 µm HILIC  
**Dimensions:** 150 x 4.6 mm  
**Part No.:** [00F-4450-E0](#)  
**Guard Cartridge:** [AJ0-8329](#)  
**Guard Holder:** [KJ0-4282](#)  
**Mobile Phase:** A: Acetonitrile  
 B: Water  
 C: 100 mM Ammonium Acetate, pH 5.8  
**Gradient:** A/B/C (90:5:5) for 2.5 min to A/B/C (50:45:5) in 7.5 min, hold for 2.5 min. Re-equilibrate @ A/B/C (90:5:5) for 7.5 min  
**Flow Rate:** 2.0 mL/min  
**Detection:** UV @ 260 nm  
**Vial:** [AR0-9925-13](#)  
**Filter:** [AF0-8103-52](#)  
**Sample:** 1. p-Aminobenzoic Acid pK<sub>a</sub> 4.7, H<sup>+</sup> pK<sub>a</sub> 2.7 logP 0.83  
 2. Nicotinamide H<sup>+</sup> pK<sub>a</sub> 3.35 logP -0.37  
 3. Riboflavin pK<sub>a</sub> 10.2 logP -1.46  
 4. Nicotinic Acid pK<sub>a</sub> 4.7, H+pK<sub>a</sub> 3.0 logP 0.36  
 5. Pyridoxine H<sup>+</sup> pK<sub>a</sub> 5.6, pK<sub>a</sub> 8.6 logP -0.77  
 6. Thiamine H<sup>+</sup> pK<sub>a</sub> 5.5 logP -4.6  
 7. Ascorbic Acid pK<sub>a</sub> 4.1, 11.2 logP -1.85  
 8. Cyanocobalamin pK<sub>a</sub> 1.59 logP -0.90  
 9. Folic Acid pK<sub>a</sub> 2.7, 4.1, 8.9 logP -0.02

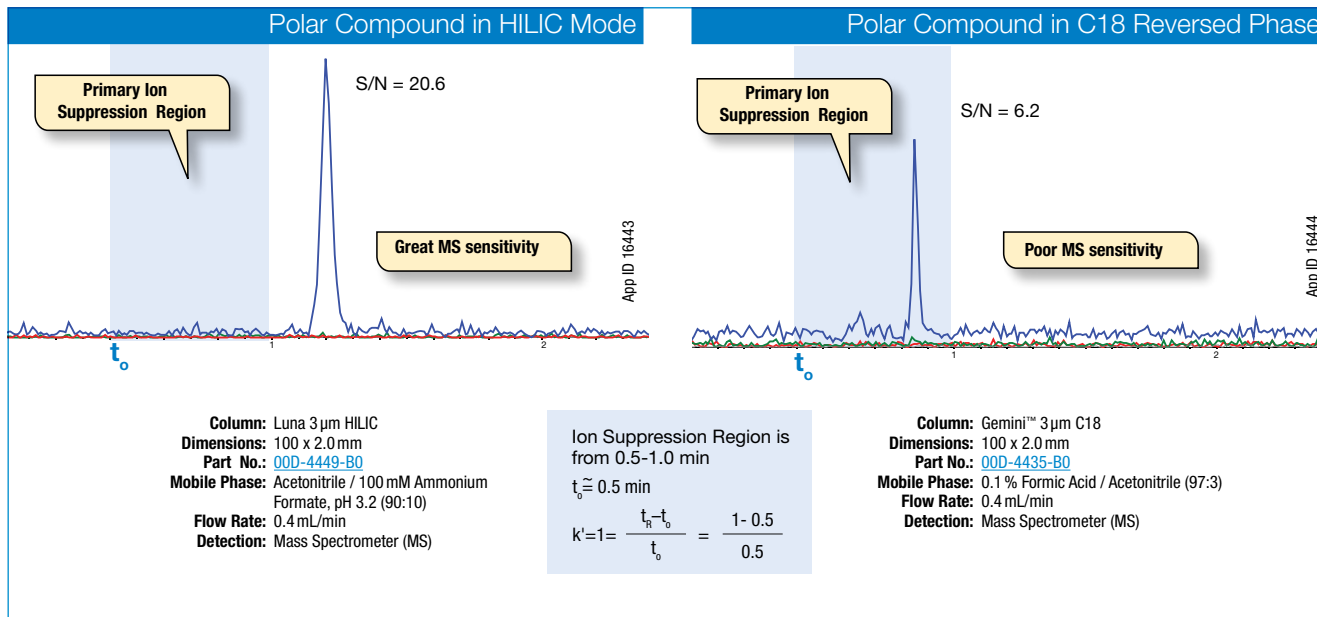
App ID 16430



### Improved Mass Spec Sensitivity

Luna HILIC columns allow low level polar metabolites to be retained on column past the critical ion suppression zone, allowing: Increased MS sensitivity and Higher signal-to-noise ratio (S/N).

#### Bamethan

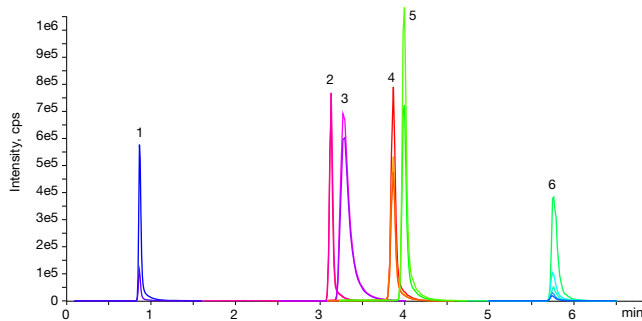


## Luna Polar Pesticides

NO MORE analytical struggles due to matrices' complexity and polarity, sample derivatization, lengthy column conditioning, and the need of multi columns and systems for your food analysis.

The Luna Polar Pesticides LC column unique selectivity delivers

### Underivatized Cationic Pesticides Analysis



#### LC Conditions

**Column:** Luna 3µm Polar Pesticides  
**Dimensions:** 100 x 2.1 mm  
**Part No.:** [OOD-4798-AN](#)  
**Guard Cartridge:** [AJO-8789](#)  
**Guard Holder:** [AJO-9000](#)  
**Mobile Phase:** A: 100 mM Ammonium Formate in Water, adjust pH to 3 with Formic Acid  
 B: Acetonitrile

Gradient:	Time (min)	% B
	0	97
	0.5	97
	4.0	70
	5.0	40
	6.0	40
	6.1	97
	10	97

**Flow Rate:** 0.5 mL/min

**Injection Volume:** 0.5 µL  
**Temperature:** 40 °C  
**Experiment Type:** MRM  
**Detector:** SCIEX® 5500

#### MRM Conditions

**Polarity:** Positive  
**Gas Temperature:** 450 °C  
**GS1:** 40 psi  
**GS2:** 30 psi  
**CUR:** 50 psi  
**IS:** 4500 V

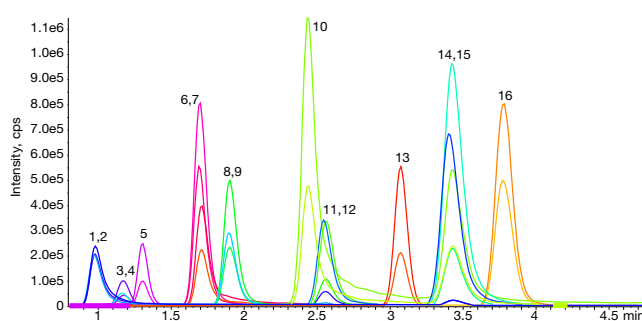
### MRM Table

Peak No.	Analyte	RT (min)	Q1	Q2	DP	CE
1	Ethythiourea	0.89	103	44	86	22
			103	86	84	26
			189	102	200	39
2	Propamocarb	3.2	189	74	200	48
			114	98	250	45
			114	70	180	45
4	Matrine	3.85	249	150	100	43
			249	110	100	46
			249	176	100	45
			265	247	60	41
5	Oxamatrine	4.22	265	205	60	41
			265	136	60	41
			186	171	140	27
			186	77	140	60
6	Paraquat	5.69	93	171	150	15
			93	77	150	31

robust analysis of underivatized polar pesticides from food and environmental matrices.

Fast column conditioning, excellent analyte retention, versatile selectivity, and great peak symmetry.

### Underivatized Anionic Pesticides Analysis



#### LC Conditions

**Column:** Luna 3µm Polar Pesticides  
**Dimensions:** 100 x 2.1 mm  
**Part No.:** [OOD-4798-AN](#)  
**Guard Cartridge:** [AJO-8789](#)  
**Guard Holder:** [AJO-9000](#)  
**Mobile Phase:** A: 0.3% Formic Acid in Water  
 B: 0.3% Formic Acid in Acetonitrile

Gradient:	Time (min)	% B
	0	2
	0.5	2
	6.0	20
	7.0	90
	9.0	90
	9.1	2
	12	2

**Flow Rate:** 0.3 mL/min

**Injection Volume:** 1 µL  
**Temperature:** 40 °C  
**Detection:** MRM  
**Detector:** SCIEX® 7500

- Sample:**
1. AMPA
  2. AMPA-<sup>13</sup>C,<sup>15</sup>N
  3. Maleic Hydrazide-D2
  4. Maleic Hydrazide
  5. Glufosinate
  6. MPPA
  7. Glyphosate
  8. N-Acetyl-Glufosinate
  9. N-Acetyl-Glufosinate-D3
  10. Phosphonic Acid
  11. Ethephon-D4
  12. Ethephon
  13. Chlorate
  14. Fosetyl Al-D15
  15. Fosetyl Al
  16. Perchlorate

#### MRM Conditions

**Polarity:** Negative  
**Gas Temperature:** 450 °C  
**GS1:** 40 psi  
**GS2:** 30 psi  
**CUR:** 40 psi  
**IS:** -4500 V

## Features and Benefits

	Material Characteristic	Benefit
<b>Morphology</b>	Fully Porous	High Sample Loading
<b>Phase</b>	Proprietary Polar	<ul style="list-style-type: none"> <li>• Unique selectivity</li> <li>• Retention of polar analytes</li> <li>• Fast equilibration</li> <li>• 100% Aqueous stability</li> <li>• 100% Organic stability</li> <li>• Multi-mode retention</li> </ul>
<b>Pore Size</b>	100Å	Right size for pesticide analysis
<b>Carbon Load</b>	8%	Great polar and nonpolar retention
<b>Surface Area</b>	380 m <sup>2</sup> /g	Improved analyte interaction with stationary phase

“The Luna Polar Pesticides LC column significantly reduced analysis time thanks to its fast re-equilibration! This column has improved our polar pesticides analyses.”

**Dr Giacomo Napolitano, PhD**  
 –Lab Manager - Lifeanalytics S.r.l.

The opinions stated herein are solely those of the speaker and not necessarily those of any company or organization.

## Luna PFP(2)

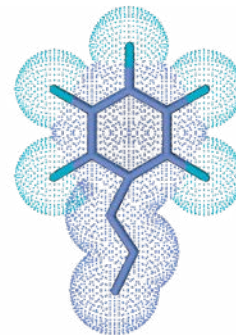
### Powerful Selectivity for Reversed Phase Methods

Luna PFP(2) columns provide remarkable selectivity for highly polar compounds, complex natural products, isomers, and other closely related compounds. This is achieved by using a pentafluorophenyl with a propyl linkage which provides multiple retention mechanisms different to other reversed phase media.

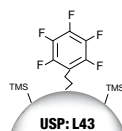
- Achieve excellent selectivity using four mechanisms of solute/stationary phase interactions
- Extremely discerning for halogenated, aromatic and conjugated compounds
- Provides orthogonal selectivity even using traditional reversed phase mobile phase systems

Luna PFP(2) selectivity is achieved through 4 mechanisms of interaction

- Hydrogen Bonding
- Dipole-Dipole Interactions
- Aromatic and  $\pi$ - $\pi$  Interactions
- Hydrophobic

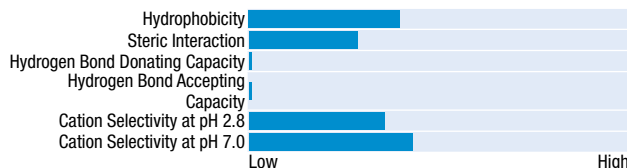


A typical alkyl phase (C18, C8) achieves selectivity through only 1 mechanism of interaction.



### Luna PFP(2)

Pentafluorophenyl groups provide very little hydrogen bonding abilities, but the strongly electronegative fluorine groups will provide good charge based selectivity for cationic compounds, while the rigid bonded phase is a good steric selector.

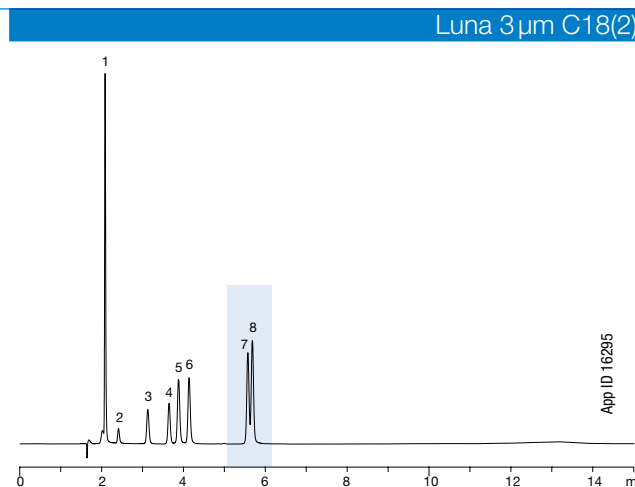
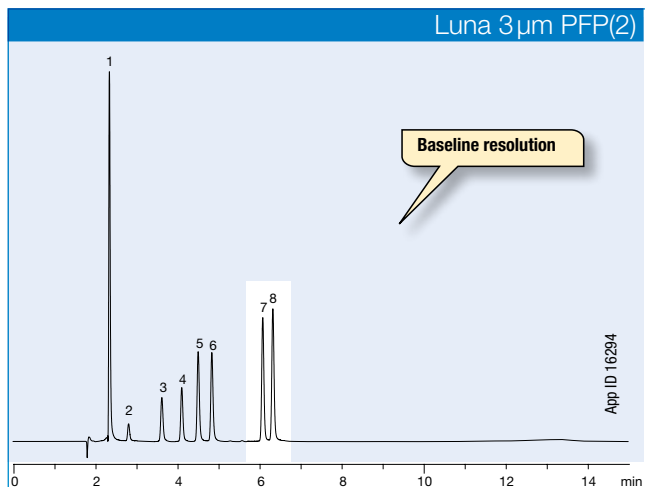


## Aromatic Compounds

Aromatic compounds show different retention characteristics on Luna PFP(2) compared to traditional reversed phase columns. The presence of the aromatic benzene ring in Luna PFP(2) increases the relative attraction between the stationary phase and aromatic analytes, leading to increased retention for these types of compounds. Closely related polyphenolic compounds are readily separated with Luna PFP(2) columns.



### Catechins



Columns: Luna 3  $\mu$ m PFP(2)  
Luna 3  $\mu$ m C18(2)  
Part Nos.: [00F-4447-E0](#)  
[00F-4251-E0](#)

Conditions for all columns:

**Dimensions:** 150 x 4.6 mm  
**Mobile Phase:** A: 0.1 % Formic acid in Water  
B: 0.1 % Formic acid in Acetonitrile  
**Gradient:** A/B (80:20) to (55:45) in 10 min  
**Flow Rate:** 1 mL/min  
**Temperature:** 22 °C  
**Detection:** UV @ 280 nm

**Sample:** 1. Gallic acid  
2. Epigallo catechin  
3. Catechin  
4. Epicatechin  
5. Epigallocatechin gallate  
6. Gallo catechin gallate  
7. Epicatechin gallate  
8. Catechin gallate



## Fast LC Solutions

### Ordering Information

2.5 µm High Speed Technology (HST) Columns (mm)					
Phase	30 x 2.0	50 x 2.0	100 x 2.0	50 x 3.0	100 x 3.0
Luna 2.5 µm C18(2)-HST	<a href="#">00A-4446-B0</a>	<a href="#">00B-4446-B0</a>	<a href="#">00D-4446-B0</a>	<a href="#">00B-4446-Y0</a>	<a href="#">00D-4446-Y0</a>



For information about HST Columns, contact your Phenomenex technical consultant or local distributor.

MercuryMS™ LC-MS Cartridges (mm)				Columns (mm)			
3 µm	Phase	10 x 2.0	10 x 4.0	20 x 2.0	20 x 4.0	20 x 2.0	20 x 4.0
Luna	C18(2)	—	—	<a href="#">00M-4251-B0-CE</a>	<a href="#">00M-4251-D0-CE</a>	<a href="#">00M-4251-B0</a>	<a href="#">00M-4251-D0</a>
Luna	C8(2)	<a href="#">00N-4248-B0-CE</a>	—	<a href="#">00M-4248-B0-CE</a>	—	<a href="#">00M-4248-B0</a>	—
5 µm	Phase	10 x 2.0	10 x 4.0	20 x 2.0	20 x 4.0		
Luna	C18(2)	<a href="#">00N-4252-B0-CE</a>	<a href="#">00N-4252-D0-CE</a>	<a href="#">00M-4252-B0-CE</a>	<a href="#">00M-4252-D0-CE</a>	—	—
Luna	C8(2)	<a href="#">00N-4249-B0-CE</a>	—	<a href="#">00M-4249-B0-CE</a>	—	—	—

## MercuryMS™ Cartridge Holders

### Ordering Information

#### Direct-Connect Cartridge Holders

Part No.	Description
<a href="#">CHO-7187</a>	10 mm direct-connect holder
<a href="#">CHO-7188</a>	20 mm direct-connect holder

#### Standard Cartridge Holders

Part No.	Description
<a href="#">CHO-5846</a>	10 mm standard holder
<a href="#">CHO-5845</a>	20 mm standard holder



Direct-Connect Holder



Standard Holder



## Micro LC Columns

### Ordering Information



For information on Micro LC Columns, Traps, and Fittings, see pp. 359-361

3 µm and 5 µm Micro LC Columns (mm)								Trap Column	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	250 x 0.50	20 x 0.30	20 x 0.50
3 µm C8(2)	<a href="#">00B-4248-AC</a>	—	—	<a href="#">00B-4248-AF</a>	—	—	—	—	—
3 µm C18(2)	<a href="#">00B-4251-AC</a>	<a href="#">00D-4251-AC</a>	<a href="#">00F-4251-AC</a>	<a href="#">00B-4251-AF</a>	<a href="#">00D-4251-AF</a>	<a href="#">00F-4251-AF</a>	—	—	—
3 µm Phenyl-Hexyl	—	<a href="#">00D-4256-AC</a>	—	—	<a href="#">00D-4256-AF</a>	—	—	—	—
3 µm NH <sub>2</sub>	—	—	<a href="#">00F-4377-AC</a>	—	—	—	—	—	—
3 µm HILIC	—	—	—	<a href="#">00B-4449-AF</a>	—	—	—	—	—
5 µm C8(2)	—	—	<a href="#">00F-4249-AC</a>	—	—	—	—	<a href="#">05M-4249-AC</a>	<a href="#">05M-4249-AF</a>
5 µm C18(2)	—	—	<a href="#">00F-4252-AC</a>	—	—	<a href="#">00F-4252-AF</a>	<a href="#">00G-4252-AF</a>	<a href="#">05M-4252-AC</a>	<a href="#">05M-4252-AF</a>
5 µm Phenyl-Hexyl	<a href="#">00B-4257-AC</a>	—	—	<a href="#">00B-4257-AF</a>	—	—	—	—	—

\*SecurityGuard™ Analytical Cartridges require holder, Part No.: [KJO-4282](#)

## HPLC Columns

### Ordering Information

3 µm Microbore and Minibore Columns (mm)									SecurityGuard Cartridges (mm)		
Phases	50 x 1.0	150 x 1.0	30 x 2.0	30 x 2.1	50 x 2.0	50 x 2.1	100 x 2.0	100 x 2.1	150 x 2.0	150 x 2.1	4 x 2.0*
Silica(2)	—	<a href="#">00F-4162-A0</a>	—	—	<a href="#">00B-4162-B0</a>	—	<a href="#">00D-4162-B0</a>	—	<a href="#">00F-4162-B0</a>	—	<a href="#">AJ0-4347</a>
C8(2)	—	—	<a href="#">00A-4248-B0</a>	—	<a href="#">00B-4248-B0</a>	—	<a href="#">00D-4248-B0</a>	—	<a href="#">00F-4248-B0</a>	—	<a href="#">AJ0-4289</a>
C18(2)	<a href="#">00B-4251-A0</a>	<a href="#">00F-4251-A0</a>	<a href="#">00A-4251-B0</a>	—	<a href="#">00B-4251-B0</a>	—	<a href="#">00D-4251-B0</a>	—	<a href="#">00F-4251-B0</a>	—	<a href="#">AJ0-4286</a>
CN	—	—	—	—	<a href="#">00B-4254-B0</a>	—	<a href="#">00D-4254-B0</a>	—	<a href="#">00F-4254-B0</a>	—	<a href="#">AJ0-4304</a>
Phenyl-Hexyl	—	—	—	—	<a href="#">00B-4256-B0</a>	—	<a href="#">00D-4256-B0</a>	—	<a href="#">00F-4256-B0</a>	—	<a href="#">AJ0-4350</a>
NH <sub>2</sub>	—	<a href="#">00F-4377-A0</a>	<a href="#">00A-4377-B0</a>	—	<a href="#">00B-4377-B0</a>	—	<a href="#">00D-4377-B0</a>	—	<a href="#">00F-4377-B0</a>	—	<a href="#">AJ0-4301</a>
HILIC	—	—	—	—	<a href="#">00B-4449-B0</a>	—	<a href="#">00D-4449-B0</a>	—	<a href="#">00F-4449-B0</a>	—	<a href="#">AJ0-8328</a>
PFP(2)	—	<a href="#">00F-4447-A0</a>	<a href="#">00A-4447-B0</a>	—	<a href="#">00B-4447-B0</a>	—	<a href="#">00D-4447-B0</a>	—	<a href="#">00F-4447-B0</a>	—	<a href="#">AJ0-8326</a>
Polar Pesticides	—	—	—	<a href="#">00A-4798-AN</a>	—	<a href="#">00B-4798-AN</a>	—	<a href="#">00D-4798-AN</a>	—	<a href="#">00F-4798-AN</a>	<a href="#">AJ0-8789</a>

for ID: 2.0-3.0 mm

## HPLC Columns (cont'd)

### Ordering Information (continued)

3µm MidBore™ and Analytical Columns (mm)								SecurityGuard™ Cartridges (mm)			
Phases	30 x 3.0	50 x 3.0	150 x 3.0	30 x 4.6	50 x 4.6	75 x 4.6	100 x 4.6	150 x 4.6	4 x 2.0*	4 x 3.0*	
									/10pk	/10pk	
Silica(2)	—	00B-4162-Y0	00F-4162-Y0	00A-4162-E0	00B-4162-E0	—	—	00D-4162-E0	00F-4162-E0	AJ0-4347	AJ0-4348
C8(2)	00A-4248-Y0	00B-4248-Y0	00F-4248-Y0	00A-4248-E0	00B-4248-E0	00C-4248-E0	00D-4248-E0	00F-4248-E0	00F-4248-E0	AJ0-4289	AJ0-4290
C18(2)	00A-4251-Y0	00B-4251-Y0	00F-4251-Y0	00A-4251-E0	00B-4251-E0	00C-4251-E0	00D-4251-E0	00F-4251-E0	00F-4251-E0	AJ0-4286	AJ0-4287
CN	—	00B-4254-Y0	00F-4254-Y0	00A-4254-E0	00B-4254-E0	00C-4254-E0	00D-4254-E0	00F-4254-E0	00F-4254-E0	AJ0-4304	AJ0-4305
Phenyl-Hexyl	—	00B-4256-Y0	00F-4256-Y0	—	00B-4256-E0	00C-4256-E0	00D-4256-E0	00F-4256-E0	00F-4256-E0	AJ0-4350	AJ0-4351
NH <sub>2</sub>	—	00B-4377-Y0	00F-4377-Y0	—	00B-4377-E0	—	00D-4377-E0	00F-4377-E0	00F-4377-E0	AJ0-4301	AJ0-4302
HILIC	—	00B-4449-Y0	00F-4449-Y0	—	—	—	00D-4449-E0	00F-4449-E0	00F-4449-E0	AJ0-8328	AJ0-8329
PPFP(2)	—	00B-4447-Y0	00F-4447-Y0	—	00B-4447-E0	—	00D-4447-E0	00F-4447-E0	00F-4447-E0	AJ0-8326	AJ0-8327
Polar Pesticides	—	—	00F-4798-Y0	—	—	—	—	—	—	AJ0-8789	—

for ID: 2.0-3.0mm 3.2-8.0mm

5µm Microbore and Minibore Columns (mm)					SecurityGuard™ Cartridges (mm)	
Phases	150 x 1.0	30 x 2.0	50 x 2.0	150 x 2.0	250 x 2.0	4 x 2.0*
						/10pk
Silica(2)	—	00A-4274-B0	00B-4274-B0	00F-4274-B0	00G-4274-B0	AJ0-4347
C5	—	00A-4043-B0	00B-4043-B0	00F-4043-B0	—	AJ0-4292
C8(2)	—	00A-4249-B0	00B-4249-B0	00F-4249-B0	00G-4249-B0	AJ0-4289
C18(2)	00F-4252-A0	00A-4252-B0	00B-4252-B0	00F-4252-B0	00G-4252-B0	AJ0-4286
CN	—	—	00B-4255-B0	00F-4255-B0	—	AJ0-4304
Phenyl-Hexyl	—	00A-4257-B0	00B-4257-B0	00F-4257-B0	00G-4257-B0	AJ0-4350
NH <sub>2</sub>	—	00A-4378-B0	00B-4378-B0	00F-4378-B0	00G-4378-B0	AJ0-4301
SCX	—	—	00B-4398-B0	—	—	AJ0-4307
PPFP(2)	—	00A-4448-B0	00B-4448-B0	00F-4448-B0	—	AJ0-8326

for ID: 2.0-3.0mm



5µm MidBore and Analytical Columns (mm)							SecurityGuard™ Cartridges (mm)		
Phases	30 x 3.0	50 x 3.0	150 x 3.0	250 x 3.0	30 x 4.6	50 x 4.6	75 x 4.6	4 x 2.0*	4 x 3.0*
								/10pk	/10pk
Silica(2)	—	—	—	—	—	00B-4274-E0	—	AJ0-4347	AJ0-4348
C5	—	—	00F-4043-Y0	—	—	00B-4043-E0	—	AJ0-4292	AJ0-4293
C8(2)	—	00B-4249-Y0	00F-4249-Y0	00G-4249-Y0	00A-4249-E0	00B-4249-E0	00C-4249-E0	AJ0-4289	AJ0-4290
C18(2)	00A-4252-Y0	00B-4252-Y0	00F-4252-Y0	00G-4252-Y0	00A-4252-E0	00B-4252-E0	00C-4252-E0	AJ0-4286	AJ0-4287
CN	—	00B-4255-Y0	00F-4255-Y0	00G-4255-Y0	00A-4255-E0	00B-4255-E0	00C-4255-E0	AJ0-4304	AJ0-4305
Phenyl-Hexyl	—	00B-4257-Y0	00F-4257-Y0	00G-4257-Y0	00A-4257-E0	00B-4257-E0	—	AJ0-4350	AJ0-4351
NH <sub>2</sub>	—	00B-4378-Y0	00F-4378-Y0	00G-4378-Y0	—	00B-4378-E0	—	AJ0-4301	AJ0-4302
SCX	—	—	00F-4398-Y0	—	—	00B-4398-E0	—	AJ0-4307	AJ0-4308
HILIC	—	—	00F-4450-Y0	—	—	—	—	AJ0-8328	AJ0-8329
PPFP(2)	—	—	00F-4448-Y0	—	—	00B-4448-E0	—	AJ0-8326	AJ0-8327

for ID: 2.0-3.0mm 3.2-8.0mm

5µm Analytical and Semi-Prep Columns (mm)				SecurityGuard™ Cartridges (mm)		
Phases	100 x 4.6	150 x 4.6	250 x 4.6	250 x 10	4 x 3.0*	10 x 10‡
					/10pk	/3pk
Silica(2)	00D-4274-E0	00F-4274-E0	00G-4274-E0	00G-4274-N0	AJ0-4348	AJ0-7223
C5	00D-4043-E0	00F-4043-E0	00G-4043-E0	00G-4043-N0	AJ0-4293	AJ0-7372
C8(2)	00D-4249-E0	00F-4249-E0	00G-4249-E0	00G-4249-N0	AJ0-4290	AJ0-7222
C18(2)	00D-4252-E0	00F-4252-E0	00G-4252-E0	00G-4252-N0	AJ0-4287	AJ0-7221
CN	00D-4255-E0	00F-4255-E0	00G-4255-E0	00G-4255-N0	AJ0-4305	AJ0-7313
Phenyl-Hexyl	00D-4257-E0	00F-4257-E0	00G-4257-E0	00G-4257-N0	AJ0-4351	AJ0-7314
NH <sub>2</sub>	00D-4378-E0	00F-4378-E0	00G-4378-E0	00G-4378-N0	AJ0-4302	AJ0-7364
SCX	00D-4398-E0	00F-4398-E0	00G-4398-E0	00G-4398-N0	AJ0-4308	AJ0-7369
HILIC	00D-4450-E0	00F-4450-E0	00G-4450-E0	00G-4450-N0	AJ0-8329	AJ0-8902
PPFP(2)	00D-4448-E0	00F-4448-E0	00G-4448-E0	00G-4448-N0	AJ0-8327	AJ0-8376

for ID: 3.2-8.0mm 9-16mm



For UHPLC system connections, see SecurityLINK™ UHPLC fingertight fitting system on pp. 336-337

\*SecurityGuard™ Analytical Cartridges require holder, Part No.: [KJ0-4282](#)  
 ‡SemiPrep SecurityGuard™ Cartridges require holder, Part No.: [AJ0-9281](#)

## Preparative Columns

### Ordering Information (continued)

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	50 x 30	100 x 30	250 x 30	15 x 21.2**	15 x 30 †
								/ea	/ea
Silica(2)	—	<a href="#">00D-4274-PO-AX</a>	<a href="#">00F-4274-PO-AX</a>	<a href="#">00G-4274-PO-AX</a>	—	—	<a href="#">00G-4274-UO-AX</a>	<a href="#">AJ0-7229</a>	<a href="#">AJ0-8312</a>
C5	—	—	—	<a href="#">00G-4043-PO-AX</a>	—	—	—	—	—
C8(2)	<a href="#">00B-4249-PO-AX</a>	—	<a href="#">00F-4249-PO-AX</a>	<a href="#">00G-4249-PO-AX</a>	—	<a href="#">00D-4249-UO-AX</a>	—	<a href="#">AJ0-7840</a>	<a href="#">AJ0-8302</a>
C18(2)	<a href="#">00B-4252-PO-AX</a>	<a href="#">00D-4252-PO-AX</a>	<a href="#">00F-4252-PO-AX</a>	<a href="#">00G-4252-PO-AX</a>	<a href="#">00B-4252-UO-AX</a>	<a href="#">00D-4252-UO-AX</a>	<a href="#">00G-4252-UO-AX</a>	<a href="#">AJ0-7839</a>	<a href="#">AJ0-8301</a>
CN	—	—	<a href="#">00F-4255-PO-AX</a>	<a href="#">00G-4255-PO-AX</a>	—	<a href="#">00D-4255-UO-AX</a>	<a href="#">00G-4255-UO-AX</a>	<a href="#">AJ0-8220</a>	<a href="#">AJ0-8311</a>
Phenyl-Hexyl	—	—	<a href="#">00F-4257-PO-AX</a>	<a href="#">00G-4257-PO-AX</a>	—	—	<a href="#">00G-4257-UO-AX</a>	<a href="#">AJ0-7841</a>	<a href="#">AJ0-8303</a>
NH <sub>2</sub>	—	—	<a href="#">00F-4378-PO-AX</a>	<a href="#">00G-4378-PO-AX</a>	—	—	—	<a href="#">AJ0-8162</a>	<a href="#">AJ0-8309</a>
PPF(2)	—	<a href="#">00D-4448-PO-AX</a>	<a href="#">00F-4448-PO-AX</a>	<a href="#">00G-4448-PO-AX</a>	—	<a href="#">00D-4448-UO-AX</a>	—	<a href="#">AJ0-8377</a>	<a href="#">AJ0-8378</a>
HILIC	—	<a href="#">00D-4450-PO-AX</a>	<a href="#">00F-4450-PO-AX</a>	<a href="#">00G-4450-PO-AX</a>	—	—	<a href="#">00G-4450-UO-AX</a>	<a href="#">AJ0-8595</a>	<a href="#">AJ0-8830</a>

for ID: 18-29 mm 30-49 mm

10 µm Axia™ Packed Preparative Columns (mm) (continued)						SecurityGuard Cartridges (mm)	
Phases	50 x 21.2	100 x 21.2	250 x 21.2	250 x 30	250 x 50	15 x 21.2**	15 x 30 †
						/ea	/ea
Silica(2)	—	—	<a href="#">00G-4091-PO-AX</a>	<a href="#">00G-4091-UO-AX</a>	<a href="#">00G-4091-V0-AX</a>	<a href="#">AJ0-7229</a>	<a href="#">AJ0-8312</a>
C5	—	<a href="#">00D-4092-PO-AX</a>	<a href="#">00G-4092-PO-AX</a>	—	<a href="#">00G-4092-V0-AX</a>	—	—
C8(2)	—	—	<a href="#">00G-4250-PO-AX</a>	<a href="#">00G-4250-UO-AX</a>	<a href="#">00G-4250-V0-AX</a>	<a href="#">AJ0-7840</a>	<a href="#">AJ0-8302</a>
C18(2)	<a href="#">00B-4253-PO-AX</a>	<a href="#">00D-4253-PO-AX</a>	<a href="#">00G-4253-PO-AX</a>	<a href="#">00G-4253-UO-AX</a>	<a href="#">00G-4253-V0-AX</a>	<a href="#">AJ0-7839</a>	<a href="#">AJ0-8301</a>
CN	—	—	<a href="#">00G-4300-PO-AX</a>	—	—	<a href="#">AJ0-8220</a>	<a href="#">AJ0-8311</a>
Phenyl-Hexyl	—	—	<a href="#">00G-4285-PO-AX</a>	<a href="#">00G-4285-UO-AX</a>	—	<a href="#">AJ0-7841</a>	<a href="#">AJ0-8303</a>
NH <sub>2</sub>	—	—	<a href="#">00G-4379-PO-AX</a>	—	<a href="#">00G-4379-V0-AX</a>	<a href="#">AJ0-8162</a>	<a href="#">AJ0-8309</a>
SCX	—	—	<a href="#">00G-4401-PO-AX</a>	—	<a href="#">00G-4401-PO-AX</a>	<a href="#">AJ0-8595</a>	<a href="#">AJ0-8596</a>

for ID: 18-29 mm 30-49 mm

## Pilot Scale Columns

### Ordering Information

10 µm Analytical and Semi-Prep Columns (mm)			SecurityGuard Cartridges (mm)	
Phases	250 x 4.6	250 x 10	4 x 3.0*	10 x 10†
			/10 pk	/3 pk
Silica(2)	<a href="#">00G-4091-E0</a>	<a href="#">00G-4091-N0</a>	<a href="#">AJ0-4348</a>	<a href="#">AJ0-7223</a>
C8(2)	<a href="#">00G-4250-E0</a>	<a href="#">00G-4250-N0</a>	<a href="#">AJ0-4290</a>	<a href="#">AJ0-7222</a>
C18(2)	<a href="#">00G-4253-E0</a>	<a href="#">00G-4253-N0</a>	<a href="#">AJ0-4287</a>	<a href="#">AJ0-7221</a>
CN	<a href="#">00G-4300-E0</a>	—	<a href="#">AJ0-4305</a>	<a href="#">AJ0-7313</a>
Phenyl-Hexyl	<a href="#">00G-4285-E0</a>	<a href="#">00G-4285-N0</a>	<a href="#">AJ0-4351</a>	<a href="#">AJ0-7314</a>
NH <sub>2</sub>	<a href="#">00G-4379-E0</a>	<a href="#">00G-4379-N0</a>	<a href="#">AJ0-4302</a>	<a href="#">AJ0-7364</a>
SCX	<a href="#">00G-4401-E0</a>	<a href="#">00G-4401-N0</a>	<a href="#">AJ0-4308</a>	<a href="#">AJ0-7369</a>

for ID: 3.2-8.0 mm 9-16 mm

10 µm- <i>PREP</i> Columns (mm)		
Phases	250 x 4.6	250 x 10
Silica(3)	<a href="#">00G-4617-E0</a>	<a href="#">00G-4617-N0</a>
C8(3)	<a href="#">00G-4623-E0</a>	<a href="#">00G-4623-N0</a>
C18(3)	<a href="#">00G-4616-E0</a>	<a href="#">00G-4616-N0</a>

15 µm Pilot Scale Columns (mm)	
Phases	250 x 4.6
C18(2)	<a href="#">00G-4273-E0</a>
Phenyl-Hexyl	<a href="#">00G-4286-E0</a>



\*SecurityGuard™ Analytical Cartridges require holder, Part No.: [KJ0-4282](#)  
 †SemiPrep SecurityGuard Cartridges require holder, Part No.: [AJ0-9281](#)  
 \*\*PREP SecurityGuard Cartridges require holder, Part No.: [AJ0-8223](#)  
 ††PREP SecurityGuard Cartridges require holder, Part No.: [AJ0-8277](#)



See our latest developments in High-throughput Purifications starting on page 384  
 For more dimensions and phases of Axia packed preparative columns, see p. 393  
 For SecurityGuard Cartridge Holders and Cartridges, see pp. 330-334  
 For additional Luna 10 µm-*PREP* Scout/Pilot Scale columns, see p. 399  
 For Bulk Media, see p. 400



Method development column kits and method validation column kits are available. Contact Phenomenex for details.

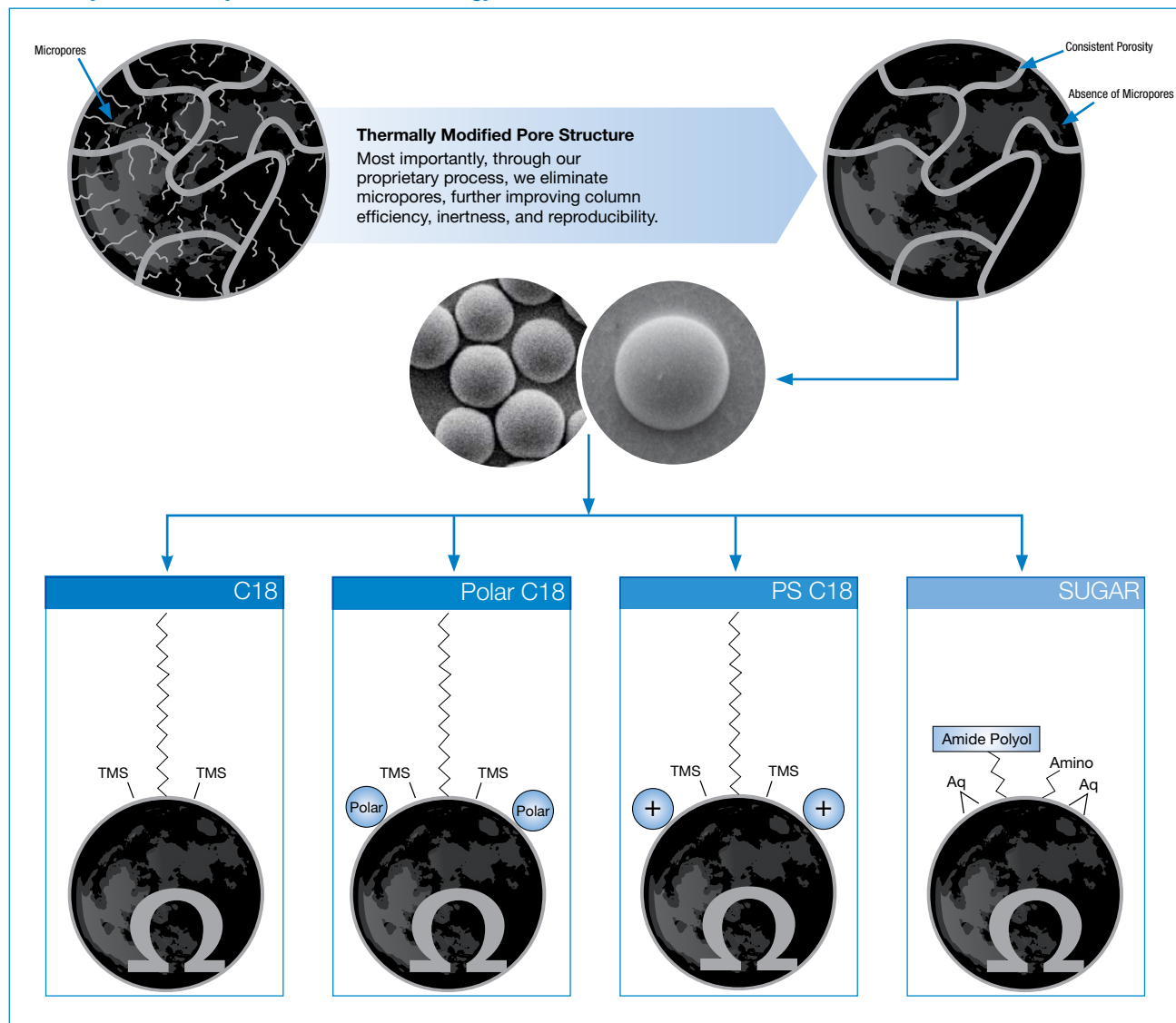


Improve analyte sensitivity and reduce baseline noise with Strata SPE tubes and well plates, see p. 70 for more information

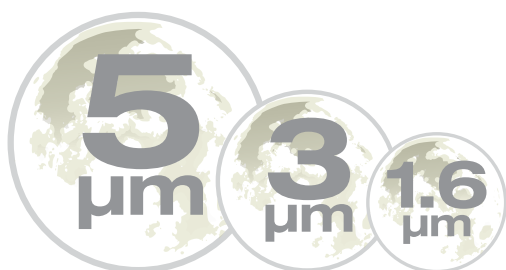
## Luna Omega Silica

The Luna Omega 1.6µm, 3µm, and 5µm particles build upon the Luna legacy with an innovative yet rugged UHPLC and HPLC silica particle architecture. The novel manufacturing process implements a proprietary processing technique to gain greater particle inertness, a stronger particle morphology, and more consistent porosity.

### Thermally Modified Fully Porous Particle Technology



LUNA OMEGA | HPLC/UHPLC



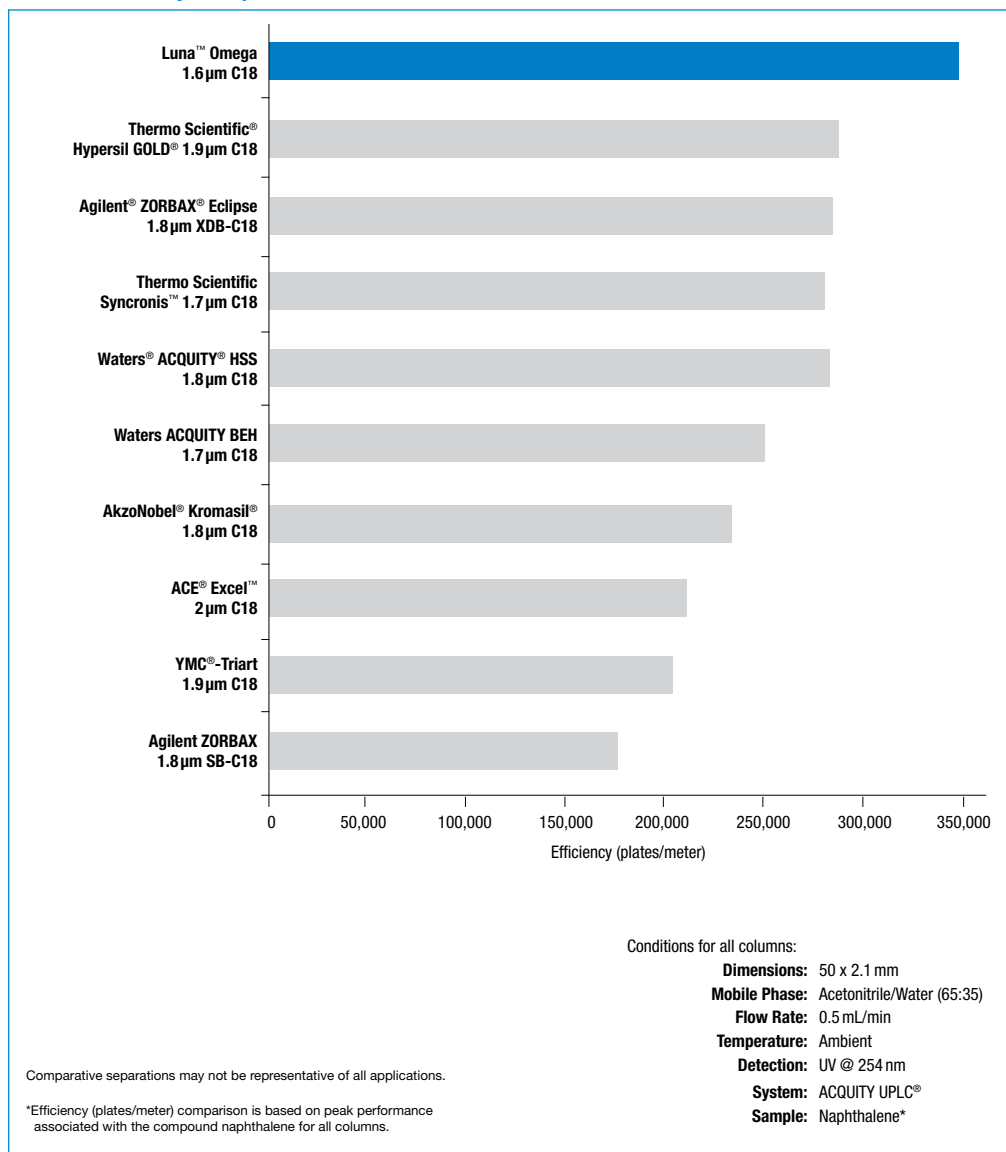


## Astounding Performance

The undeniably high efficiency levels found in each Luna Omega UHPLC column provide you with the potential of huge gains in method performance. While traditional silica and hybrid fully porous

particles claim high performance, when compared to Luna Omega 1.6µm, they fall drastically short and prevent UHPLC scientists from reaching their UHPLC potential.

### UHPLC Efficiency Comparison



Increase lab safety with HPLC / UHPLC solvent protection, see SecurityCAP™ products on pp. 417-418

## Luna Omega C18

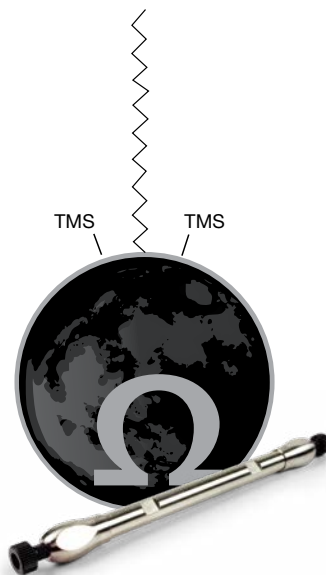
Luna Omega C18 is an excellent first choice for chromatographers who are just starting method development or attempting to improve upon existing chromatographic results with other C18s. With its higher performance potential, excellent retention profile, and greater inertness, the Luna Omega C18 was designed to be the new all-purpose UHPLC to HPLC to PREP LC solution with next level scalable reproducibility for industries all over the world.

### Materials Characteristics

Phase	Particle Sizes (µm)	Pore Size (Å)	Surface Area (m <sup>2</sup> /g)	Carbon Load (%)	pH Stability	Pressure Limit (bar)	USP Column Classification
C18	1.6, 3, 5	100	260	11	1.5 - 8.5*	1034/600**	L1

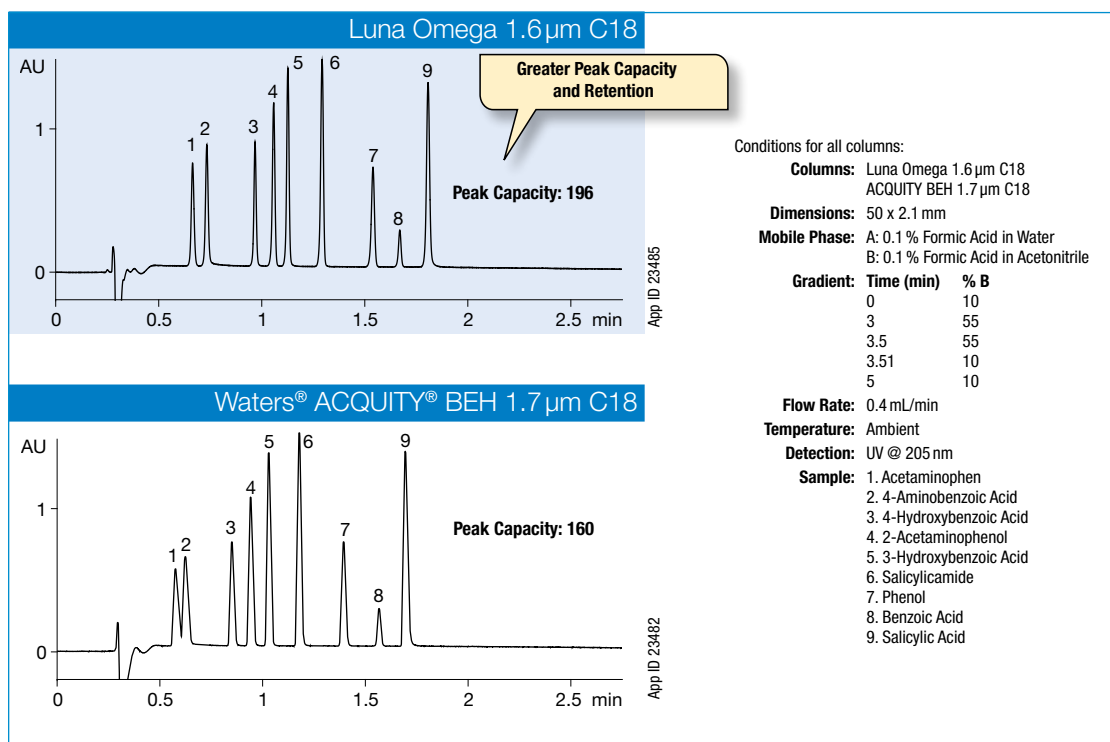
\*pH stability under gradient conditions. pH stability is 1.5-10 under isocratic conditions.

\*\*1.6µm Luna Omega columns are pressure stable up to 1034 bar and 3 or 5µm are stable up to 600 bar.



### Greater Retention and Better Results

Higher efficiency levels in combination with excellent stationary phase coverage and greater particle inertness, translates to improved separation power for you. Now you can utilize the greater retention of Luna Omega C18 to tackle both easy and difficult separations.



Comparative separations may not be representative of all applications.

## Generating the Next Level Of Reliability Through Advanced Process Optimization

Over the past few years, our scientists and engineers with the help of customers and Danaher colleagues, have optimized our processes to provide products that deliver very high levels of performance and newly achievable levels of reliability and reproducibility.

### Reproducible and Scalable

By setting a new standard for reliability, the Luna Omega C18 spans UHPLC and HPLC with a scalable range of high-performance particle sizes that will ensure that your developed methods are easily transferred. From single compound identification to complex impurity profiles, the Luna Omega C18 will serve as a pillar for your lab to count on day in and day out.



### Batch-to-Batch Reproducibility Study

In this example, we compared three batches of Luna Omega C18 using all three different particle sizes on a complex QC Pharmaceutical representative sample.

Conditions for all columns:

**Mobile Phase:** A: Water with 0.1 % Formic Acid  
B: Acetonitrile with 0.1 % Formic Acid

**Temperature:** 30 °C

**Detection:** UV @ 254 nm

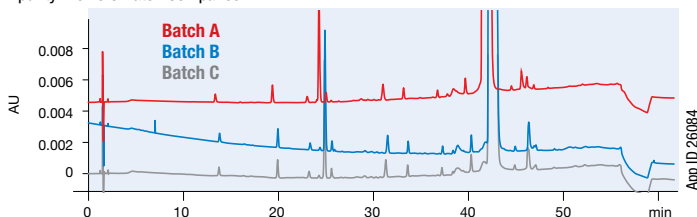
**Injection Volume:** 5 µL

**Sample:** 5 mg/mL of Chlorhexidine and Related Substances



#### Luna Omega 5 µm C18

Impurity Profile 3 Batch Comparison



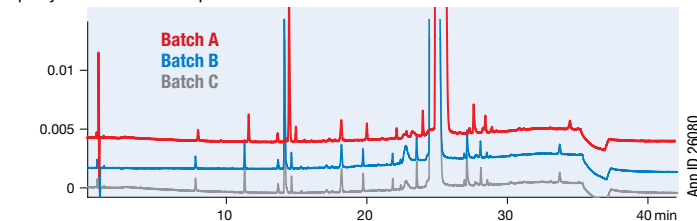
**Column:** Luna Omega 5 µm C18  
**Dimensions:** 250 x 4.6 mm  
**Part No.:** [00G-4785-E0](#)

Gradient:	Time (min)	% B
	0	2
	2.5	2
	52.5	35
	55	35
	57.5	2
	62.5	2



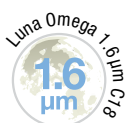
#### Luna Omega 3 µm C18

Impurity Profile 3 Batch Comparison



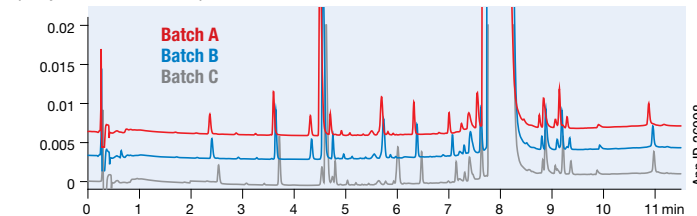
**Column:** Luna Omega 3 µm C18  
**Dimensions:** 150 x 4.6 mm  
**Part No.:** [00F-4784-E0](#)

Gradient:	Time (min)	% B
	0	2
	1.5	2
	31.5	35
	34.5	35
	36	2
	42	2



#### Luna Omega 1.6 µm C18

Impurity Profile 3 Batch Comparison



**Column:** Luna Omega 1.6 µm C18  
**Dimensions:** 50 x 2.1 mm  
**Part No.:** [00B-4742-AN](#)

Gradient:	Time (min)	% B
	0	2
	0.5	2
	10.5	35
	11.5	35
	12	2
	14	2

## Luna Omega PS C18

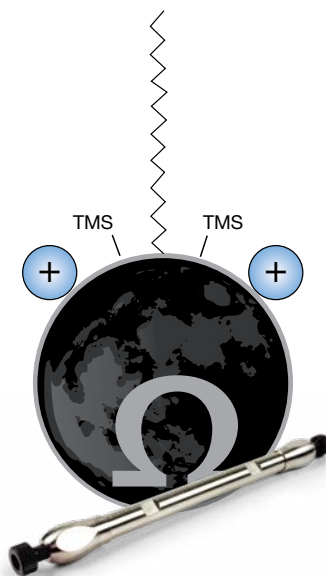
Luna Omega PS C18 is a unique mixed-mode stationary phase that provides incredibly useful polar and non-polar retention. The surface of the PS C18 contains a positive charge which provides better peak shape for bases at low pH under LC-MS conditions, while the C18 ligand promotes general reversed phase retention. This mixed-mode selectivity allows for greater separation between compounds with varying functional groups.

### Materials Characteristics

Phase	Particle Sizes (µm)	Pore Size (Å)	Surface Area (m <sup>2</sup> /g)	Carbon Load (%)	pH Stability	Pressure Limit (bar)	USP Column Classification
PS C18	1.6, 3, 5	100	260	9	1.5 - 8.5*	1034/600**	L1

\*pH stability under gradient conditions. pH stability is 1.5-10 under isocratic conditions.

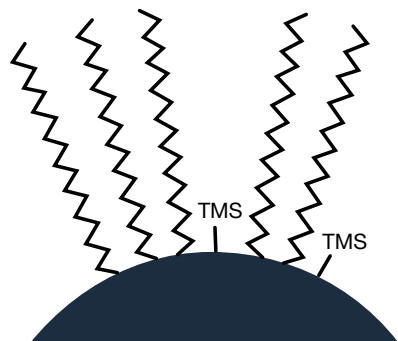
\*\*1.6µm Luna Omega columns are pressure stable up to 1034 bar and 3 or 5µm are stable up to 600 bar.



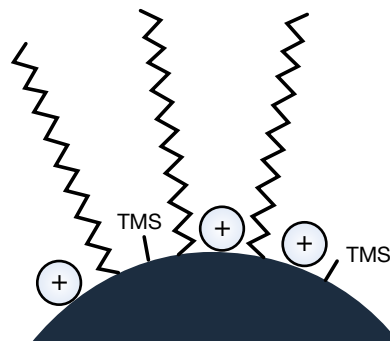
### A C18, But More Positive

Luna Omega PS C18 has been fine-tuned and manufactured by Phenomenex to provide a mixed selectivity that is highly useful for method development involving either combinations of polars and non-polars, or just one single compound class with small changes in functional groups.

Luna Omega C18 silica surface



Luna Omega PS C18 silica surface



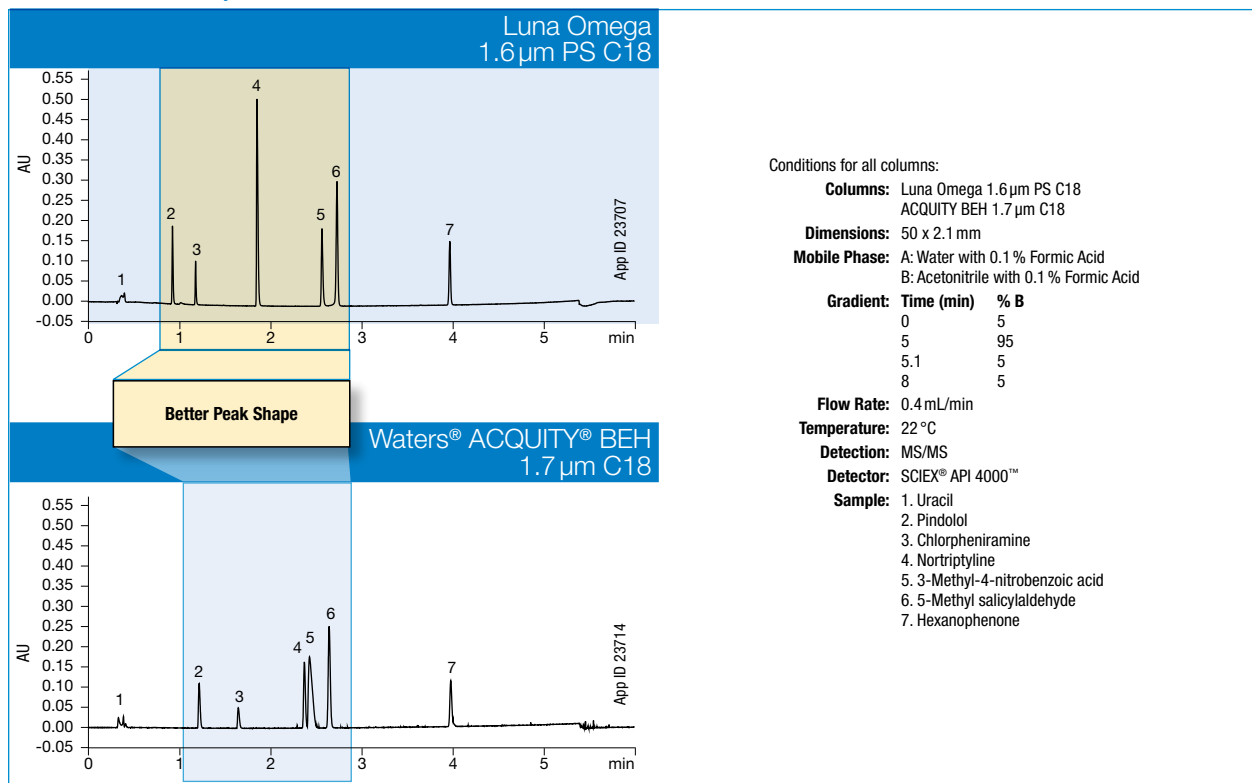


## Luna Omega PS C18 (cont'd)

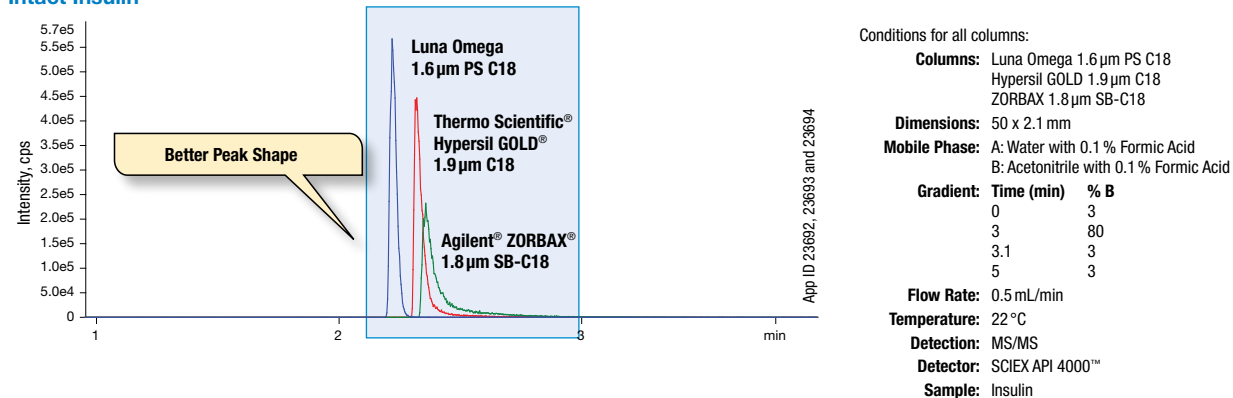
### Better Peak Shape for Bases

While traditional alkyl phases are prone to show tailing for basic compounds because of secondary interactions occurring at the silica surface, the surface of the Luna Omega PS C18 was designed with positive charges that serve to repel strong basic species and consistently display sharp peak shape.

#### Pharmaceutical Compound Mixture



#### Intact Insulin



Comparative separations may not be representative of all applications.

## Luna Omega Polar C18

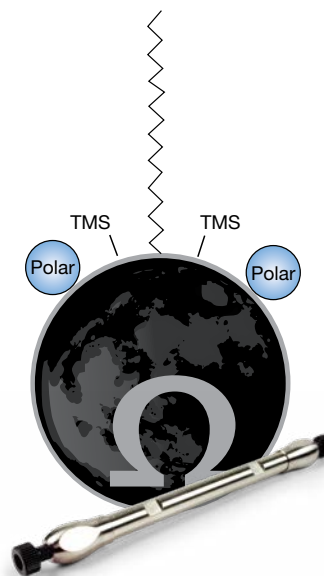
Luna Omega Polar C18 is a novel UHPLC stationary phase capable of providing a unique selectivity within a wide elution window and increased retention for both polar and non-polar analytes. The all-purpose C18 ligand provides hydrophobic interactions while a polar modified particle surface provides enhanced polar retention and also aqueous stability. These attributes make the Luna Omega Polar C18 an excellent choice for balanced retention of polar and hydrophobic compounds as well as to enhance retention of highly polar compounds.

### Materials Characteristics

Phase	Particle Sizes (µm)	Pore Size (Å)	Surface Area (m <sup>2</sup> /g)	Carbon Load (%)	pH Stability	Pressure Limit (bar)	USP Column Classification
Polar C18	1.6, 3, 5	100	260	9	1.5 - 8.5*	1034/600**	L1

\*pH stability under gradient conditions. pH stability is 1.5-10 under isocratic conditions.

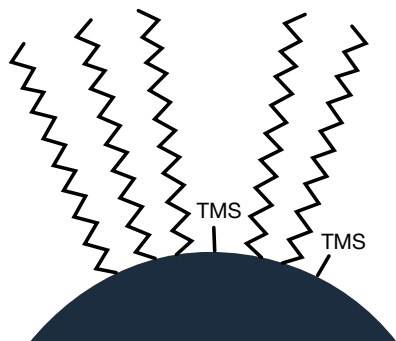
\*\*1.6µm Luna Omega columns are pressure stable up to 1034 bar and 3 or 5µm are stable up to 600 bar.



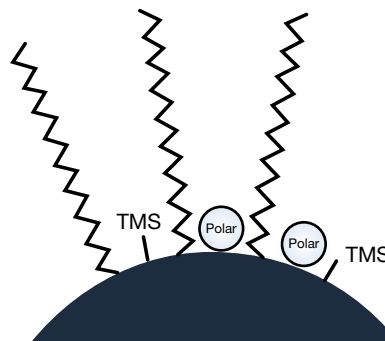
### A C18, But Different

Luna Omega Polar C18 is a uniquely modified C18-based chemistry that has been optimized to improve the performance of polar analyses. This new particle surface chemistry makes the Polar C18 applicable to all industries that utilize UHPLC for mixtures of polar and non-polar compounds.

Luna Omega C18 silica surface



Luna Omega Polar C18 silica surface

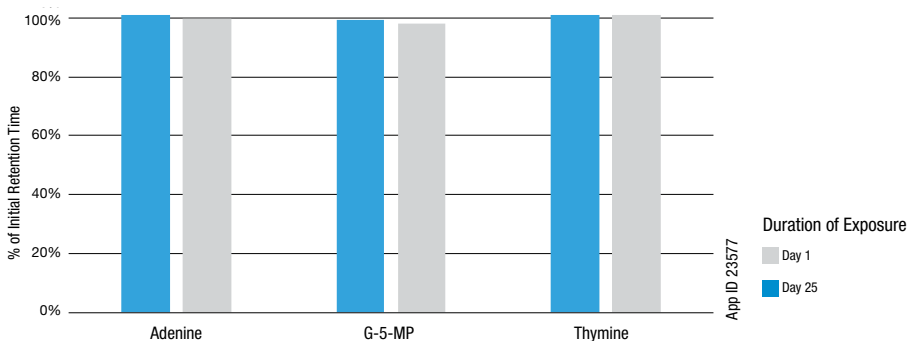


## Luna Omega Polar C18 (cont'd)

### No Stationary Phase Collapse

Traditional C18 phases are known to collapse under 100% aqueous conditions, causing retention loss of compounds and method development headaches. That is why an advanced proprietary bonding technology was used for the Luna Omega Polar C18 in order to ensure aqueous stability. The graph below displays the excellent stability of Polar C18 in 100% aqueous buffer conditions for over 2 weeks.

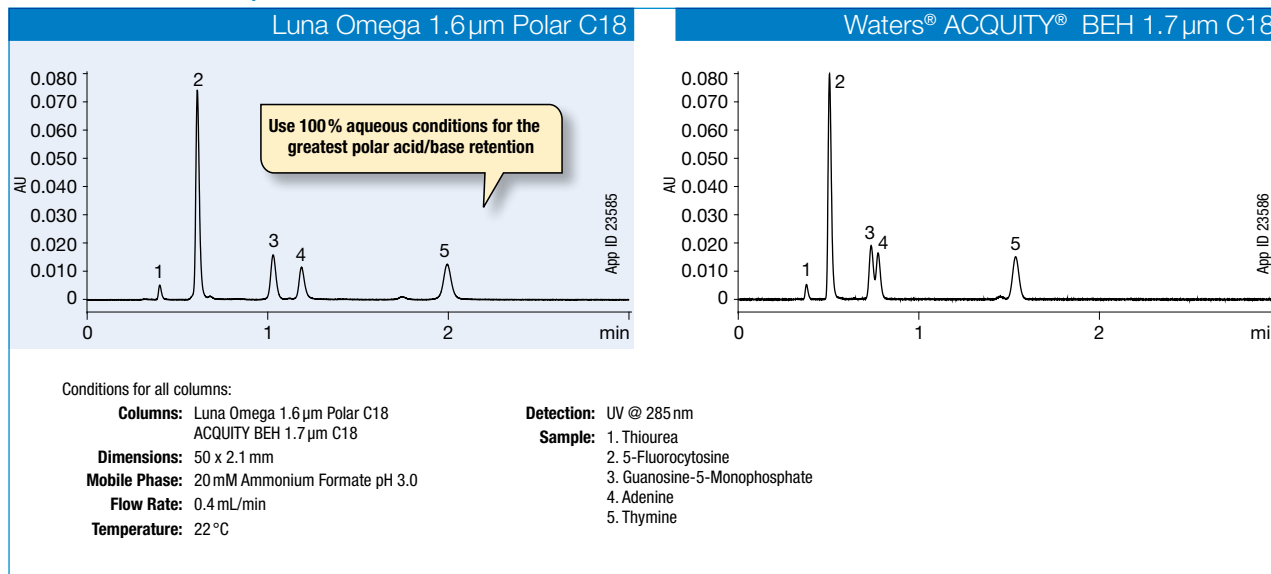
#### Aqueous Stability of Luna Omega Polar C18



Conditions for all columns:

<b>Columns:</b> Luna Omega 1.6 μm Polar C18	<b>Temperature:</b> 22 °C
<b>Dimensions:</b> 50 x 2.1 mm	<b>Detection:</b> UV @ 254 nm
<b>Part No.:</b> <a href="#">00B-4748-AN</a>	<b>Sample:</b> 1. Adenine
<b>Mobile Phase:</b> 10 mM Ammonium Formate with 0.1 % Formic Acid	2. Guanosine-5-Monophosphate
<b>Flow Rate:</b> 0.4 mL/min	3. Thymine

#### Nucleosides in 100% Aqueous Conditions



Comparative separations may not be representative of all applications.

## Luna Omega SUGAR

Luna Omega SUGAR breaks ground as it combines the performance benefits of thermally modified fully porous particles with a novel HILIC stationary phase that excels at polar compound retention and selectivity.

- Improved carbohydrate retention and separation with multi-functional selectivity that contains amide/amino stationary phase and polar endcapping
- Enhanced lifetime with highly robust and efficient thermally modified fully porous particle
- QC tested for sugars to ensure reliable quality

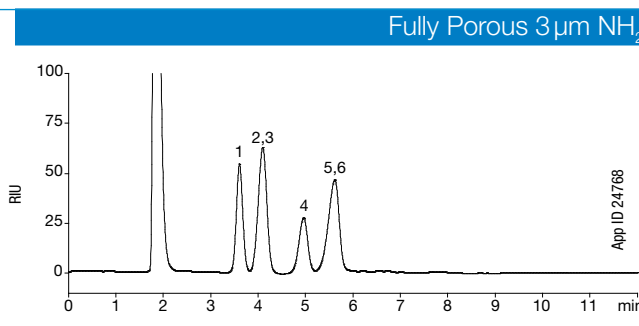
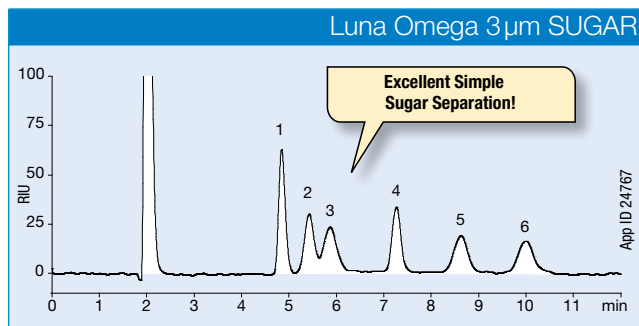
### Materials Characteristics

Phase	Particle Sizes (μm)	Pore Size (Å)	Surface Area (m <sup>2</sup> /g)	Carbon Load (%)	pH Stability	Pressure Limit (bar)	USP Column Classification
Luna Omega SUGAR	3	100	260	<2	2.0-7.0	345	L8



## Exceptional Retention and Separation

Luna Omega SUGAR greatly improves upon the retention and separation capabilities of traditional fully porous, core-shell, and hybrid materials, while also allowing for greater peak response! All this while also ensuring that customers do not need to depend on buffers or ion-pair agents to get adequate separation at the cost of losing signal.



Conditions for all columns:

**Columns:** Luna Omega 3 μm SUGAR  
Fully Porous 3 μm NH<sub>2</sub>  
Hybrid Fully Porous 3.5 μm Amide

**Dimensions:** 150 x 4.6 mm

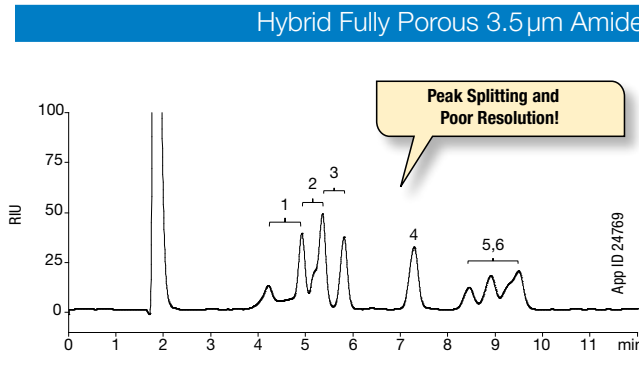
**Mobile Phase:** Acetonitrile/Water (75:25)

**Flow Rate:** 1 mL/min

**Temperature:** 25 °C

**Detection:** RI

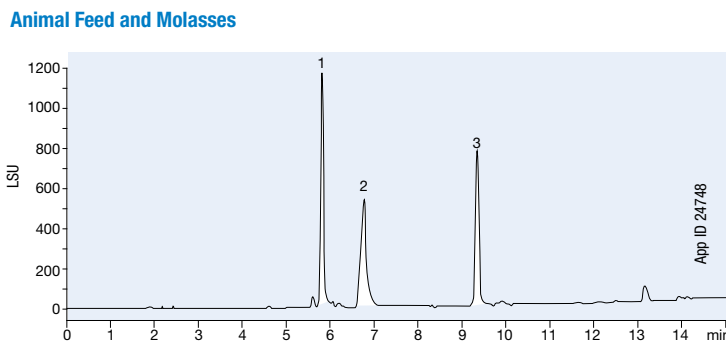
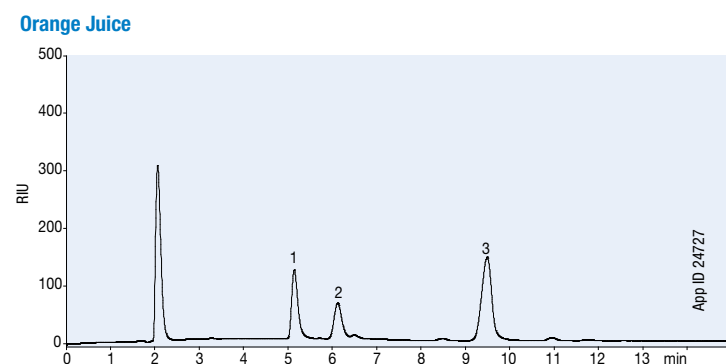
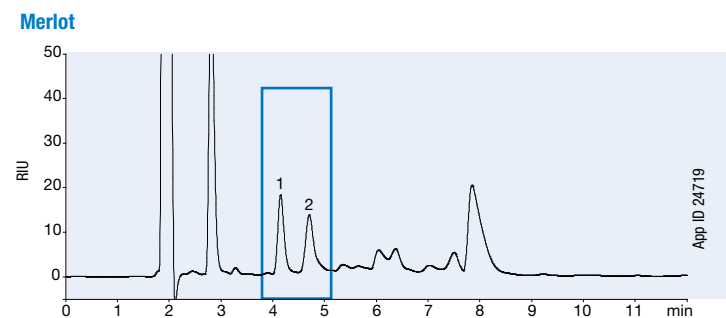
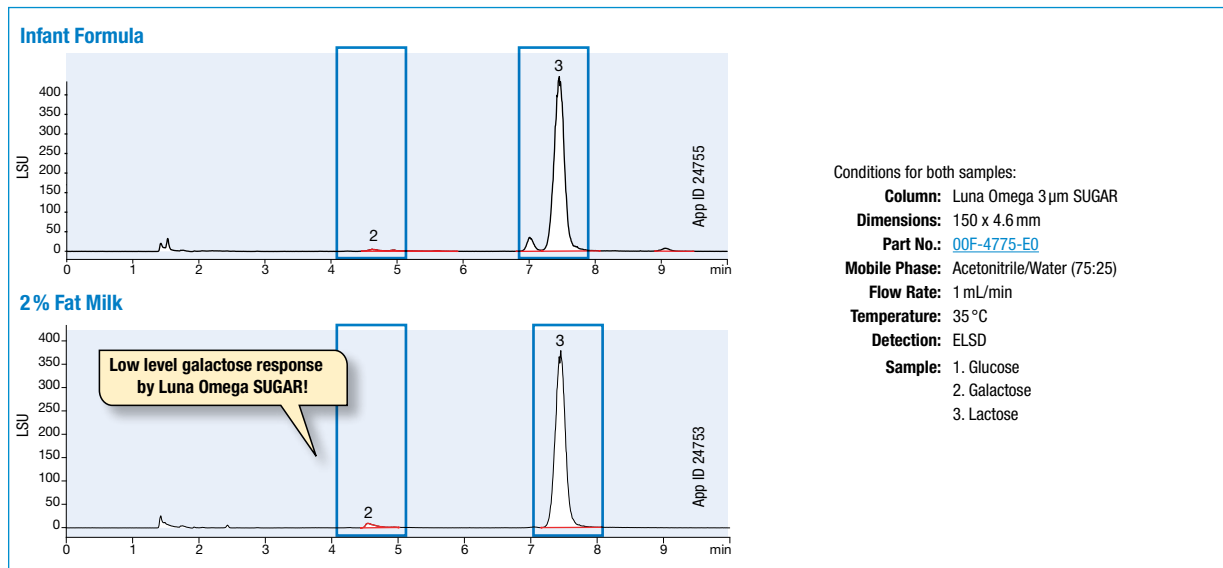
**Sample:** 1. Fructose  
2. Glucose  
3. Galactose  
4. Sucrose  
5. Maltose  
6. Lactose



Comparative separations may not be representative of all applications.



## Luna Omega SUGAR (cont'd)



# Luna™ Omega

## Ordering Information

1.6 µm Microbore Columns (mm)			
Phases	50 x 1.0	100 x 1.0	150 x 1.0
Polar C18	<a href="#">00B-4748-AO</a>	<a href="#">00D-4748-AO</a>	<a href="#">00F-4748-AO</a>
PS C18	—	<a href="#">00D-4752-AO</a>	—
C18	<a href="#">00B-4742-AO</a>	<a href="#">00D-4742-AO</a>	<a href="#">00F-4742-AO</a>

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	<a href="#">00A-4748-AN</a>	<a href="#">00B-4748-AN</a>	<a href="#">00D-4748-AN</a>	<a href="#">00F-4748-AN</a>	<a href="#">AJ0-9505</a>
PS C18	<a href="#">00A-4752-AN</a>	<a href="#">00B-4752-AN</a>	<a href="#">00D-4752-AN</a>	<a href="#">00F-4752-AN</a>	<a href="#">AJ0-9508</a>
C18	<a href="#">00A-4742-AN</a>	<a href="#">00B-4742-AN</a>	<a href="#">00D-4742-AN</a>	<a href="#">00F-4742-AN</a>	<a href="#">AJ0-9502</a>

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	<a href="#">00B-4760-AC</a>	<a href="#">00D-4760-AC</a>	<a href="#">00F-4760-AC</a>	<a href="#">00B-4760-AF</a>	<a href="#">00D-4760-AF</a>	<a href="#">00F-4760-AF</a>	—
PS C18	<a href="#">00B-4758-AC</a>	<a href="#">00D-4758-AC</a>	<a href="#">00F-4758-AC</a>	<a href="#">00B-4758-AF</a>	<a href="#">00D-4758-AF</a>	<a href="#">00F-4758-AF</a>	<a href="#">05M-4758-AC</a>

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	<a href="#">00A-4760-AN</a>	<a href="#">00B-4760-AN</a>	<a href="#">00D-4760-AN</a>	<a href="#">00F-4760-AN</a>	<a href="#">AJ0-7600</a>
PS C18	<a href="#">00A-4758-AN</a>	<a href="#">00B-4758-AN</a>	<a href="#">00D-4758-AN</a>	<a href="#">00F-4758-AN</a>	<a href="#">AJ0-7605</a>
C18	—	<a href="#">00B-4784-AN</a>	<a href="#">00D-4784-AN</a>	<a href="#">00F-4784-AN</a>	<a href="#">AJ0-7611</a>
SUGAR	—	<a href="#">00B-4775-AN</a>	<a href="#">00D-4775-AN</a>	<a href="#">00F-4775-AN</a>	<a href="#">AJ0-4496</a>

for ID: 2.0-3.0 mm

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

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	<a href="#">00B-4760-E0</a>	<a href="#">00D-4760-E0</a>	<a href="#">00F-4760-E0</a>	<a href="#">00G-4760-E0</a>	<a href="#">AJ0-7601</a>
PS C18	<a href="#">00B-4758-E0</a>	<a href="#">00D-4758-E0</a>	<a href="#">00F-4758-E0</a>	<a href="#">00G-4758-E0</a>	<a href="#">AJ0-7606</a>
C18	<a href="#">00B-4784-E0</a>	<a href="#">00D-4784-E0</a>	<a href="#">00F-4784-E0</a>	<a href="#">00G-4784-E0</a>	<a href="#">AJ0-7612</a>
SUGAR	—	<a href="#">00D-4775-E0</a>	<a href="#">00F-4775-E0</a>	<a href="#">00G-4775-E0</a>	<a href="#">AJ0-4495</a>

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	<a href="#">00B-4754-AN</a>	<a href="#">00D-4754-AN</a>	<a href="#">00F-4754-AN</a>	<a href="#">00B-4754-YO</a>	<a href="#">00D-4754-YO</a>	<a href="#">00F-4754-YO</a>	<a href="#">AJ0-7600</a>
PS C18	<a href="#">00B-4753-AN</a>	<a href="#">00D-4753-AN</a>	<a href="#">00F-4753-AN</a>	<a href="#">00B-4753-YO</a>	<a href="#">00D-4753-YO</a>	<a href="#">00F-4753-YO</a>	<a href="#">AJ0-7605</a>

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	<a href="#">00B-4754-E0</a>	<a href="#">00D-4754-E0</a>	<a href="#">00F-4754-E0</a>	<a href="#">00G-4754-E0</a>	<a href="#">AJ0-7601</a>
PS C18	<a href="#">00B-4753-E0</a>	<a href="#">00D-4753-E0</a>	<a href="#">00F-4753-E0</a>	<a href="#">00G-4753-E0</a>	<a href="#">AJ0-7606</a>
C18	<a href="#">00B-4785-E0</a>	<a href="#">00D-4785-E0</a>	<a href="#">00F-4785-E0</a>	<a href="#">00G-4785-E0</a>	<a href="#">AJ0-7612</a>

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	<a href="#">00G-4754-N0</a>	<a href="#">AJ0-9519</a>	
PS C18	<a href="#">00G-4753-N0</a>	<a href="#">AJ0-9520</a>	

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	<a href="#">00B-4754-P0-AX</a>	<a href="#">00D-4754-P0-AX</a>	<a href="#">00F-4754-P0-AX</a>	<a href="#">00G-4754-P0-AX</a>	<a href="#">AJ0-7603</a>
PS C18	<a href="#">00B-4753-P0-AX</a>	<a href="#">00D-4753-P0-AX</a>	<a href="#">00F-4753-P0-AX</a>	<a href="#">00G-4753-P0-AX</a>	<a href="#">AJ0-7608</a>
C18	—	—	—	<a href="#">00G-4785-P0-AX</a>	—

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	<a href="#">00D-4754-U0-AX</a>	<a href="#">00F-4754-U0-AX</a>	<a href="#">00G-4754-U0-AX</a>	<a href="#">00G-4754-V0-AX</a>	<a href="#">AJ0-7604</a>
PS C18	<a href="#">00D-4753-U0-AX</a>	<a href="#">00F-4753-U0-AX</a>	<a href="#">00G-4753-U0-AX</a>	<a href="#">00G-4753-V0-AX</a>	<a href="#">AJ0-7609</a>

for ID: 30-49 mm



For 5 µm Luna Omega Micro LC Columns, Traps, and Fittings, see p. 361

† SecurityGuard ULTRA Cartridges require holder, Part No.: [AJ0-9000](#)  
 \* SecurityGuard Analytical Cartridges require holder, Part No.: [KJ0-4282](#)  
 \*\*\*SemiPREP SecurityGuard Cartridges require holder, Part No.: [AJ0-9281](#)  
 \*\*PREP SecurityGuard Cartridges require holder, Part No.: [AJ0-8223](#)  
 ♦PREP SecurityGuard Cartridges require holder, Part No.: [AJ0-8277](#)

## Coated and Immobilized Polysaccharide Chiral Phases that Offer Broad Enantioselectivity

Lux coated and immobilized chiral columns are guaranteed to perform similar to or better than the equivalent DAICEL Chiral Technologies column of matching polysaccharide backbone and chiral selector at considerable cost savings. Lux phases can also provide alternative selectivity to other chiral selectors when separation is not achieved or when higher resolution is required.

### Technical Specifications

Particle Size	3, 5, 10 <sup>1</sup> , 20 <sup>1</sup> μm
pH Stability	2-9
Stability	Normal phase, polar organic, SFC, and reversed phase conditions
Maximum Pressure	300 bar
Temperature Range	0-50 °C
Shipping Solvent	n-Hexane/2-propanol (9:1, v/v)
Switching Solvent	Methanol/Ethanol (9:1, v/v)

<sup>1</sup>Please inquire for availability

### Resolve Over 92% of Your Enantiomers with Our Eight Coated and Immobilized Phases!

#### Immobilized Lux Columns

**Lux i-Amylose-1**  
Amylose tris  
(3,5-dimethylphenylcarbamate)

**Lux i-Amylose-3**  
Amylose tris  
(3-chloro-5-methylphenylcarbamate)

**Lux i-Cellulose-5**  
Cellulose tris  
(3,5-dichlorophenylcarbamate)

#### Coated Lux Columns

**Lux Cellulose-1**  
Cellulose tris  
(3,5-dimethylphenylcarbamate)

**Lux Cellulose-2**  
Cellulose tris  
(3-chloro-4-methylphenylcarbamate)

**Lux Cellulose-3**  
Cellulose tris  
(4-methylbenzoate)

**Lux Cellulose-4**  
Cellulose tris  
(4-chloro-3-methylphenylcarbamate)

**Lux Amylose-1**  
Amylose tris  
(3,5-dimethylphenylcarbamate)



### Easily upgrade from your existing chiral columns to Lux LC/SFC columns!

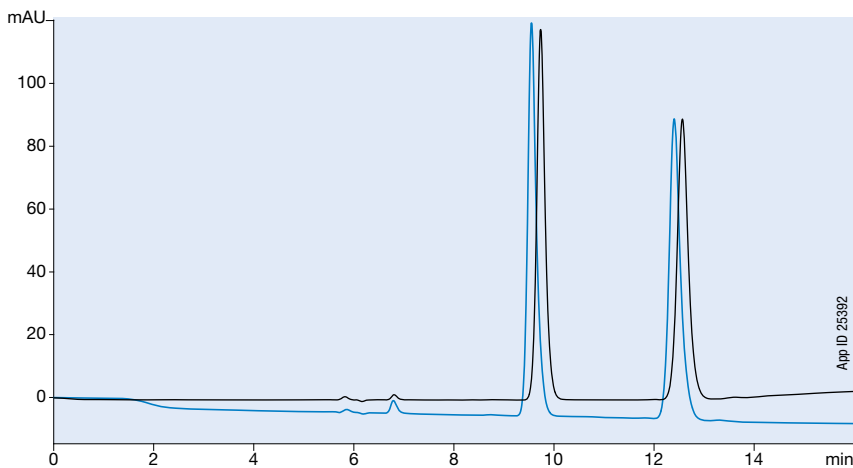
If you are using one of the DAICEL® columns below:	Guaranteed alternative:	Phase description:
CHIRALPAK® IA® and IA-3	<b>Lux i-Amylose-1</b>	Amylose tris(3,5-dimethylphenylcarbamate)
CHIRALPAK IG® and IG-3	<b>Lux i-Amylose-3</b>	Amylose tris(3-chloro-5-methylphenylcarbamate)
CHIRALPAK IC® and IC-3	<b>Lux i-Cellulose-5</b>	Cellulose tris(3,5-dichlorophenylcarbamate)
CHIRALPAK AD®, AD-H®, AD-3, AD-RH®, and AD-3R	<b>Lux Amylose-1</b>	Amylose tris(3,5-dimethylphenylcarbamate)
CHIRALCEL® OD®, OD-H®, OD-3, OD-RH®, and OD-3R	<b>Lux Cellulose-1</b>	Cellulose tris(3,5-dimethylphenylcarbamate)
CHIRALCEL OZ®, OZ-H®, OZ-3, OZ-RH®, and OZ-3R	<b>Lux Cellulose-2</b>	Cellulose tris(3-chloro-4-methylphenylcarbamate)
CHIRALCEL OJ®, OJ-H®, OJ-3, OJ-RH®, and OJ-3R	<b>Lux Cellulose-3</b>	Cellulose tris(4-methylbenzoate)
CHIRALCEL OX-H, OX-3, OX-RH, and OX-3R	<b>Lux Cellulose-4</b>	Cellulose tris(4-chloro-3-methylphenylcarbamate)

## Lux Immobilized Chiral Selectors

The immobilization and bonding technology used within the Lux i-Amylose-3 promotes column stability in strong organic solvents, which affords you the ability to expand your chiral separation success with more solvent systems and separation modes. Below is an example of stable retention time, separation, and peak shape

after exposure to strong solvents for both 5 and 3 μm particle sizes. The exposure to aggressive solvents DCM and THF did not affect the excellent performance of these Lux i-Amylose-3 columns. In addition, bonding technology that promotes robust reproducibility.

### Strong Solvent Stability and Robustness



\*Aggressive solvent stability was tested by flushing columns with DCM followed by THF before rerunning in mobile phase.

Conditions for all separations:

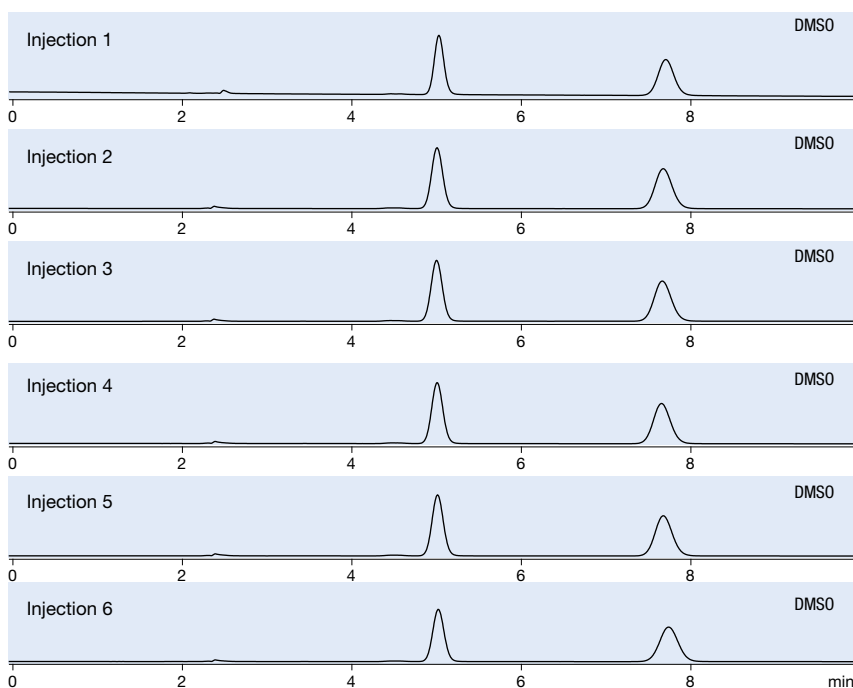
- Columns:** Lux 5 μm i-Amylose-3
- Dimensions:** 250 x 4.6 mm
- Part No.:** [00G-4779-E0](#)
- Mobile Phase:** Hexane/Isopropanol with 0.1% Diethylamine (80/20)
- Flow Rate:** 0.5 mL/min
- Injection Volume:** 10 μL (2 mg/mL)
- Detection:** UV @ 220 nm
- Sample:** 1. Trans-Stilbene Oxide  
2. Trans-Stilbene Oxide

- Before Exposure to Strong Solvents (DCM & THF)\*
- After Exposure



### Load Samples in Desired Strong Solvents

With the strong solvent stability of the Lux immobilized phases (i-Amylose-3, i-Cellulose-5 and i-Amylose-1) comes the ability to keep samples diluted in the strong organic solvents that are needed for sample solubility or are directly from a reaction mixture.



Conditions for all separations:

- Column:** Lux 5 μm i-Cellulose-5
- Dimensions:** 250 x 4.6 mm
- Part No.:** [00G-4756-E0](#)
- Mobile Phase:** Methanol/DEA (100:0.1)
- Flow Rate:** 1.5 mL/min
- Detection:** UV @ 280 nm
- Temperature:** 27 °C
- Sample:** Laudanosine
- Dilution Solvent:** Dimethyl Sulfoxide (DMSO)

### Solve compound solubility issues

by loading in strong organic solvents for preparative purifications on extremely robust Lux i-Amylose-3, i-Cellulose-5 and i-Amylose-1 AXIA™ packed columns.





## Lux Chiral Stationary Phases

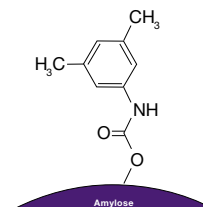
The Lux line of coated and immobilized cellulose-based and amylose-based chiral stationary phases includes eight complementary selectivities.



Excellent separation at a fraction of the cost of DAICEL/Chiral Technologies.

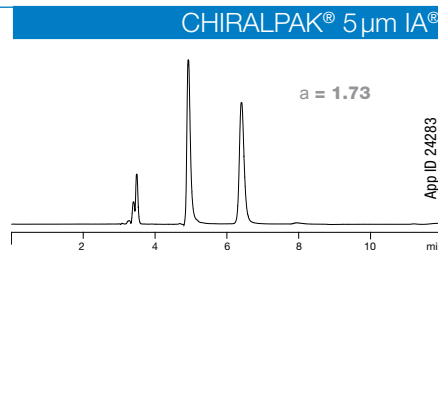
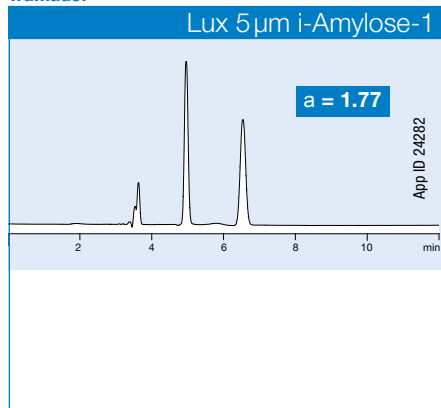
### Lux i-Amylose-1: Immobilized 3,5-Dimethyl Phenylcarbamate Selector

Known to have broad enantio-recognition, this incredibly popular Amylose tris (3,5-dimethylphenylcarbamate) chiral selector provides polar, electrostatic, hydrophobic, van der Waals, and other retention mechanisms.



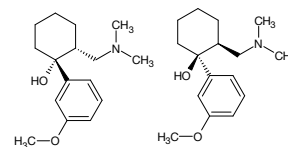
Amylose tris(3,5-dimethylphenylcarbamate)

#### Tramadol



Conditions for both columns:

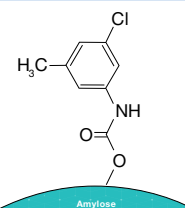
- Dimensions:** 250 x 4.6 mm
- Mobile Phase:** 0.1% DEA in Hexane / 0.1% DEA in IPA (90:10)
- Flow Rate:** 1 mL/min
- Detection:** UV @ 270 nm
- Temperature:** Ambient



Excellent separation at a fraction of the cost of DAICEL/Chiral Technologies.

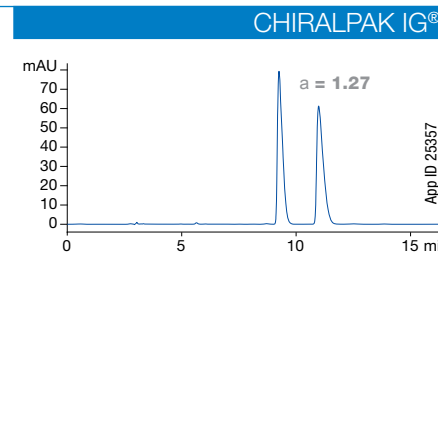
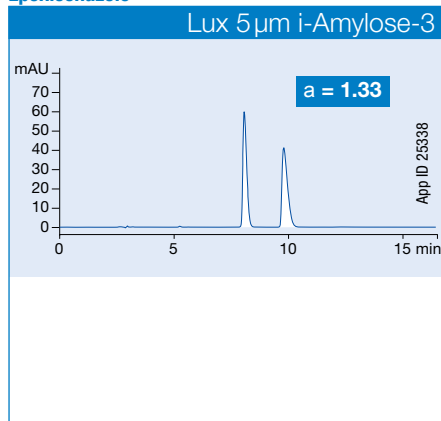
### Lux i-Amylose-3: Immobilized 3-Chloro, 5-Methyl Phenylcarbamate Selector

Lux immobilized chiral stationary phases provide complementary but distinct enantioselectivity for a wide range of chirality. In addition, the immobilization process allows for the use of a wide range of mobile phases and strong solvents, making the Lux immobilized phases an ideal set of chiral phases to start screening with.



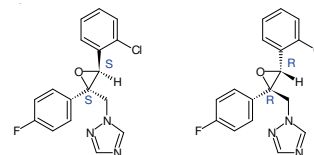
Amylose tris(3-chloro-5-methylphenylcarbamate)

#### Epoxiconazole



Conditions for both columns:

- Dimensions:** 250 x 4.6 mm
- Mobile Phase:** Water with 5 mM Ammonium Acetate + 0.05% Formic Acid/Acetonitrile (35:65)
- Flow Rate:** 1.0 mL/min
- Injection Volume:** 10 μL (2 mg/mL)
- Detection:** UV @ 254 nm
- Temperature:** Ambient



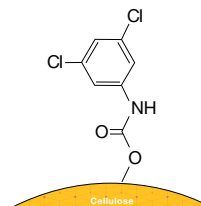
Columns used for comparison were manufactured by DAICEL Corporation. Phenomenex is in no way affiliated with DAICEL Corporation. Comparative separations may not be representative of all applications.



Excellent separation at a fraction of the cost of DAICEL/Chiral Technologies.

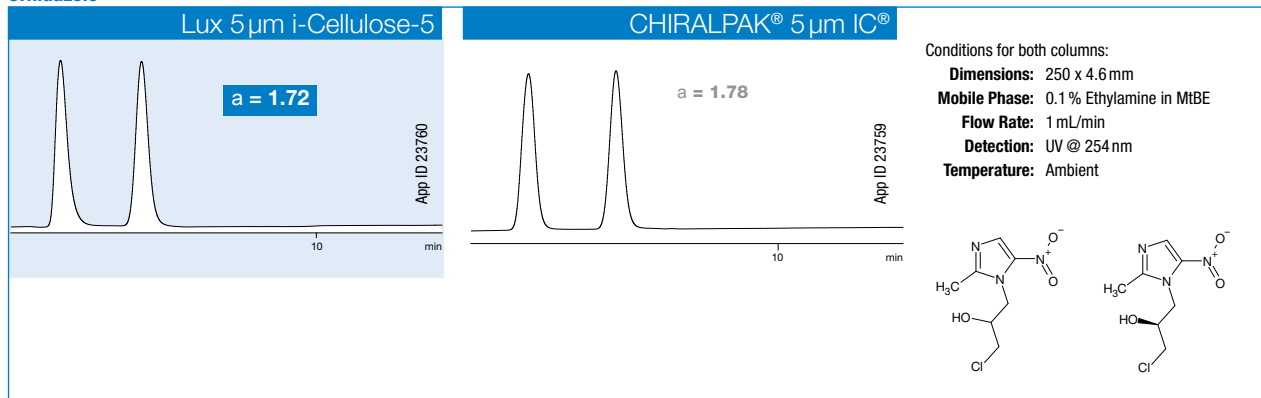
## Lux i-Cellulose-5: Immobilized 3,5-Dichloro Phenylcarbamate Selector

The dichlorophenyl-moiety part of the i-Cellulose-5 selector creates a novel chiral selectivity by way of having two strong electron accepting atoms that draw the electron cloud of the phenyl ring outward.



Cellulose tris(3,5-dichlorophenylcarbamate)

### Omidazole



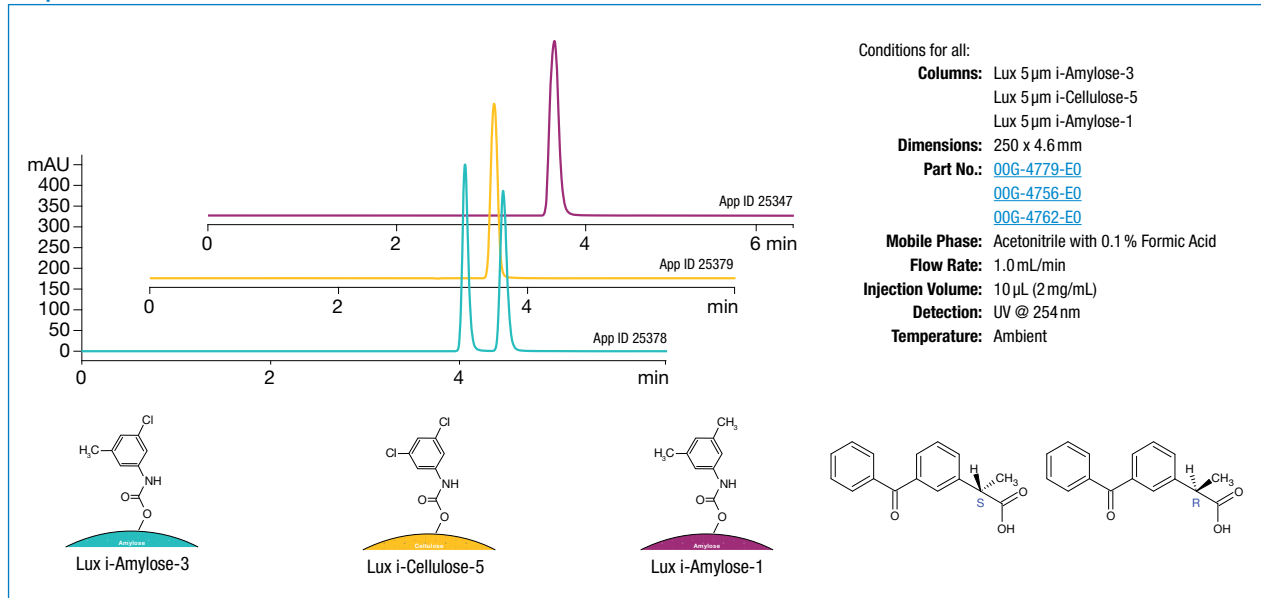
Columns used for comparison were manufactured by DAICEL Corporation. Phenomenex is in no way affiliated with DAICEL Corporation. Comparative separations may not be representative of all applications.



## Immobilized Selectivity Comparison

Lux immobilized chiral columns offer a wide and complementary range of enantioselectivity for chiral separation projects under normal phase, reversed phase, polar ionic, or SFC separation modes. Below is an example of chiral screening using i-Amylose-3, i-Cellulose-5, and i-Amylose-1 under polar ionic conditions.

### Ketoprofen

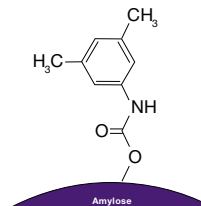




**Excellent separation at a fraction of the cost of DAICEL/Chiral Technologies.**

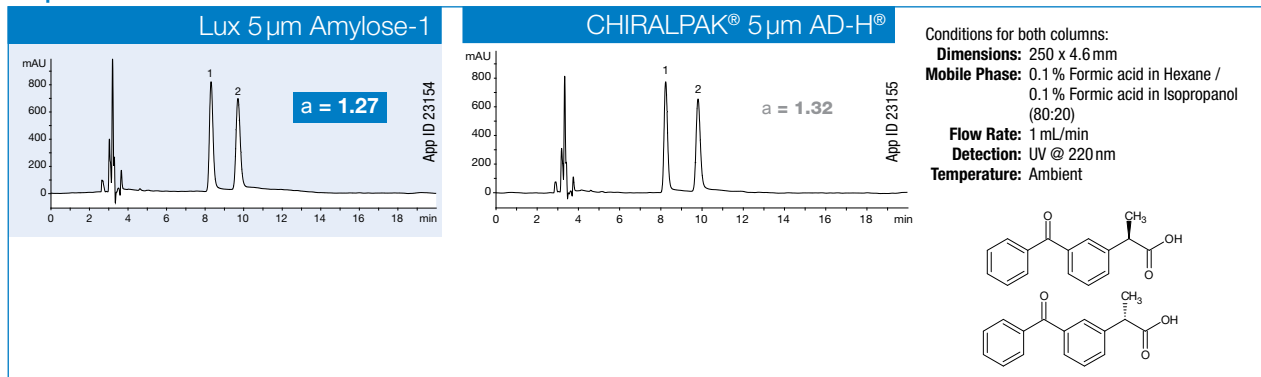
## Lux Amylose-1: Coated 3,5-Dimethyl Phenylcarbamate Selector

This universally trusted amylose phenylcarbamate derivative is absolutely essential to any chiral screen. Lux Amylose-1 is a guaranteed alternative to CHIRALPAK® AD®. Expect equivalent or better performance when using this Lux phase.



Amylose tris(3,5-dimethylphenylcarbamate)

### Ketoprofen



### Chiral Screening

For more information or to begin a project today, please contact your local Phenomenex representative.



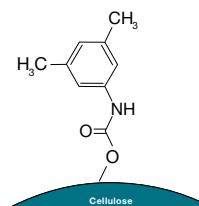
[www.phenomenex.com/contact-us](http://www.phenomenex.com/contact-us)



Excellent separation at a fraction of the cost of DAICEL/Chiral Technologies.

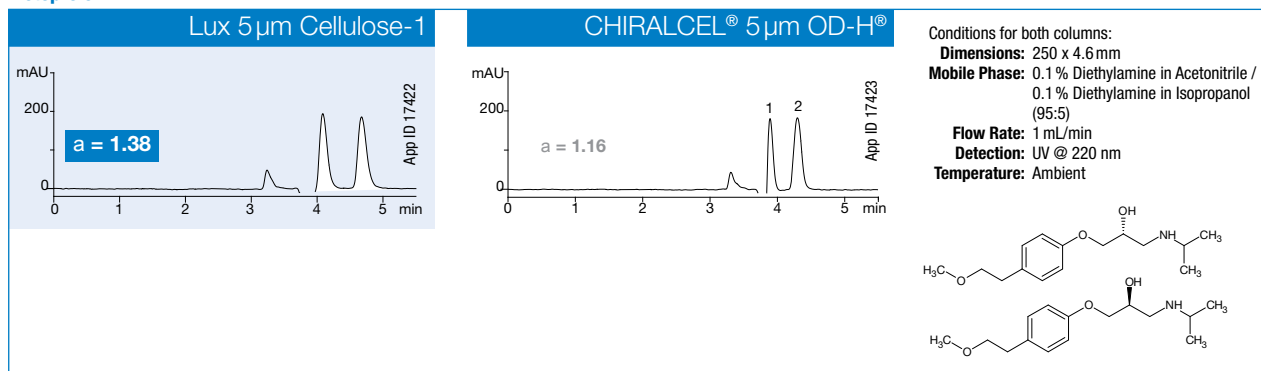
## Lux Cellulose-1: Coated 3,5-Dimethyl Phenylcarbamate Selector

This universally trusted cellulose phenylcarbamate derivative is absolutely essential to any chiral screen. Guaranteed alternative to CHIRALCEL® OD-H®. Expect equivalent or better performance.



Cellulose tris(3,5-dimethylphenylcarbamate)

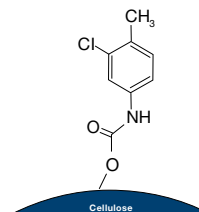
### Metoprolol



Excellent separation at a fraction of the cost of DAICEL/Chiral Technologies.

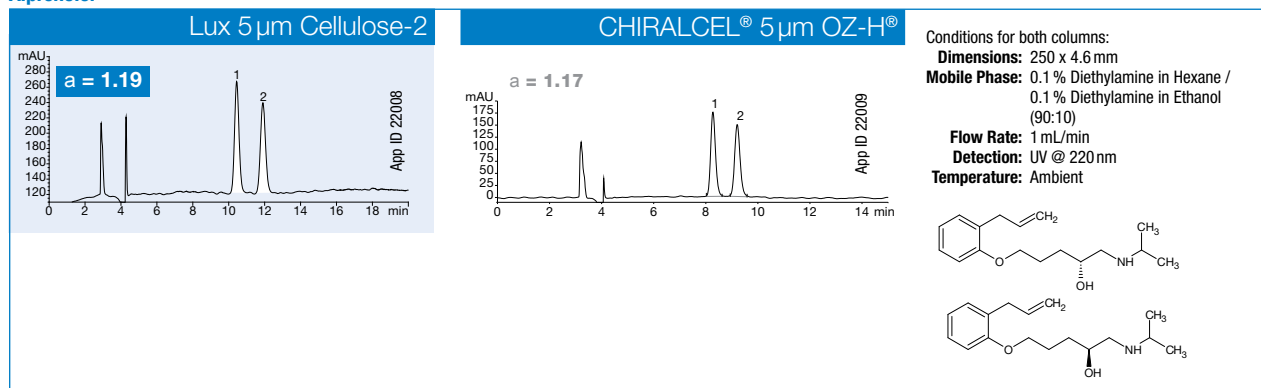
## Lux Cellulose-2: Coated 3-Chloro, 4-Methyl Phenylcarbamate Selector

This first-to-market halogenated cellulose phenylcarbamate derivative offers unique chiral recognition abilities that complement the rest of the Lux family of columns.



Cellulose tris(3-chloro-4-methylphenylcarbamate)

### Alprenolol



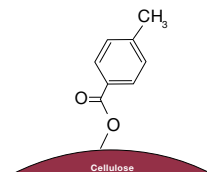
Comparative separations may not be representative of all applications.



Excellent separation at a fraction of the cost of DAICEL/Chiral Technologies.

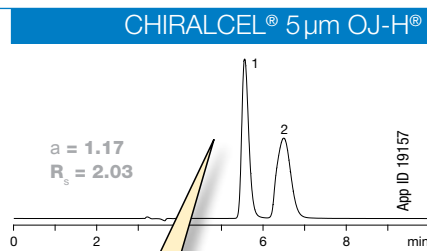
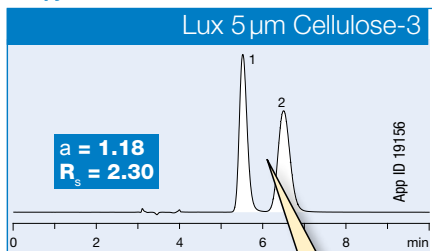
## Lux Cellulose-3: Coated 4-Methyl Phenylacetate Selector

This cellulose methylbenzoate derivative offers distinct and complementary chiral recognition abilities.



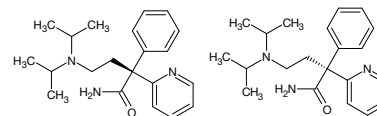
Cellulose tris(4-methylbenzoate)

### Disopyramide



Similar Lux phases can offer equivalent, if not better, performance when compared to CHIRALCEL® and CHIRALPAK®

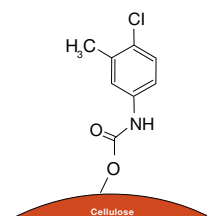
Conditions for both columns:  
**Dimensions:** 250 x 4.6 mm  
**Mobile Phase:** 0.1 % Diethylamine in Hexane / 0.1 % Diethylamine in Ethanol (90:10)  
**Flow Rate:** 1 mL/min  
**Detection:** UV @ 220 nm  
**Temperature:** Ambient



Excellent separation at a fraction of the cost of DAICEL/Chiral Technologies.

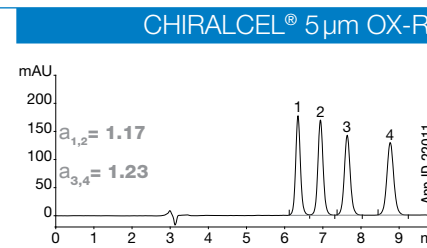
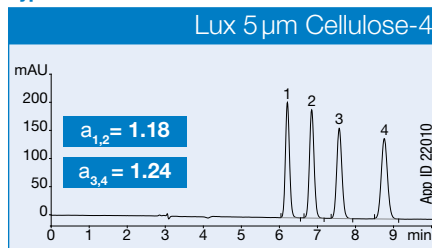
## Lux Cellulose-4: Coated 4-Chloro, 3-Methyl Phenylcarbamate Selector

This chlorinated cellulose phenylcarbamate derivative offers unique chiral recognition abilities.

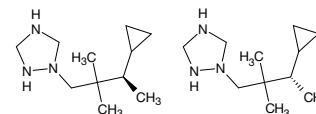


Cellulose tris(4-chloro-3-methylphenylcarbamate)

### Cyproconazole



Conditions for both columns:  
**Dimensions:** 250 x 4.6 mm  
**Mobile Phase:** 0.1 % Diethylamine in Acetonitrile / 0.1 % Diethylamine in 20 mM Ammonium bicarbonate (60:40)  
**Flow Rate:** 1 mL/min  
**Detection:** UV @ 220 nm  
**Temperature:** Ambient



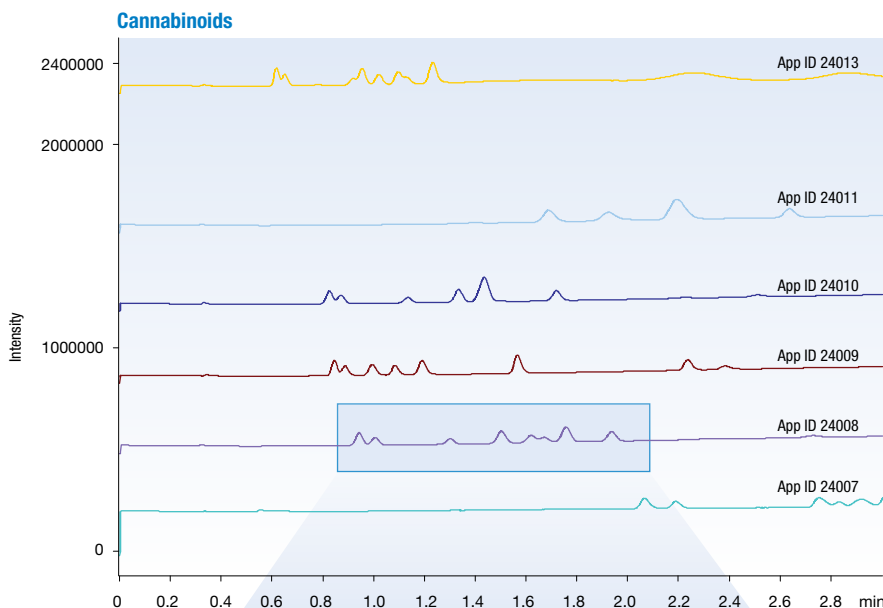
Comparative separations may not be representative of all applications.



## Achiral SFC Success with Chiral Columns!

While the incredible range of interaction mechanisms (polar, electrostatic, hydrophobic, van der Waals, and others) present in each Lux material are fundamental for ensuring baseline separation of chiral compounds, these same interaction mechanisms can also be used as an excellent screening tool for achiral work. Here we

present an achiral screening of natural cannabinoids using 7 Lux selectivities under one SFC mobile phase. The initial resolution and separation provided by the Lux Cellulose-2 was then further optimized to provide even greater resolution.



Conditions for all columns:

**Columns:** Lux 3 µm i-Cellulose-5  
Lux 3 µm Amylose-1  
Lux 3 µm Cellulose-4  
Lux 3 µm Cellulose-3  
Lux 3 µm Cellulose-2  
Lux 3 µm Cellulose-1

**Dimensions:** 150 x 3.0 mm

**Mobile Phase:** A: Carbon Dioxide  
B: Methanol

Gradient:	Time (min)	% B
	0	5
	2.5	25
	3	25

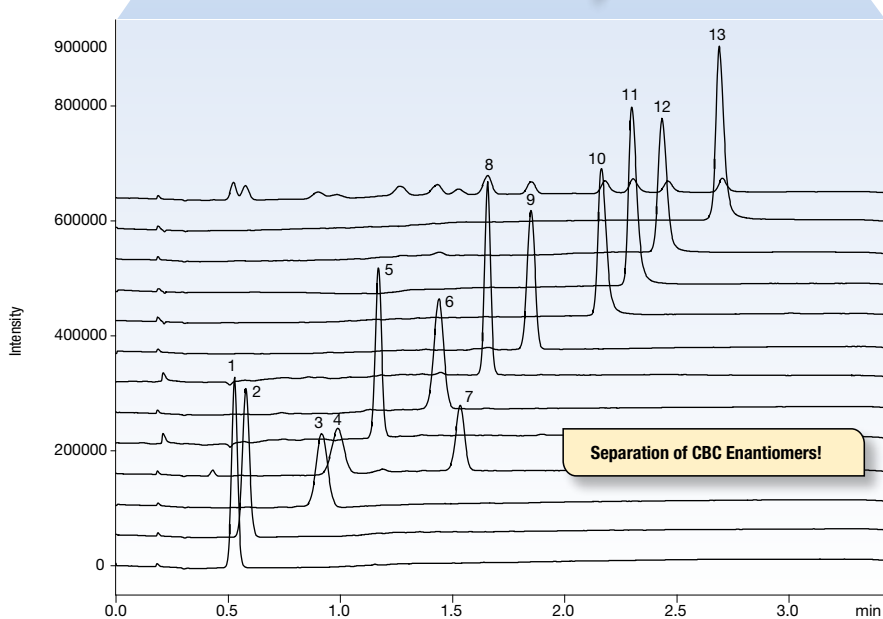
**Flow Rate:** 3 mL/min

**Detection:** UV @ 220 nm

**Temperature:** 40 °C

**Sample:** Cannabinoid mix of 8

Expanded and optimized method separates achiral and chiral species!



**Column:** Lux 3 µm Cellulose-2

**Dimensions:** 150 x 3.0 mm

**Part No.:** [00F-4456-Y0](#)

**Mobile Phase:** A: Carbon Dioxide  
B: Methanol

Gradient:	Time (min)	% B
	0	4
	3	25
	3.5	25

**Flow Rate:** 5 mL/min

**Detection:** UV @ 220 nm

**Temperature:** 40 °C

**Sample:** Cannabinoid mix of 12

- |                       |           |
|-----------------------|-----------|
| 1. CBDV               | 8. THCV   |
| 2. CBN                | 9. CBG    |
| 3. Delta-8-THC        | 10. CBDA  |
| 4. CBC (Enantiomer 1) | 11. CBDVA |
| 5. CBD                | 12. THCA  |
| 6. Delta-9-THC        | 13. CBGA  |
| 7. CBC (Enantiomer 2) |           |



App ID 24342

## Axia™ Chiral Columns Out Perform Other Prep Columns

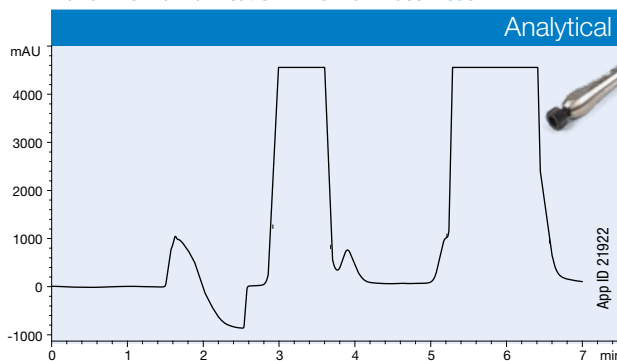
Axia specialized preparative hardware shows higher performance than traditionally packed standard hardware preparative columns. This revolutionary packing technology paired with Lux polysaccharide-based chiral stationary phases provide purification results like no other chiral column can provide.

To better understand how much Axia technology improves column performance over traditionally slurry packed preparative columns we scaled-up a 5 µm Lux Cellulose-1 chiral media analytical column and packed the same media into two different 150 x 21.2 mm ID

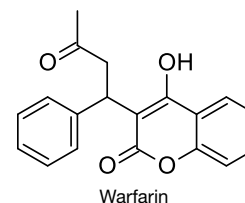
columns. One column was packed using Axia technology and the other prep column was packed using the traditional slurry packing process.

The Axia packing technology had a substantial increase in column efficiency resulting in increased resolution over traditionally packed preparative columns. With increased resolution you are able to increase your sample load enabling you to purify more target compound(s) per purification run. This equates to better throughput and economics.

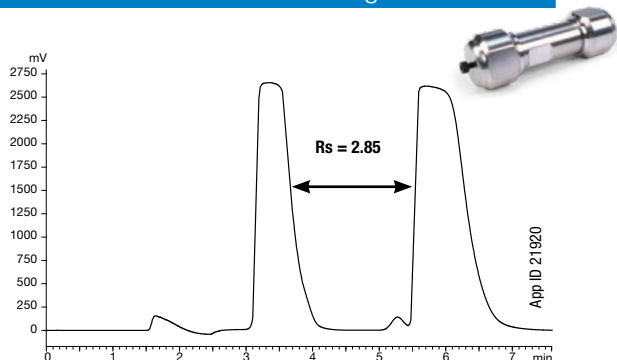
### Warfarin Chiral Purification in Normal Phase Mode



**Column:** Lux 5 µm Cellulose-1  
**Dimensions:** 150 x 4.6 mm  
**Mobile Phase:** Hexane/Ethanol (75:25)  
**Flow Rate:** 1 mL/min  
**Temperature:** Ambient  
**Inj. Volume:** 100 µL

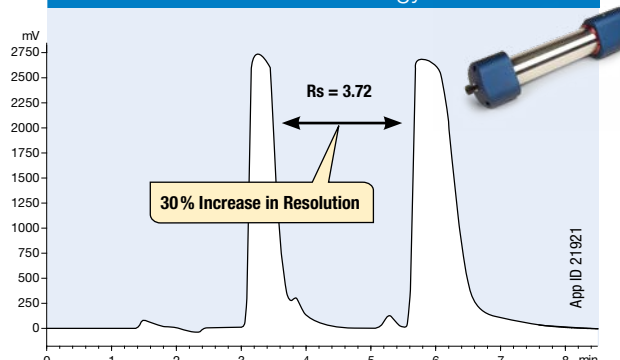


### Standard Packing and Hardware



Conditions for both columns:  
**Media:** Lux 5 µm Cellulose-1  
**Dimensions:** 150 x 21.2 mm  
**Mobile Phase:** Hexane / Ethanol (75:25)

### Axia Technology and Hardware



**Flow Rate:** 20 mL/min  
**Temperature:** Ambient  
**Inj. Volume:** 2 mL

42% Increase in Efficiency

Column (mm)	Analytical 150 x 4.6	Standard 150 x 21.2	Axia 150 x 21.2
Mass Loaded (mg)	2	40	40
Resolution*	1.5	2.85	3.72
Plates (N)	117	535	760

\* Resolution calculated with peak width at baseline and center retention time due to the overloaded peaks being off-scale

“We have used Phenomenex Axia prep-HPLC columns for several years and they consistently provide excellent separation and reproducibility for a variety of different compounds.”

Jeremy R. Wolf  
 ABC Laboratories, USA

The opinions stated herein are solely those of the speaker and not necessarily those of any company or organization.

# LUX™ Chiral LC and SFC Columns

## Ordering Information

3µm Minibore, MidBore™, and Analytical Columns (mm)										SecurityGuard™ Cartridges (mm)	
Phases	50 x 2.0	150 x 2.0	50 x 3.0	100 x 3.0	150 x 3.0	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	4 x 2.0*	4 x 3.0*
										/10pk	/10pk
i-Amylose-3	<a href="#">00B-4778-BO</a>	<a href="#">00F-4778-BO</a>	<a href="#">00B-4778-YO</a>	—	—	<a href="#">00B-4778-EQ</a>	<a href="#">00D-4778-EQ</a>	<a href="#">00F-4778-EQ</a>	<a href="#">00G-4778-EQ</a>	<a href="#">AJ0-8651</a>	<a href="#">AJ0-8650</a>
i-Cellulose-5	<a href="#">00B-4755-BO</a>	<a href="#">00F-4755-BO</a>	<a href="#">00B-4755-YO</a>	<a href="#">00D-4755-YO</a>	<a href="#">00F-4755-YO</a>	<a href="#">00B-4755-EQ</a>	<a href="#">00D-4755-EQ</a>	<a href="#">00F-4755-EQ</a>	<a href="#">00G-4755-EQ</a>	<a href="#">AJ0-8631</a>	<a href="#">AJ0-8632</a>
Cellulose-1	<a href="#">00B-4458-BO</a>	<a href="#">00F-4458-BO</a>	<a href="#">00B-4458-YO</a>	<a href="#">00D-4458-YO</a>	<a href="#">00F-4458-YO</a>	<a href="#">00B-4458-EQ</a>	<a href="#">00D-4458-EQ</a>	<a href="#">00F-4458-EQ</a>	<a href="#">00G-4458-EQ</a>	<a href="#">AJ0-8402</a>	<a href="#">AJ0-8403</a>
Cellulose-2	<a href="#">00B-4456-BO</a>	<a href="#">00F-4456-BO</a>	<a href="#">00B-4456-YO</a>	<a href="#">00D-4456-YO</a>	<a href="#">00F-4456-YO</a>	<a href="#">00B-4456-EQ</a>	<a href="#">00D-4456-EQ</a>	<a href="#">00F-4456-EQ</a>	<a href="#">00G-4456-EQ</a>	<a href="#">AJ0-8398</a>	<a href="#">AJ0-8366</a>
Cellulose-3	<a href="#">00B-4492-BO</a>	<a href="#">00F-4492-BO</a>	<a href="#">00B-4492-YO</a>	<a href="#">00D-4492-YO</a>	<a href="#">00F-4492-YO</a>	<a href="#">00B-4492-EQ</a>	<a href="#">00D-4492-EQ</a>	<a href="#">00F-4492-EQ</a>	<a href="#">00G-4492-EQ</a>	<a href="#">AJ0-8621</a>	<a href="#">AJ0-8622</a>
Cellulose-4	<a href="#">00B-4490-BO</a>	<a href="#">00F-4490-BO</a>	<a href="#">00B-4490-YO</a>	<a href="#">00D-4490-YO</a>	<a href="#">00F-4490-YO</a>	<a href="#">00B-4490-EQ</a>	<a href="#">00D-4490-EQ</a>	<a href="#">00F-4490-EQ</a>	<a href="#">00G-4490-EQ</a>	<a href="#">AJ0-8626</a>	<a href="#">AJ0-8627</a>
Amylose-1	<a href="#">00B-4729-BO</a>	<a href="#">00F-4729-BO</a>	<a href="#">00B-4729-YO</a>	<a href="#">00D-4729-YO</a>	<a href="#">00F-4729-YO</a>	<a href="#">00B-4729-EQ</a>	<a href="#">00D-4729-EQ</a>	<a href="#">00F-4729-EQ</a>	<a href="#">00G-4729-EQ</a>	<a href="#">AJ0-9337</a>	<a href="#">AJ0-9336</a>

for ID: 2.0–3.0mm 3.2–8.0mm

5µm Minibore and Analytical Columns (mm)						SecurityGuard Cartridges (mm)	
Phases	50 x 2.0	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	4 x 2.0*	4 x 3.0*
						/10pk	/10pk
i-Amylose-1	<a href="#">00B-4762-BO</a>	<a href="#">00B-4762-EQ</a>	<a href="#">00D-4762-EQ</a>	<a href="#">00F-4762-EQ</a>	<a href="#">00G-4762-EQ</a>	<a href="#">AJ0-8640</a>	<a href="#">AJ0-8641</a>
i-Amylose-3	—	<a href="#">00B-4779-EQ</a>	<a href="#">00D-4779-EQ</a>	<a href="#">00F-4779-EQ</a>	<a href="#">00G-4779-EQ</a>	<a href="#">AJ0-8651</a>	<a href="#">AJ0-8650</a>
i-Cellulose-5	—	<a href="#">00B-4756-EQ</a>	<a href="#">00D-4756-EQ</a>	<a href="#">00F-4756-EQ</a>	<a href="#">00G-4756-EQ</a>	<a href="#">AJ0-8631</a>	<a href="#">AJ0-8632</a>
Cellulose-1	—	<a href="#">00B-4459-EQ</a>	<a href="#">00D-4459-EQ</a>	<a href="#">00F-4459-EQ</a>	<a href="#">00G-4459-EQ</a>	<a href="#">AJ0-8402</a>	<a href="#">AJ0-8403</a>
Cellulose-2	<a href="#">00B-4457-BO</a>	<a href="#">00B-4457-EQ</a>	<a href="#">00D-4457-EQ</a>	<a href="#">00F-4457-EQ</a>	<a href="#">00G-4457-EQ</a>	<a href="#">AJ0-8398</a>	<a href="#">AJ0-8366</a>
Cellulose-3	—	<a href="#">00B-4493-EQ</a>	<a href="#">00D-4493-EQ</a>	<a href="#">00F-4493-EQ</a>	<a href="#">00G-4493-EQ</a>	<a href="#">AJ0-8621</a>	<a href="#">AJ0-8622</a>
Cellulose-4	—	—	<a href="#">00D-4491-EQ</a>	<a href="#">00F-4491-EQ</a>	<a href="#">00G-4491-EQ</a>	<a href="#">AJ0-8626</a>	<a href="#">AJ0-8627</a>
Amylose-1	<a href="#">00B-4732-BO</a>	—	<a href="#">00D-4732-EQ</a>	<a href="#">00F-4732-EQ</a>	<a href="#">00G-4732-EQ</a>	<a href="#">AJ0-9337</a>	<a href="#">AJ0-9336</a>

for ID: 2.0–3.0mm 3.2–8.0mm

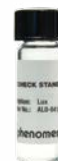
5µm Semi-Prep Columns (mm)			SecurityGuard Cartridges (mm)
Phases	150 x 10.0	250 x 10.0	10 x 10.0†
			/3pk
i-Amylose-1	—	<a href="#">00G-4762-NO</a>	<a href="#">AJ0-8642</a>
i-Amylose-3	—	<a href="#">00G-4779-NO</a>	<a href="#">AJ0-8652</a>
i-Cellulose-5	—	<a href="#">00G-4756-NO</a>	<a href="#">AJ0-8633</a>
Cellulose-1†	<a href="#">00F-4459-NO</a>	<a href="#">00G-4459-NO</a>	<a href="#">AJ0-8404</a>
Cellulose-2†	—	<a href="#">00G-4457-NO</a>	<a href="#">AJ0-8399</a>
Cellulose-3	—	<a href="#">00G-4493-NO</a>	<a href="#">AJ0-8623</a>
Cellulose-4	—	<a href="#">00G-4491-NO</a>	<a href="#">AJ0-8628</a>
Amylose-1	—	<a href="#">00G-4732-NO</a>	<a href="#">AJ0-9344</a>

for ID: 9–16mm

\*Inquire for Lux 10µm Cellulose-1 and Cellulose-2 columns.

## Column Performance Check Standard

Part No.	Description	Unit
<a href="#">AL0-8412</a>	Chiral Test Mix No. 5 (Lux)	ea



Lux Chiral Method Screening Kits are available. Please contact your Phenomenex representative for more information.

5µm Axia™ Packed Preparative Columns (mm)					SecurityGuard Cartridges (mm)	
Phases	150 x 21.2	250 x 21.2	250 x 30	250 x 50	15 x 21.2**	15 x 30.0*
					/ea	/ea
i-Amylose-1	<a href="#">00F-4762-P0-AX</a>	<a href="#">00G-4762-P0-AX</a>	<a href="#">00G-4762-U0-AX</a>	<a href="#">00G-4762-V0-AX</a>	<a href="#">AJ0-8643</a>	<a href="#">AJ0-8644</a>
i-Amylose-3	<a href="#">00F-4779-P0-AX</a>	<a href="#">00G-4779-P0-AX</a>	<a href="#">00G-4779-U0-AX</a>	<a href="#">00G-4779-V0-AX</a>	<a href="#">AJ0-8653</a>	<a href="#">AJ0-8654</a>
i-Cellulose-5	<a href="#">00F-4756-P0-AX</a>	<a href="#">00G-4756-P0-AX</a>	<a href="#">00G-4756-U0-AX</a>	<a href="#">00G-4756-V0-AX</a>	<a href="#">AJ0-8634</a>	<a href="#">AJ0-8635</a>
Cellulose-1†	<a href="#">00F-4459-P0-AX</a>	<a href="#">00G-4459-P0-AX</a>	<a href="#">00G-4459-U0-AX</a>	<a href="#">00G-4459-V0-AX</a>	<a href="#">AJ0-8405</a>	<a href="#">AJ0-8406</a>
Cellulose-2†	<a href="#">00F-4457-P0-AX</a>	<a href="#">00G-4457-P0-AX</a>	<a href="#">00G-4457-U0-AX</a>	<a href="#">00G-4457-V0-AX</a>	<a href="#">AJ0-8400</a>	<a href="#">AJ0-8401</a>
Cellulose-3	<a href="#">00F-4493-P0-AX</a>	<a href="#">00G-4493-P0-AX</a>	<a href="#">00G-4493-U0-AX</a>	<a href="#">00G-4493-V0-AX</a>	<a href="#">AJ0-8624</a>	<a href="#">AJ0-8625</a>
Cellulose-4	<a href="#">00F-4491-P0-AX</a>	<a href="#">00G-4491-P0-AX</a>	<a href="#">00G-4491-U0-AX</a>	<a href="#">00G-4491-V0-AX</a>	<a href="#">AJ0-8629</a>	<a href="#">AJ0-8630</a>
Amylose-1	<a href="#">00F-4732-P0-AX</a>	<a href="#">00G-4732-P0-AX</a>	<a href="#">00G-4732-U0-AX</a>	<a href="#">00G-4732-V0-AX</a>	<a href="#">AJ0-9338</a>	<a href="#">AJ0-9339</a>

for ID: 18–29mm 30–49mm

Bulk Media		
Phases	100 g	1 kg
<b>10µm</b>		
Cellulose-1	<a href="#">04G-4501</a>	<a href="#">04K-4501</a>
Cellulose-2	<a href="#">04G-4502</a>	<a href="#">04K-4502</a>
Cellulose-3	<a href="#">04G-4624</a>	<a href="#">04K-4624</a>
Cellulose-4	<a href="#">04G-4625</a>	<a href="#">04K-4625</a>



\*SecurityGuard Analytical Cartridges require holder, Part No.: [KJ0-4282](#)

†SemiPrep SecurityGuard Cartridges require holder, Part No.: [AJ0-9281](#)

\*\*HPLC PREP SecurityGuard Cartridges require holder, Part No.: [AJ0-8223](#)  
SFC PREP SecurityGuard Cartridges require holder, Part No.: [AJ0-8617](#)

\*HPLC PREP SecurityGuard Cartridges require holder, Part No.: [AJ0-8277](#)  
SFC PREP SecurityGuard Cartridges require holder, Part No.: [AJ0-8618](#)

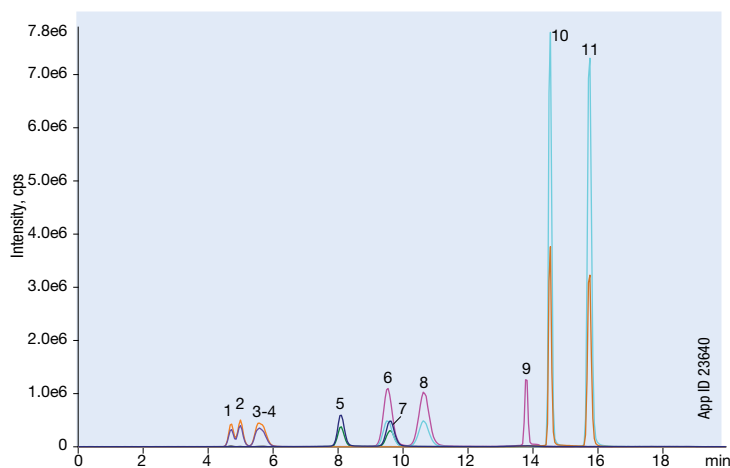


## Rapid and Accurate Chiral Separation of Methamphetamine and Amphetamine Enantiomers from Urine

Lux 3 μm AMP is a unique LC media that is specifically developed and tested for the chiral analysis of amphetamine and substituted amphetamines, including methamphetamine. Once presence of amphetamine or methamphetamine has been determined, enantiomeric confirmation can then easily be achieved.

### Not Affected by Common Interferences

Another excellent benefit of the Lux 3 μm AMP is that its separation of amphetamine and methamphetamine enantiomers isn't affected by common therapeutics and ingredients such as those seen below. In addition, the separation power of the Lux AMP column can also help with resolution between enantiomers of substituted amphetamines.



**Column:** Lux 3 μm AMP  
**Dimension:** 150 x 3.0 mm  
**Part No.:** [00F-4751-Y0](#)  
**Mobile Phase:** A: 5 mM Ammonium Bicarbonate, adjusted to pH 11 with Ammonium Hydroxide  
 B: Methanol

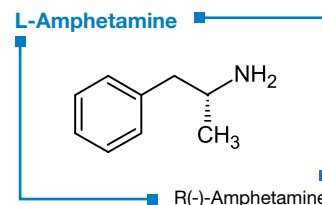
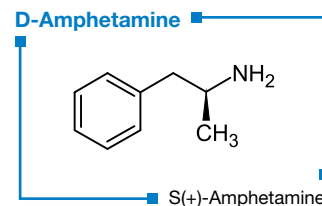
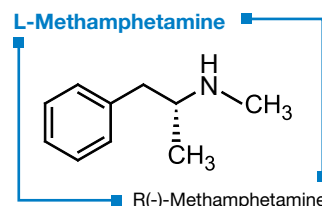
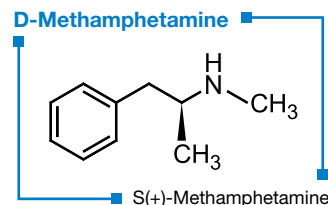
Gradient	Time (min)	% B
	0	60
	10	60
	11	95
	16	95
	16.3	60

**Flow Rate:** 0.42 mL/min  
**Temperature:** Ambient  
**Detection:** MS/MS (SCIEX® 4500 QTRAP®)

- 1S,2R(+)-Ephedrine
2. R,R(-)-Pseudoephedrine
3. S,S(+)-Pseudoephedrine
4. 1R,2S(-)-Ephedrine
5. R(-)-Amphetamine
6. R(-)-Methamphetamine
7. S(+)-Amphetamine
8. S(+)-Methamphetamine
9. Phentermine
10. R(-)-MDMA
11. S(+)-MDMA

**Compounds included in this interference study but not illustrated chromatographically:**

- acetaminophen
- aspirin
- (±)-chlorpheniramine
- caffeine
- diphenhydramine
- dextromethorphan
- ibuprofen
- (±)-MDA
- (±)-MDEA
- phenylephrine
- norephedrine



### 1-Minute β-Glucuronidase Removal

Within 1 minute, with no necessary method development, your samples will be ready for analysis.

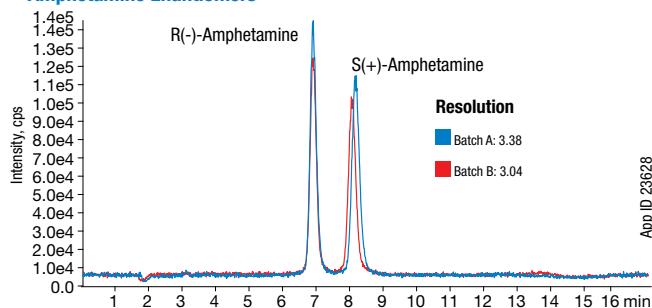
Learn more at: [www.phenomenex.com/beta-gone](http://www.phenomenex.com/beta-gone) or visit p. 56



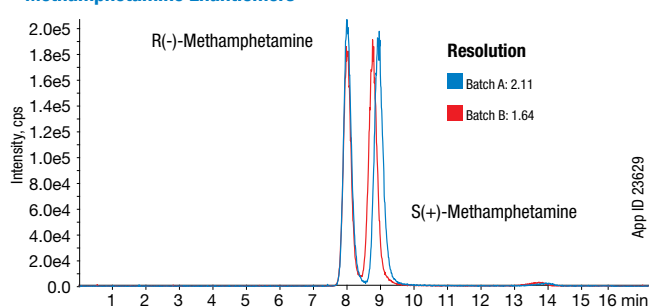
## Exceptional Reliability

Lux 3 µm AMP media and columns are designed to be consistent and incredibly accurate tools for amphetamine and methamphetamine analysis. Each batch is specifically tested by LC-MS for the analysis of amphetamine and methamphetamine, and columns are quality tested to ensure dependability and reproducibility.

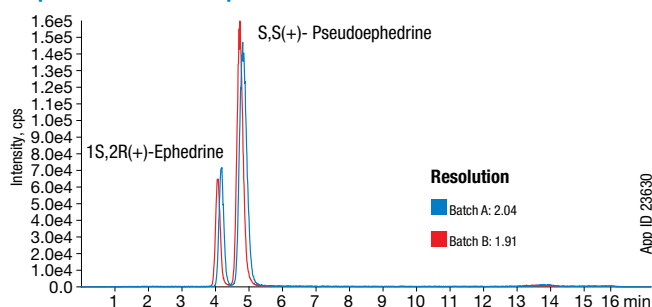
### Amphetamine Enantiomers



### Methamphetamine Enantiomers



### Ephedrine and Pseudoephedrine



**Column:** Lux 3 µm AMP  
**Dimension:** 150 x 3.0 mm  
**Part No.:** 00F-4751-Y0  
**Mobile Phase:** A: 5 mM Ammonium Bicarbonate, adjusted to pH 11 with Ammonium Hydroxide  
 B: Methanol  
**Gradient:**

Time (min)	% B
0	60
10	60
11	95
13	95
13.1	60

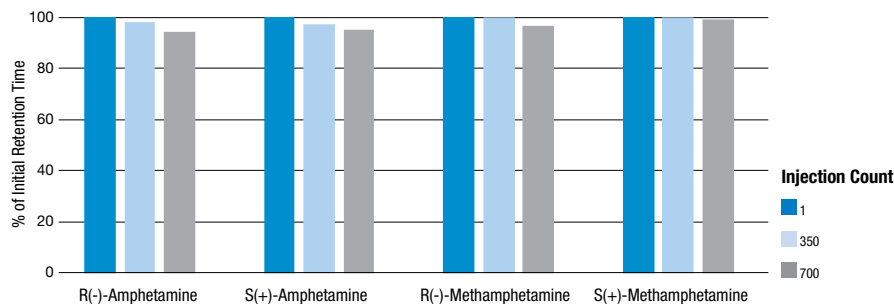
**Flow Rate:** 0.42 mL/min  
**Temperature:** 22 °C  
**Sample:**

- Ephedrine
- Pseudoephedrine
- R(-)-Amphetamine
- S(+)-Amphetamine
- R(-)-Methamphetamine
- S(+)-Methamphetamine



CHIRAL LC | LUX AMP | HPLC/UHPLC

## Excellent Lifetime



### Ordering Information

Phase	3 µm Analytical Columns (mm)			SecurityGuard™ Cartridges (mm)	
	100 x 3.0	150 x 3.0	150 x 4.6	4 x 2.0*	4 x 3.0*
AMP	00D-4751-Y0	00F-4751-Y0	00F-4751-E0	10/pk AJ0-8475	10/pk AJ0-8476
				for ID: 2.0 - 3.0 mm	3.2 - 8.0 mm

\*SecurityGuard Analytical Cartridges require holder, Part No.: KJQ-4282



## Finish First with Monolithic Silica HPLC Columns

Onyx is a silica monolithic HPLC column designed for high speed analysis. The monolithic nature allows for "dilute-and-shoot" applications saving scientists valuable sample preparation time.

- Reduce run times by more than 50 %
- "Dilute-and-Shoot" dirty biological samples
- Analytical, capillary, and semi-prep dimensions

### Material Characteristics

Packing Material	Macropore Size (µm)	Mesopore Size (Å)	Pore Volume (mL/g)	Surface Area (m <sup>2</sup> /g)	Carbon Load %	Calculated Bonded Phase Coverage (µmole/m <sup>2</sup> )	End Capping
Onyx C8	2	130	1.0	300	11	3.8	Yes
Onyx C18	2	130	1.0	300	18	3.6	Yes
Onyx C18*	1.5	130	1.0	300	18	3.6	Yes
Onyx HD-C18	1	130	1.0	300	18	3.6	Yes

Maximum Pressure: 200 Bar; pH Range: 2.0-7.5

\*50 x 2.0 mm ID only; enhanced 1.5 µm macropore size for higher efficiencies

## High Resolution Monolithic Columns— Onyx HD-C18

- 50% higher performance compared to our standard Onyx columns
- Backpressure 2 times lower than particle packed columns
- 30% longer column lifetime compared to some particle packed columns

## Monolithic Technology vs. Particle-Based Technology

### Onyx

- **Monolithic porous silica rod**
- **Significantly shorter run times**  
Cut methods by more than half
- **Low backpressures**  
Less stress on system and column
- **High flow rates**  
Due to high porosity
- **No inlet bed settling**  
Increased reliability, reproducibility, and lifetime



### Particle-Based Columns

- **Individual silica particles**
- **High flow resistance**  
Limits ability to shorten run times
- **Increased backpressure**  
Limits life of pumps, seals, and column
- **Reduced throughput**  
Long run times
- **Bed splitting possible**  
Shortens column life & lessens reproducibility



## 10 mm ID Onyx Semi-Prep Column

- Flow rates from 5 – 35 mL/min
- Loading capacities approaching what is typically observed on 21.2mm ID columns for some samples
- Pore structure rapidly disrupts DMSO injection slug resulting in better mixing & improved binding of analyte to sorbent
- Long lifetimes when analyzing “dirty” samples due to monolithic nature

## Excellent Reproducibility

Several parameters, such as peak asymmetry and retention factors, were used to test the reproducibility of Onyx silica monolithic columns and ensure that every batch meets the quality control standards of chromatographers worldwide.



Refer to technical note, [TN-1025](#), for more information pertaining to Onyx reproducibility. Call your Phenomenex representative.

### Ordering Information

Part No.	Description	Size (mm)
<b>Analytical Columns</b>		
<a href="#">CHO-8373</a>	Onyx Monolithic C18	50 x 2.0
<a href="#">CHO-8158</a>	Onyx Monolithic C18	100 x 3.0
<a href="#">CHO-7643</a>	Onyx Monolithic C18	100 x 4.6
<a href="#">CHO-7644</a>	Onyx Monolithic C18	50 x 4.6
<a href="#">CHO-7645</a>	Onyx Monolithic C18	25 x 4.6
<a href="#">CHO-8611</a>	Onyx Monolithic HD-C18	100 x 4.6
<a href="#">CHO-7647</a>	Onyx Monolithic C8	100 x 4.6
<b>SemiPrep Columns</b>		
<a href="#">CHO-7878</a>	Onyx Monolithic C18	100 x 10.0
<b>Guard Cartridge System</b>		
<a href="#">KJO-8465</a>	Onyx Monolithic C18 Guard Cartridge Kit (3/pk cartridges + holder)	5 x 3.0
<a href="#">CHO-8466</a>	Onyx Monolithic C18 Guard Cartridges (3/pk)	5 x 3.0
<a href="#">CHO-7649</a>	Onyx Monolithic C18 Guard Cartridges (3/pk)	5 x 4.6
<a href="#">KJO-7652</a>	Onyx Monolithic C18 Guard Cartridge Kit (3/pk cartridges + holder + wrench)	10 x 4.6
<a href="#">CHO-7650</a>	Onyx Monolithic C18 Guard Cartridges (3/pk)	10 x 4.6
<b>Column Coupler</b>		
<a href="#">AQO-7654</a>	Onyx Column Coupler, 0.020 in. ID	



For Onyx Reversed Phase Column  
Check Standard, see p. 424



Product based on monolithic technology under license from Merck KGaA, Darmstadt, Germany

## Organic Size Exclusion/Gel Permeation for Polymer Analysis

- 5 and 10  $\mu\text{m}$  particle sizes
- Narrow bore (4.6 mm ID) solvent-saver to preparative columns available
- Alternative to Agilent® (Polymer Labs) PLgel™, Waters® Styragel® and Ultrastaygel™, and other columns (see p. 320)
- Highly cross-linked for mechanical and chemical stability
- Temperature stable to 140 °C

Phenogel is available in seven different pore sizes, ranging from 50 Å to 10<sup>6</sup> Å†, and a linear bed configuration. Pore size distribution and pore volume are closely controlled parameters in the manufacturing process accounting for the high resolution, tight linear calibration curves, and excellent column-to-column reproducibility.

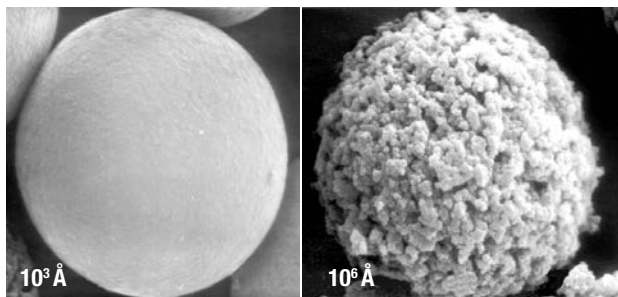
### Sample Elution

Each standard dimension Phenogel column (300 x 7.8 mm) has an internal volume of 15 mL that is distributed as follows:

- 3 mL is occupied by the solid portions of the gel particles (20% of total column volume)
- 6 mL is the pore volume of the packing material (40% of total column volume)
- 6 mL is the interstitial volume or volume between the gel particles (40% of total column volume)

Thus, about 6 mL of solvent must elute through each column before even the largest molecules can emerge, while the smallest molecules emerge with the total column volume of 12 mL. This constant distribution of volume makes it possible to predict the amount of solvent and time necessary to complete any analysis.

### SEM Photos of Phenogel Polymer Beads



### Technical Specifications

Material:	SDVB
Particle Size:	5, 10 $\mu\text{m}$
Porosities:	50 Å to 10 <sup>6</sup> Å†, and mixed beds
Maximum Pressure:	1500 psi
Maximum Temperature:	140 °C
Minimum Efficiency*:	5 $\mu\text{m}$ : 45,000 p/m** 10 $\mu\text{m}$ : 35,000 p/m**
Typical Flow Rates:	4.6 mm ID: 0.35 mL/min 7.8 mm ID: 1.0 mL/min 21.2 mm ID: 7.0 mL/min

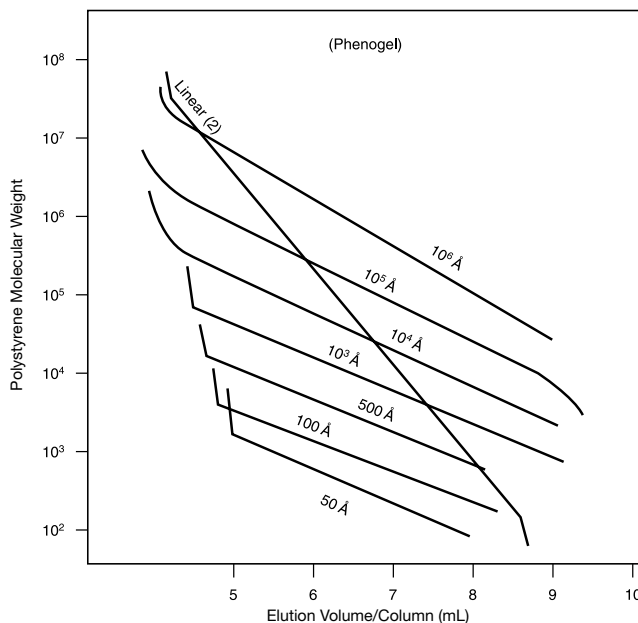
\* Tested in THF \*\* For 300 x 7.8 mm ID columns

† See note on p. 444 regarding pore sizes and exclusion limits

### Column Selection by Molecular Weight

Sample Type	Molecular Weight	Phenogel Column
Small Organics	100 - 3 K	50 Å
	500 - 6 K	100 Å
	1 K - 15 K	500 Å
Resins	1 K - 75 K	10 <sup>3</sup> Å
	5 K - 500 K	10 <sup>4</sup> Å
	10 K - 1,000 K	10 <sup>5</sup> Å
High MW Polymers	60 K - 10,000 K	10 <sup>6</sup> Å
	100 - 10,000 K	Linear(2)

### Column Molecular Weight Calibration Curves



## Solvent and Temperature Compatibility

- Phenogel columns are packed in tetrahydrofuran (THF)
- Columns can also be shipped in solvents such as DMF and chloroform to help minimize equilibration time

## Solvent Compatibility Table

Mobile Phase Solvent	Phenogel Pore Size (Å)							Linear & Mixed	Suggested Operating Temp.
	50	100	500	10 <sup>3</sup>	10 <sup>4</sup>	10 <sup>5</sup>	10 <sup>6</sup>		
Acetone	Y	Y	Y	Y				Y	
Benzene	Y	Y	Y	Y	Y	Y	Y	Y	Y
Carbon Tetrachloride	Y	Y	Y	Y	Y	Y	Y	Y	Y
Chloroform	Y	Y	Y	Y	Y	Y	Y	Y	Y
30% HFIP/Chloroform	Y	Y	Y	Y	Y	Y	Y	Y	Y
Diethyl Ether	Y	Y	Y	Y	Y	Y	Y	Y	Y
Dimethylacetamide (DMAC)	Y*	Y	Y	Y	Y	Y	Y	Y	60 °C
Dimethylformamide (DMF)	Y*	Y	Y	Y	Y	Y	Y	Y	60 °C
Dioxane	Y	Y	Y	Y	Y	Y	Y	Y	Y
DMSO	Y*	Y	Y	Y	Y	Y	Y	Y	60 °C
Ethyl Acetate	Y	Y	Y	Y	Y	Y	Y	Y	Y
Hexafluoroisopropanol (HFIP)	Y	Y	Y	Y	Y	Y	Y	Y	Y
Hexane	Y	Y	Y	Y	Y	Y	Y	Y	Y
M-Cresol	Y*	Y	Y	Y	Y	Y	Y	Y	100 °C
Methyl Ethyl Ketone	Y	Y	Y	Y	Y	Y	Y	Y	Y
Methylene Chloride	Y	Y	Y	Y	Y	Y	Y	Y	Y
O-Chlorophenol	Y*	Y	Y	Y	Y	Y	Y	Y	100 °C
O-Dichlorobenzene	Y*	Y	Y	Y	Y	Y	Y	Y	135 °C
Quinolin	Y*	Y	Y	Y	Y	Y	Y	Y	60 °C
Tetrahydrofuran	Y	Y	Y	Y	Y	Y	Y	Y	Y
Toluene	Y	Y	Y	Y	Y	Y	Y	Y	Y
Trichlorobenzene	Y*	Y	Y	Y	Y	Y	Y	Y	135 °C
Water	N	N	N	N	N	N	N	N	
Xylene	Y	Y	Y	Y	Y	Y	Y	Y	

\*Not recommended on 5 μm 50 Å columns.

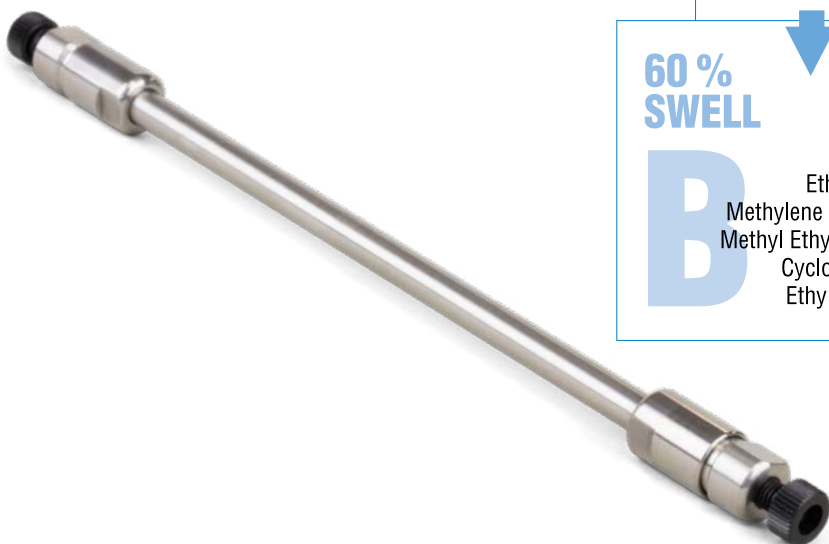
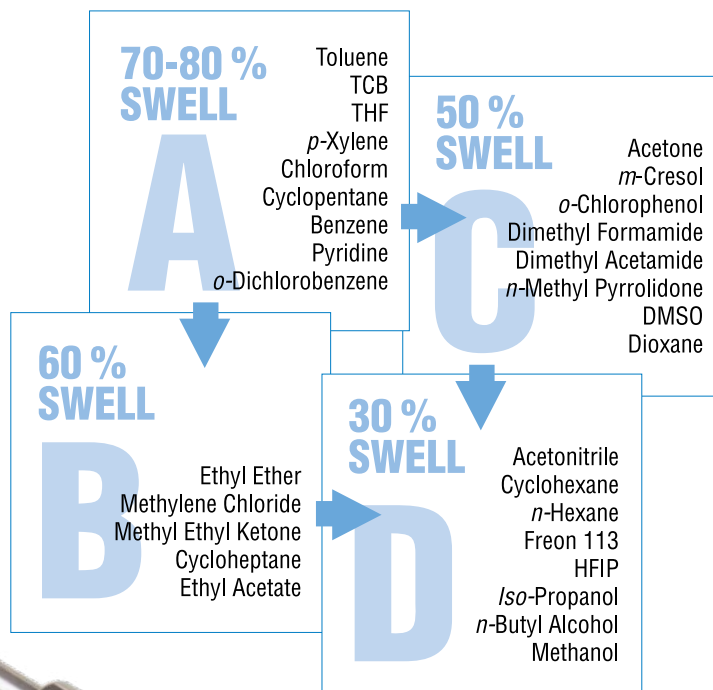
N = Not Compatible  
Y = Compatible

## Solvent Switching Considerations

Although Phenogel columns are rugged and can withstand strong solvent changes, care should be exercised when switching from high-swell solvents (A) to low-swell solvents (B, C, and D). Improper solvent switches can result in a void. Best results are attained when an intermediate-swell solvent is used and column lifetime is improved. Contact Phenomenex regarding solvents not listed below.

Column life can be maximized by dedicating certain columns to certain solvents. This will also minimize solvent switches. If care is not taken, a void may occur.

- Reduce flow rate to 0.2 mL/min
- Backpressure must NEVER exceed 1500 psi
- Always check solvent miscibility in a beaker or follow the solvent miscibility table on page 442 before proceeding with ANY solvent switch.
- Compare the swell characteristics of solvent 1 (old solvent) to solvent 2 (new solvent) and use the following guidelines:
  - If solvent 1 and solvent 2 belong to the same swell category (see table below), check the solvent miscibility and proceed with the switch.
  - If solvent 1 and solvent 2 belong to successive swell categories as indicated by the arrows in the table below, check the miscibility and proceed with the switch.
  - If solvent 1 and solvent 2 DO NOT belong to the same OR successive swell categories, switch to an intermediate solvent FIRST, as indicated by the arrows in the table.

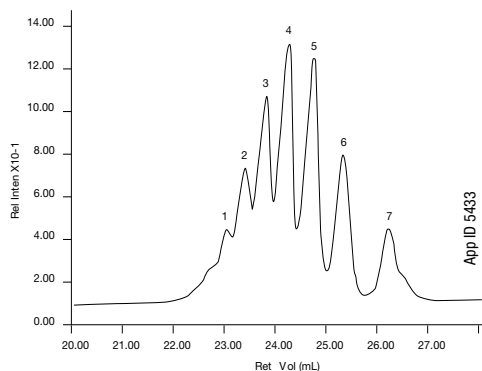


## Pharmaceutical Excipients Analysis

Gel permeation chromatography using Phenogel columns is an excellent method for measuring the molecular weight distribution and lot-to-lot consistency of fillers and dispersants.

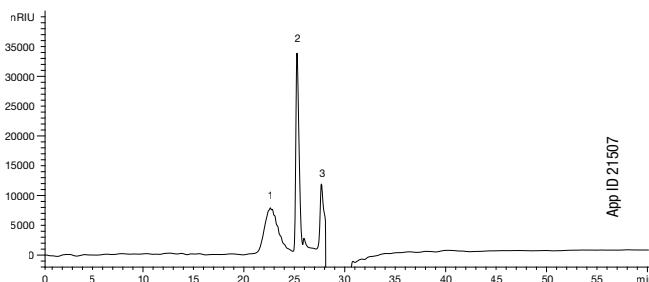
### Polyethylene Glycol 330

**Column:** Phenogel 5  $\mu\text{m}$  50 Å, 100 Å, 500 Å  
**Dimensions:** 300 x 7.8 mm  
**Guard Cartridge:** [AJ0-9292](#)  
**Guard Holder:** [KJ0-4282](#)  
**Solvent:** THF  
**Flow Rate:** 1.0 mL/min  
**Detection:** Differential Refractometer  
**Injection Volume:** 100  $\mu\text{L}$  0.25% w/v  
**Temperature:** Ambient  
**Vial:** [ARO-9925-13](#)  
**Filter:** [AF0-1102-52](#)  
**Sample:** 1. dp7 546 MW    5. dp3 194 MW  
           2. dp6 458 MW    6. dp2 106 MW  
           3. dp5 370 MW    7. dp1 62 MW  
           4. dp4 282 MW



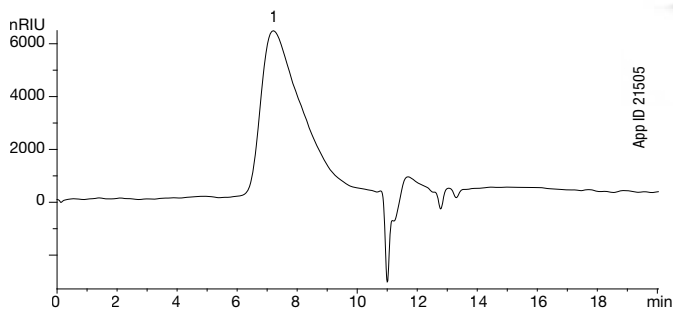
### Polyethylene Glycol 106

**Column:** Phenogel 5  $\mu\text{m}$  50 Å, 100 Å, 500 Å  
**Dimensions:** 300 x 7.8 mm  
**Guard Cartridge:** [AJ0-9292](#)  
**Guard Holder:** [KJ0-4282](#)  
**Mobile Phase:** THF  
**Flow Rate:** 1 mL/min  
**Detection:** Refractive Index (RI)  
**Temperature:** 40 °C  
**Vial:** [ARO-9925-13](#)  
**Filter:** [AF0-1102-52](#)  
**Sample:** 1. PEG 106  
           2. API peak A (unknown)  
           3. API peak B (unknown)



### Polyvinylpyrrolidone

**Column:** Phenogel 5  $\mu\text{m}$  Linear(2) x2  
**Dimensions:** 300 x 7.8 mm  
**Part No:** [00H-3259-K0](#)  
**Guard Cartridge:** [AJ0-9292](#)  
**Guard Holder:** [KJ0-4282](#)  
**Mobile Phase:** 10 mM Lithium bromide in DMF  
**Flow Rate:** 2 mL/min  
**Detection:** Refractive Index (RI)  
**Column Temp:** 40 °C  
**Vial:** [ARO-9925-13](#)  
**Filter:** [AF0-1102-52](#)  
**Sample:** 1. Polyvinylpyrrolidone (PVP)



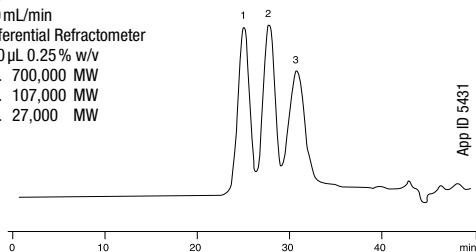


## 50 Å - 10<sup>6</sup> Å Columns

- High resolution at low cost
- Customize your analysis by coupling different pore-size columns
- Wide range of solvent compatibility

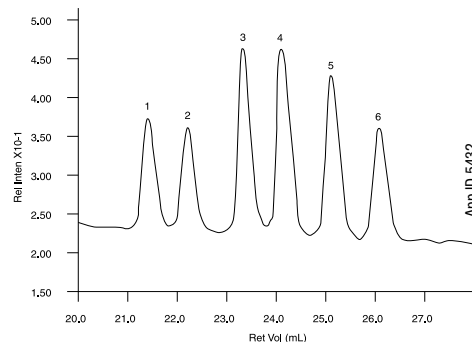
### Polymethyl Methacrylates (Wide MW Range)

**Column:** Phenogel 5 μm 10<sup>5</sup> Å, 10<sup>4</sup> Å, 10<sup>3</sup> Å, 500 Å  
**Dimensions:** 300 x 7.8 mm  
**Solvent:** THF  
**Flow Rate:** 1.0 mL/min  
**Detection:** Differential Refractometer  
**Injection Volume:** 100 μL 0.25% w/v  
**Sample:** 1. 700,000 MW  
 2. 107,000 MW  
 3. 27,000 MW



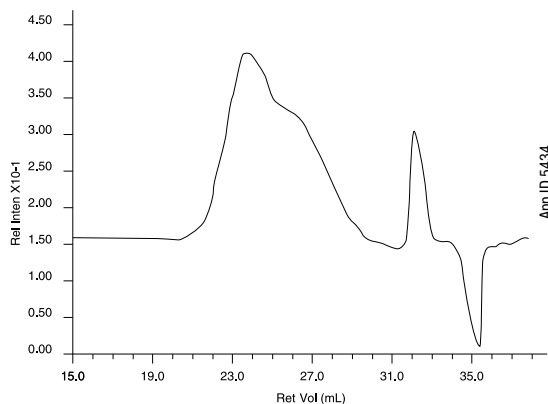
### Closely Related Hydrocarbons

**Column:** Phenogel 5 μm 50 Å, 100 Å, 500 Å  
**Dimensions:** 300 x 7.8 mm  
**Solvent:** THF  
**Flow Rate:** 1.0 mL/min  
**Detection:** Differential Refractometer  
**Injection Volume:** 100 μL 0.25% w/v  
**Temperature:** Ambient  
**Sample:** 1. C40 562 MW 4. C20 282 MW  
 2. C32 450 MW 5. C16 226 MW  
 3. C24 338 MW 6. C13 184 MW



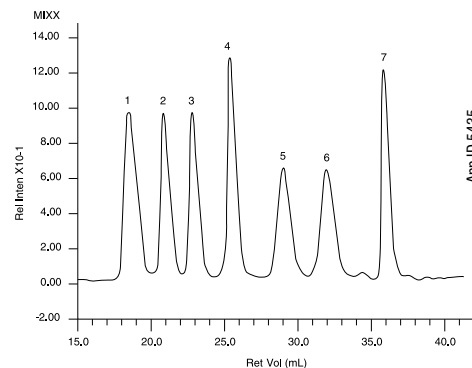
### Polyethylene Oxide (PEO)

**Column:** Phenogel 10 μm 10<sup>5</sup>, 10<sup>4</sup>, 10<sup>3</sup> Å  
**Dimensions:** 300 x 7.8 mm  
**Mobile Phase:** DMF (0.1 M LiBr)  
**Flow Rate:** 1.0 mL/min  
**Detection:** Differential Refractometer  
**Injection Volume:** 100 μL 0.125% w/v  
**Temperature:** 50 °C  
**Sample:** 400,000 MW



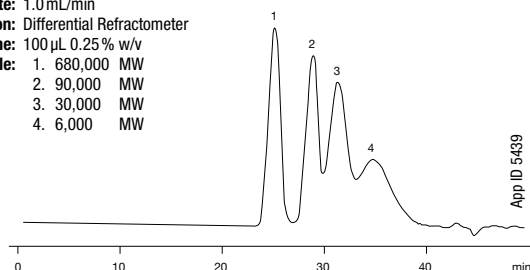
### Polystyrenes (Wide MW Range)

**Column:** Phenogel 10 μm 10<sup>5</sup>, 10<sup>4</sup>, 10<sup>3</sup> Å  
**Dimensions:** 300 x 7.8 mm  
**Mobile Phase:** THF  
**Flow Rate:** 1.0 mL/min  
**Detection:** Differential Refractometer  
**Injection Volume:** 100 μL 0.125% w/v  
**Temperature:** Ambient  
**Sample:** 1. 1,560,000 MW 5. 6,100 MW  
 2. 260,000 MW 6. 845 MW  
 3. 94,000 MW 7. 146 MW  
 4. 30,000 MW



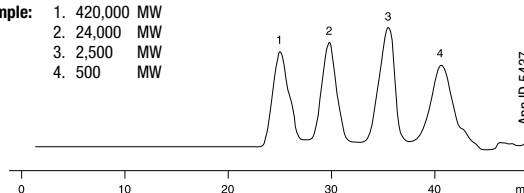
### Poly-(α-Methyl Styrene) (Wide MW Range)

**Column:** Phenogel 5 μm 10<sup>5</sup>, 10<sup>4</sup>, 10<sup>3</sup>, 500 Å  
**Dimensions:** 300 x 7.8 mm  
**Solvent:** THF  
**Flow Rate:** 1.0 mL/min  
**Detection:** Differential Refractometer  
**Injection Volume:** 100 μL 0.25% w/v  
**Sample:** 1. 680,000 MW  
 2. 90,000 MW  
 3. 30,000 MW  
 4. 6,000 MW



### Polybutadienes (Wide MW Range)

**Column:** Phenogel 5 μm 10<sup>5</sup>, 10<sup>4</sup>, 10<sup>3</sup>, 500 Å  
**Dimensions:** 300 x 7.8 mm  
**Solvent:** THF  
**Flow Rate:** 1.0 mL/min  
**Detection:** Differential Refractometer  
**Injection Volume:** 100 μL 0.25% w/v  
**Sample:** 1. 420,000 MW  
 2. 24,000 MW  
 3. 2,500 MW  
 4. 500 MW

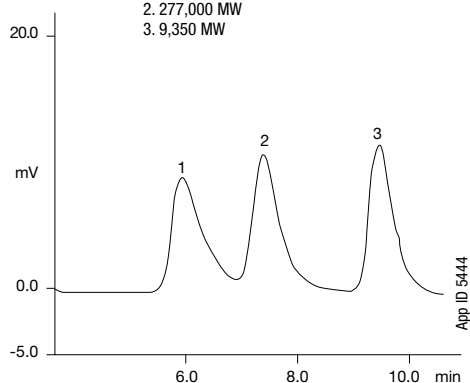


## Linear Columns

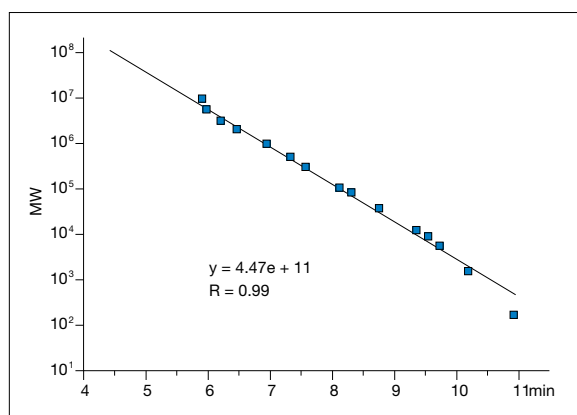
- Linear calibration to 10 million daltons
- Long column lifetime
- Excellent mechanical stability
- Excellent for analyzing a wide range of molecular weights

### Mixed Polystyrene Standard

**Column:** Phenogel 5 µm Linear(2)  
**Dimensions:** 300 x 7.8 mm  
**Part No.:** [00H-3259-K0](#)  
**Guard Cartridge:** [AJ0-9292](#)  
**Guard Holder:** [KJ0-4282](#)  
**Mobile Phase:** THF  
**Flow Rate:** 1.0 mL/min  
**Detection:** RI  
**Injection Volume:** 50 µL  
**Temperature:** 35 °C  
**Vial:** [ARO-9925-13](#)  
**Filter:** [AF0-1102-52](#)  
**Sample:** Polystyrene standards injected  
 1. 2,860,000 MW  
 2. 277,000 MW  
 3. 9,350 MW



Calibration Curve: Linear (2) - Phenogel 5 µm 300 x 7.8 mm



## Narrow Bore Columns

### An Improved Dimension in GPC Analysis

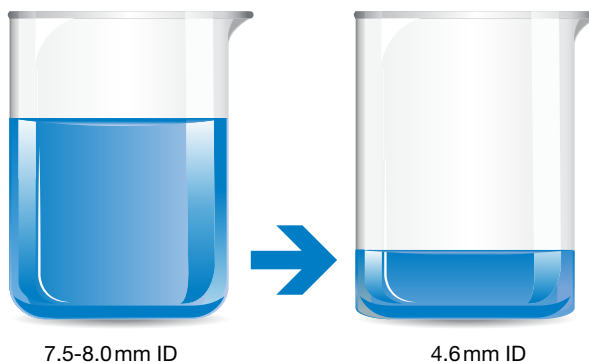
- Decrease solvent consumption
- Retain same elution profile
- Reduce solvent disposal costs

Phenogel-NB (Narrow Bore) columns are optimized to reduce solvent consumption. The Phenogel-NB columns have a 4.6 mm column ID and run at 0.35 mL/min, reducing solvent consumption and disposal costs up to 65 %!

#### Loading

With narrow bore GPC/SEC columns, the volume in which the sample elutes is significantly decreased, thus increasing the effective concentration of the sample. In GPC, this leads to overloading effects and proportionally lower sample loadings must be used.

## Cut Down on Waste!



DISCOVER HOW MUCH YOU WILL SAVE when switching to Phenogel Narrow Bore columns! Try our NEW solvent savings calculator web tool at [www.phenomenex.com/GPCSavings](http://www.phenomenex.com/GPCSavings)

# Phenogel™ Organic GPC/SEC Columns

## Ordering Information

5 µm Analytical Columns (mm)		Shipping Solvent		Guards	SecurityGuard™ Cartridges (mm)
		THF	DMF		
		300 x 7.8	300 x 7.8	50 x 7.8	4 x 3.0*
<b>Pore Size</b>	<b>MW Range</b>			ea	/3pk
50 Å	100-3 K	<a href="#">00H-0441-K0</a>	<a href="#">00H-0441-K0-DF</a>	<a href="#">03B-2088-K0</a>	<a href="#">AJ0-9292</a>
100 Å	500-6 K	<a href="#">00H-0442-K0</a>	—	<a href="#">03B-2088-K0</a>	<a href="#">AJ0-9292</a>
500 Å	1 K-15 K	<a href="#">00H-0443-K0</a>	—	<a href="#">03B-2088-K0</a>	<a href="#">AJ0-9292</a>
10 <sup>3</sup> Å	1 K-75 K	<a href="#">00H-0444-K0</a>	<a href="#">00H-0444-K0-DF</a>	<a href="#">03B-2088-K0</a>	<a href="#">AJ0-9292</a>
10 <sup>4</sup> Å	5 K-500 K	<a href="#">00H-0445-K0</a>	—	<a href="#">03B-2088-K0</a>	<a href="#">AJ0-9292</a>
10 <sup>5</sup> Å	10 K-1,000 K	<a href="#">00H-0446-K0</a>	<a href="#">00H-0446-K0-DF</a>	<a href="#">03B-2088-K0</a>	<a href="#">AJ0-9292</a>
10 <sup>6</sup> Å	60 K-10,000 K	<a href="#">00H-0447-K0</a>	—	<a href="#">03B-2088-K0</a>	<a href="#">AJ0-9292</a>
		300 x 7.8	300 x 7.8	50 x 7.8	4 x 3.0*
<b>Mixed Beds</b>				ea	/3pk
Linear(2)	100-10,000 K	<a href="#">00H-3259-K0</a>	<a href="#">00H-3259-K0-DF</a>	<a href="#">03B-2088-K0</a>	<a href="#">AJ0-9292</a>

for 3.2–8.0 mm ID

5 µm Narrow Bore (NB) Columns (mm)		Guards		SecurityGuard Cartridges (mm)
		300 x 4.6	30 x 4.6	4 x 3.0*
<b>Pore Size</b>	<b>MW Range</b>			ea /3pk
50 Å	100-3 K	<a href="#">00H-0441-E0</a>	<a href="#">03A-2088-E0</a>	<a href="#">AJ0-9292</a>
100 Å	500-6 K	<a href="#">00H-0442-E0</a>	<a href="#">03A-2088-E0</a>	<a href="#">AJ0-9292</a>
500 Å	1 K-15 K	<a href="#">00H-0443-E0</a>	<a href="#">03A-2088-E0</a>	<a href="#">AJ0-9292</a>
10 <sup>3</sup> Å	1 K-75 K	<a href="#">00H-0444-E0</a>	<a href="#">03A-2088-E0</a>	<a href="#">AJ0-9292</a>
10 <sup>4</sup> Å	5 K-500 K	<a href="#">00H-0445-E0</a>	<a href="#">03A-2088-E0</a>	<a href="#">AJ0-9292</a>
10 <sup>5</sup> Å	10 K-1,000 K	<a href="#">00H-0446-E0</a>	<a href="#">03A-2088-E0</a>	<a href="#">AJ0-9292</a>
10 <sup>6</sup> Å	60 K-10,000 K	<a href="#">00H-0447-E0</a>	<a href="#">03A-2088-E0</a>	<a href="#">AJ0-9292</a>
		300 x 4.6	30 x 4.6	4 x 3.0*
<b>Mixed Beds</b>				ea /3pk
Linear(2)	100-10,000 K	<a href="#">00H-3259-E0</a>	<a href="#">03A-2088-E0</a>	<a href="#">AJ0-9292</a>

for 3.2–8.0 mm ID

10 µm Analytical Columns (mm)		Guards		SecurityGuard Cartridges (mm)
		300 x 7.8	50 x 7.8	4 x 3.0*
<b>Pore Size</b>	<b>MW Range</b>			ea /3pk
50 Å	100-3 K	<a href="#">00H-0641-K0</a>	<a href="#">03B-2090-K0</a>	<a href="#">AJ0-9292</a>
100 Å	500-6 K	<a href="#">00H-0642-K0</a>	<a href="#">03B-2090-K0</a>	<a href="#">AJ0-9292</a>
500 Å	1 K-15 K	<a href="#">00H-0643-K0</a>	<a href="#">03B-2090-K0</a>	<a href="#">AJ0-9292</a>
10 <sup>3</sup> Å	1 K-75 K	<a href="#">00H-0644-K0</a>	<a href="#">03B-2090-K0</a>	<a href="#">AJ0-9292</a>
10 <sup>4</sup> Å	5 K-500 K	<a href="#">00H-0645-K0</a>	<a href="#">03B-2090-K0</a>	<a href="#">AJ0-9292</a>
10 <sup>5</sup> Å	10 K-1,000 K	<a href="#">00H-0646-K0</a>	<a href="#">03B-2090-K0</a>	<a href="#">AJ0-9292</a>
10 <sup>6</sup> Å	60 K-10,000 K	<a href="#">00H-0647-K0</a>	<a href="#">03B-2090-K0</a>	<a href="#">AJ0-9292</a>
		300 x 7.8	50 x 7.8	4 x 3.0*
<b>Mixed Beds</b>				ea /3pk
Linear(2)	100-10,000 K	<a href="#">00H-3260-K0</a>	<a href="#">03B-2090-K0</a>	<a href="#">AJ0-9292</a>

for 3.2–8.0 mm ID

5 µm Preparative Columns (mm)		Guards	
		300 x 21.2	50 x 21.2
<b>Pore Size</b>	<b>MW Range</b>	ea	
100 Å	500-6 K	<a href="#">00H-0442-P0</a>	<a href="#">03B-0642-P0</a>

10 µm Preparative Columns (mm)		Guards	
		300 x 21.2	50 x 21.2
<b>Pore Size</b>	<b>MW Range</b>	ea	
100 Å	500-6 K	<a href="#">00H-0642-P0</a>	<a href="#">03B-0642-P0</a>

### Guard Cartridge Holder

Part No.	Description
<a href="#">KJO-4282</a>	Reusable Holder (SecurityGuard Kit)

### Column Union

Part No.	Description	Unit
<a href="#">AQ0-8507</a>	Zero Dead Union, SS, with 10-32 fittings	ea

Note: Additional union ([AQ0-8507](#)) may be necessary for SecurityGuard to fit in column oven with less than 30 cm length capacity.

## Phenogel Columns are a Recommended Alternative to:

Manufacturer	Columns
Agilent® (Polymer Labs)	PLgel™
Jordi Labs	Jordi Resolve™ RP DVB Column Jordi Resolve DVB 13µ GPC Columns Jordi Resolve DVB GPC Column
Polymer Standards Service (PSS)	SDV® GRAM PolarSil PFG POLEFIN®
Shodex®	GPC K-800 Series GPC KF-800 Series GPC KD-800 Series GPC KF-200 Series
Tosoh Bioscience®	TSKgel® Hxl TSKgel Hhr
Waters®	Styragel® Ultrastryragel™ HSPgel™

\*SecurityGuard Analytical Cartridges require holder, Part No.: [KJO-4282](#)



For Column Heater, see p. 416



SecurityGuard cartridges for Non-Aqueous Polymer GPC columns are not compatible with HFIP solvent.



## Reversed Phase Polymer HPLC Columns

- Excellent alternative to other polystyrene divinylbenzene (PSDVB) columns
- High chemical strength and stability
- pH stable from 0-14
- No bonded phase = zero phase bleed
- Great long-lived solution for separating quaternary amines

PolymerX RP-1 is a porous (100 Å) polystyrene divinylbenzene media which has hydrophobic retention similar to a C18-bonded silica. Because the media is a polymer instead of silica, it is tolerant to pH extremes (0-14) and a good solution for high pH applications where silica-based media fail. PolymerX also delivers good lifetime for analytes like quaternary amines which strongly interact with bonded silica particles.

### Material Characteristics

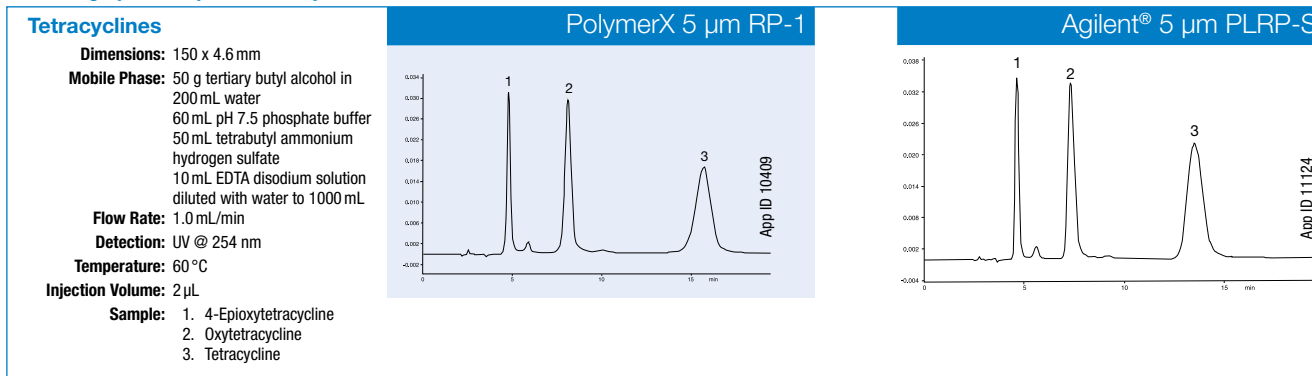
Packing Material	Particle Shape/Size (µm)	Pore Size (Å)	pH Stability
RP-1 (PSDVB)	Spherical 5, 7, 10	100	0 - 14

### Typical Results and Operating Parameters of RP Silica and Polymer Columns

Parameter	C18 silica	RP-polymer
Acidic silanols	present	absent
pH stability	2-9	0-14
Recovery*	~50-80%	>95%
Capacity*	1 mg	10-25 mg
Pressure limit	3500 psi	2500 psi
Temperature limit	60 °C	80 °C
Column lifetime		longer

\*pertains to dimethyltritylated (DMT) synthetic oligomer purification on a 150 x 4.1 mm column

### Chromatographic Comparison of Polymer Columns



Comparative separations may not be representative of all applications.

### Erythromycins

**Column:** PolymerX 7 µm RP-1

**Dimensions:** 250 x 4.6 mm

**Part No.:** [00G-4327-E0](#)

**Guard Cartridge:** [AJ0-5809](#)

**Guard Holder:** [KJ0-4282](#)

**Mobile Phase:** A: 1.75 g dibasic potassium phosphate in 50 mL water, adjust to pH 9.0. Add 165 mL of tertiary butyl alcohol and 30 mL acetonitrile. Add water to a final volume of 1 L  
B: Acetonitrile  
A/B (50:50)

**Flow Rate:** 0.8 mL/min

**Detection:** UV @ 215 nm

**Temperature:** 75 °C

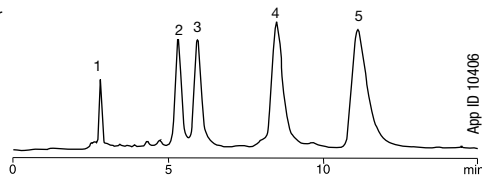
**Injection Volume:** 20 µL

**Vial:** [ARO-9925-13](#)

**Filter:** [AF0-8103-52](#)

**Sample:**

1. Unknown
2. Erythromycin related compound N
3. Erythromycin C
4. Erythromycin A
5. Erythromycin B



### Ordering Information

	PolymerX RP-1 Columns (mm)					
	150 x 4.1	150 x 4.6	250 x 4.1	250 x 4.6	250 x 10.0	250 x 21.2
5 µm	<a href="#">00F-4326-Z0</a>	<a href="#">00F-4326-E0</a>	<a href="#">00G-4326-Z0</a>	<a href="#">00G-4326-E0</a>	—	—
7 µm	—	—	—	<a href="#">00G-4327-E0</a>	—	—
10 µm	—	—	<a href="#">00G-4328-Z0</a>	<a href="#">00G-4328-E0</a>	<a href="#">00G-4328-N0</a>	<a href="#">00G-4328-P0</a>

RP-1 SecurityGuard™ Cartridges (mm)		
4 x 3.0*	10 x 10 <sup>†</sup>	15 x 21.2**
/10pk	/3pk	/ea
<a href="#">AJ0-5809</a>	<a href="#">AJ0-7368</a>	<a href="#">AJ0-8358</a>
for ID: 3.2-8.0 mm	9-16 mm	18-29 mm



Bulk media available upon request.



For PolymerX Column Performance Check Standards, see p. 424

\*SecurityGuard Analytical Cartridges require holder, Part No.: [KJ0-4282](#)

†SemiPrep SecurityGuard Cartridges require holder, Part No.: [AJ0-9281](#)

\*\*Prep SecurityGuard Cartridges require holder, Part No.: [AJ0-8223](#)

## Aqueous GFC Columns for the Separation of Polymers, Proteins and Peptides

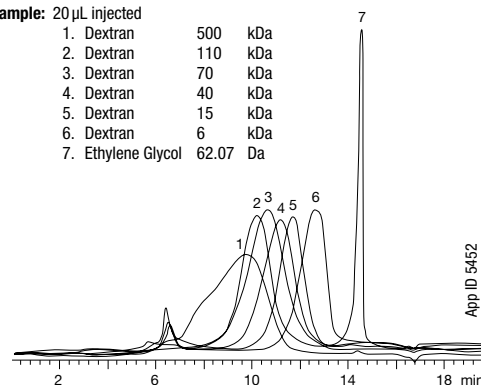
- Highly hydrophilic synthetic polymer phase
- Suitable for water-soluble polymers
- Very low nonspecific interaction with the separation matrix
- Extremely cost-effective
- High efficiencies
- Good mechanical strength

The PolySep material undergoes rigorous quality control tests, from the initial stages of testing of the starting monomers to the final product. There are at least 25 steps of quality assurance during the entire procedure. The packed column then undergoes at least five additional tests, including a batch test for the manufactured materials. Each column is then tested for column efficiency and peak symmetry and ships with a QC chromatogram. This ensures long-lasting columns with very high efficiencies.

### Dextran

Column: PolySep-GFC-P4000  
 Dimensions: 300 x 7.8 mm  
 Part No.: CHO-9229  
 Mobile Phase: Water  
 Flow Rate: 0.8 mL/min  
 Detection: RI  
 Sample: 20 µL injected

1. Dextran	500	kDa
2. Dextran	110	kDa
3. Dextran	70	kDa
4. Dextran	40	kDa
5. Dextran	15	kDa
6. Dextran	6	kDa
7. Ethylene Glycol	62.07	Da



App ID 5452

### PolySep-GFC-P Technical Data and Specifications

Phase:	1000	2000	3000	4000	5000	6000	Linear
Exclusion Limits in Daltons:							
PEG	2 x 10 <sup>5</sup>	9 x 10 <sup>5</sup>	5 x 10 <sup>4</sup>	2 x 10 <sup>5</sup>	2 x 10 <sup>6</sup>	1 x 10 <sup>7</sup>	1 x 10 <sup>7</sup>
Pullulans	3.5 x 10 <sup>5</sup>	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>	3.5 x 10 <sup>5</sup>	4 x 10 <sup>6</sup>	2 x 10 <sup>7</sup>	2 x 10 <sup>7</sup>
Separation Range (Da)	20 - 3K	100 - 10K	250 - 75K	3K - 400K	50K - 2M	100K - 15M	1K - 10M
Typical Efficiency Plates/meter	22,000	50,000	32,000	32,000	32,000	32,000	32,000
Maximum Organic Modifier:							
Methanol	20%	95%	70%	70%	70%	70%	70%
Acetonitrile	20%	70%	70%	70%	70%	70%	70%
pH Range	3.0 to 12.0						
Maximum Flow Rate	Depends on backpressure, do not exceed 1000 psi						
Column Hardware	Stainless steel or PEEK (Biocompatible hardware available upon request)						
Temperature	4 to 60 °C						
Maximum Salt	Maximum allowed 0.5 M with a flow rate not to exceed 0.5 mL/min						
Storage	For overnight, pump water at 0.2 mL/min, for longer storage use 0.05% NaNO <sub>3</sub> in water or 10% methanol in water						
General	A guard column is recommended to improve column life						

### Ordering Information

PolySep-GFC-P Columns (mm)		
	Analytical	Guards
Phases	300 x 7.8	35 x 7.8
1000	CHO-9226	CHO-9225
2000	CHO-9227	CHO-9225
3000	CHO-9228	CHO-9225
4000	CHO-9229	CHO-9225
5000	CHO-9230	CHO-9225
6000	CHO-9231	CHO-9225
Linear	CHO-9232	CHO-9225

### Aqueous SEC 2 Column Check Standard

(For PolySep GFC-P and other aqueous-soluble analysis columns)

Part No.: AL0-3043

Unit quantity: 2 mL  
 Contains: Ethylene Glycol  
 Diluent: Water

#### Test Conditions

Mobile Phase: Water  
 Flow Rate: 0.8 mL/min  
 Injection Volume: 15 µL  
 Detection: RI



For additional GFC Columns, see pp. 355-358



For HPLC Column Heater (25-90 °C), see p. 416



## Guaranteed Alternative to Inertsil®

- Highly reproducible
- Long column life
- Mimics performance of GL Sciences, Inc. Inertsil®

### Ordering Information

3 µm ODS-3 Columns (mm)							SecurityGuard™ Cartridges (mm)	
Phases	100 x 2.0	150 x 2.0	100 x 4.0	30 x 4.6	100 x 4.6	150 x 4.6	4 x 2.0*	4 x 3.0*
							/10pk	/10pk
ODS-3 100 Å	<a href="#">00D-4222-B0</a>	<a href="#">00F-4222-B0</a>	<a href="#">00D-4222-D0</a>	<a href="#">00A-4222-E0</a>	<a href="#">00D-4222-E0</a>	<a href="#">00F-4222-E0</a>	<a href="#">AJ0-4286</a>	<a href="#">AJ0-4287</a>
							for ID: 2.0-3.0 mm	3.2-8.0 mm

3 µm and 5 µm ODS-3V Columns (mm)		
Phases	Part No.	Size (mm)
3 µm ODS-3V	<a href="#">00D-4243-E0</a>	100 x 4.6
3 µm ODS-3V	<a href="#">00F-4243-E0</a>	150 x 4.6
5 µm ODS-3V	<a href="#">00F-4241-E0</a>	150 x 4.6
5 µm ODS-3V	<a href="#">00G-4241-E0</a>	250 x 4.6

5 µm Minibore Columns (mm)				SecurityGuard™ Cartridges (mm)	
Phases	50 x 2.0	150 x 2.0	250 x 2.0	4 x 2.0*	
				/10pk	
ODS-2 150 Å	—	<a href="#">00F-3300-B0</a>	—	<a href="#">AJ0-4286</a>	
ODS-3 100 Å	<a href="#">00B-4097-B0</a>	<a href="#">00F-4097-B0</a>	<a href="#">00G-4097-B0</a>	<a href="#">AJ0-4286</a>	
				for ID: 2.0-3.0 mm	

5 µm MidBore™ Columns (mm)					SecurityGuard™ Cartridges (mm)	
Phases	150 x 3.0	250 x 3.0	150 x 3.2	250 x 3.2	4 x 2.0*	4 x 3.0*
					/10pk	/10pk
C8 150 Å	—	<a href="#">00G-3301-Y0</a>	—	—	<a href="#">AJ0-4289</a>	<a href="#">AJ0-4290</a>
ODS-2 150 Å	—	—	<a href="#">00F-3300-R0</a>	<a href="#">00G-3300-R0</a>	<a href="#">AJ0-4286</a>	<a href="#">AJ0-4287</a>
ODS-3 100 Å	<a href="#">00F-4097-Y0</a>	<a href="#">00G-4097-Y0</a>	<a href="#">00F-4097-R0</a>	<a href="#">00G-4097-R0</a>	<a href="#">AJ0-4286</a>	<a href="#">AJ0-4287</a>
					for ID: 2.0-3.0 mm	3.2-8.0 mm

5 µm and 10 µm Analytical Columns (mm)					SecurityGuard™ Cartridges (mm)	
Phases	30 x 4.6	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	4 x 3.0*
						/10pk
5 µm C8 150 Å	<a href="#">00A-3301-E0</a>	<a href="#">00B-3301-E0</a>	<a href="#">00D-3301-E0</a>	<a href="#">00F-3301-E0</a>	<a href="#">00G-3301-E0</a>	<a href="#">AJ0-4290</a>
5 µm ODS-2 150 Å	<a href="#">00A-3300-E0</a>	—	<a href="#">00D-3300-E0</a>	<a href="#">00F-3300-E0</a>	<a href="#">00G-3300-E0</a>	<a href="#">AJ0-4287</a>
5 µm Silica 100 Å	—	—	—	—	<a href="#">00G-4098-E0</a>	<a href="#">AJ0-4348</a>
5 µm ODS-3 100 Å	<a href="#">00A-4097-E0</a>	<a href="#">00B-4097-E0</a>	<a href="#">00D-4097-E0</a>	<a href="#">00F-4097-E0</a>	<a href="#">00G-4097-E0</a>	<a href="#">AJ0-4287</a>
5 µm Phenyl-3 (PH-3) 100 Å	—	—	—	<a href="#">00F-4298-E0</a>	<a href="#">00G-4298-E0</a>	<a href="#">AJ0-4351</a>
10 µm Silica-3 100 Å	—	—	—	—	<a href="#">00G-4245-E0</a>	<a href="#">AJ0-4348</a>
10 µm ODS-3 100 Å	—	—	—	—	<a href="#">00G-4244-E0</a>	<a href="#">AJ0-4287</a>
						for ID: 3.2-8.0 mm

5 µm and 10 µm SemiPreparative Columns (mm)		SecurityGuard™ Cartridges (mm)	
Phases	250 x 10	10 x 10*	
		/3pk	
10 µm ODS-3 100 Å	<a href="#">00G-4244-N0</a>	<a href="#">AJ0-7221</a>	
		for ID: 9-16 mm	

\*SecurityGuard™ Analytical Cartridges require holder, Part No.: [KJ0-4282](#)  
 \*SemiPrep SecurityGuard™ Cartridges require holder, Part No.: [AJ0-9281](#)

For SecurityGuard Cartridge Holders and Cartridges, see pp. 330-334

## Carbohydrate and Organic Acid Analysis

- Excellent resolution and column-to-column reproducibility
- Easy, accurate quantitation from sharper peak shapes
- Longer column lifetimes and faster run time capability from lower backpressures
- Baseline separation of critical sample components due to higher efficiencies

Rezex HPLC columns achieve reproducible, accurate separations based on multiple modes of interaction. Available in 4% and 8% cross-linked sulfonated styrene-divinylbenzene (SDVB) and multiple ionic forms (calcium, sodium, hydrogen, potassium, lead, and silver) for a wide range of selectivities. USP L17, L19, L22, L34, and L58 packings available.

### Use Rezex for carbohydrate, oligosaccharide, and organic acid separations:

- Drug formulation and excipient analysis
- Food and beverage quality control testing
- Fermentation reaction monitoring and recovery testing for biofuels



Recommended alternative to Bio-Rad® Aminex®, Supelco® SUPELCOGEL™, and Waters® Sugar-Pak™ (see p. 329)

### Find the Column For Your Application

Phases Available	Description	Applications	Additional Notes
<b>RCM-Monosaccharide</b> (L19 packing)*	8% cross-linked resin <b>CALCIUM</b> ionic form	Monosaccharides and sugar alcohols from sweeteners and corn and cane sugars; Class separation of di-, tri-, and tetra-	– Our most commonly used column type – Easy regeneration with calcium nitrate solutions
<b>RHM-Monosaccharide</b> (L17 packing)*	8% cross-linked resin <b>HYDROGEN</b> ionic form	Monosaccharides in combination with organic acids, fatty acids, alcohols, ketones, neutral compounds, or inorganic salts	– Versatile column, generally run with a mobile phase of deionized water
<b>RSO-Oligosaccharide</b>	4% cross-linked resin <b>SILVER</b> ionic form	High resolution of oligosaccharides up to 18 degrees of polymerization (Dp)	– Guard column is recommended to protect the ionic integrity of the matrix
<b>RPM-Monosaccharide</b> (L34 packing)*	8% cross-linked resin <b>LEAD</b> ionic form	Monosaccharides and sugar alcohol analysis. Cellobiose, glucose, xylose, arabinose, mannose and other cellulose products	
<b>RNM-Carbohydrate</b> (L58 packing)*	8% cross-linked resin <b>SODIUM</b> ionic form	For matrices which contain high concentration of inorganic sodium, i.e. molasses	– Easily regenerated to the original ionic strength
<b>ROA-Organic Acid</b> (L22 packing)*	8% cross-linked resin <b>HYDROGEN</b> ionic form	Organic acids alone or in combination with carbohydrates, alcohols, fatty acids, or neutral compounds; Amino sugars; Ethanol, acetic acid, glycerol, and standard alcohol mixtures	– Selectivity can be altered by changing the pH as well as the type of dilute mineral acid used as the mobile phase
<b>RFQ-Fast Acid</b>	8% cross-linked resin <b>HYDROGEN</b> ionic form	Rapid screening of fruit quality; Ethanol, acetic acid, glycerol, and standard alcohol mixtures	– Analytes are routinely chromatographed under 5 minutes
<b>RKP-Potassium</b>	8% cross-linked resin <b>POTASSIUM</b> ionic form	Analysis of glyphosate	
<b>RCU-USP Sugar Alcohols</b> (L19 packing)*	8% cross-linked resin <b>CALCIUM</b> ionic form	For sugar analysis according to the USP procedures	– Sorbitol and mannitol can be resolved using simple isocratic conditions

\* United States Pharmacopeia (USP)



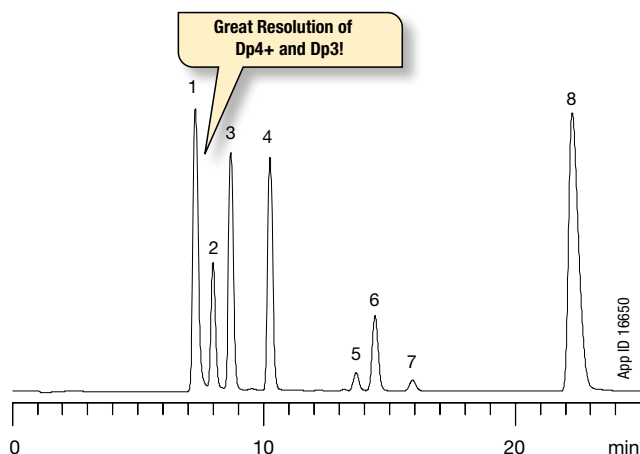


## Bioethanol Fermentation Monitoring

- Easy quantitation of ethanol fermentation broth components
- Monitor starches, sugars, organic acids, and ethanol in one run
- Reliable lactic acid and acetic acid monitoring
- Increase throughput by reducing run times 50% with 150 mm column length

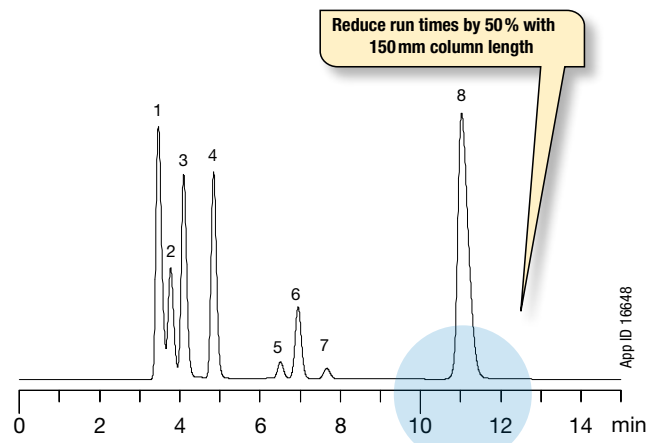
Monitoring the key reaction components throughout the fermentation process is crucial for maximizing ethanol recovery. Rezex ROA is uniquely suited for the separation and analysis of simple and complex sugars, organic acids, and ethanol within a fermentation broth sample. With results easily obtained through an isocratic run, Rezex ROA is instrumental in helping you to accurately determine what critical steps need to be taken to ensure the maximum yield is achieved during your fermentation run.

Rezex ROA has the ability to achieve excellent baseline separation between Dp3 and Dp4+, which have proven to be a challenge within the bioethanol industry. It is this great baseline separation that affords scientists the opportunity to utilize a shorter column dimension. By using the 150 x 7.8 mm Rezex ROA column, you are able to decrease the run time by 50% when compared to the average run time on a 300 x 7.8 mm column.



**Column:** Rezex ROA-Organic Acid  
**Dimensions:** 300 x 7.8 mm  
**Part No.:** [00H-0138-K0](#)  
**Guard Cartridge:** [AJ0-4490](#)  
**Guard Holder:** [KJ0-4282](#)  
**Mobile Phase:** 0.005 N Sulfuric Acid  
**Flow Rate:** 0.6 mL/min  
**Vial:** [AR0-9925-13](#)  
**Filter:** [AF0-8103-52](#)  
**Temperature:** 60 °C  
**Detection:** RI @ 40 °C  
**System:** Shimadzu® Prominence® LC-20A System  
**Sample:**

1. Dp4+	5. Lactic Acid
2. Dp3	6. Glycerol
3. Maltose	7. Acetic Acid
4. Glucose	8. Ethanol



**Column:** Rezex ROA-Organic Acid  
**Dimensions:** 150 x 7.8 mm  
**Part No.:** [00F-0138-K0](#)  
**Guard Cartridge:** [AJ0-4490](#)  
**Guard Holder:** [KJ0-4282](#)  
**Mobile Phase:** 0.005 N Sulfuric Acid  
**Flow Rate:** 0.6 mL/min  
**Vial:** [AR0-9925-13](#)  
**Filter:** [AF0-8103-52](#)  
**Temperature:** 60 °C  
**Detection:** RI @ 40 °C  
**System:** Shimadzu Prominence LC-20A System  
**Sample:**

1. Dp4+	5. Lactic Acid
2. Dp3	6. Glycerol
3. Maltose	7. Acetic Acid
4. Glucose	8. Ethanol

**Shorten GC Fuel Quality Testing**  
 Zebtron ZB-Bioethanol GC column can shorten your quality test down to 5 minutes! (See pp. 122-123).

**Extend Column Lifetime**  
 Protect the Rezex column from the intrusion of the metal ions by using Phenex™ Syringe Filters and SecurityGuard™. The filters and SecurityGuard guard cartridge system work by trapping metal ions, such as calcium, magnesium, and iron, which can damage the column and cause it to lose or change separation efficiency. (See pp. 8 and 330).

## Rezex vs. Bio-Rad® Aminex®

Phenomenex guarantees satisfaction when using Rezex HPLC columns. As illustrated below, Rezex offers advantages that enhance chromatographic results, increase throughput, and simplify quantitation.

### Easier, Accurate Quantitation

Due to improved peak shape

#### Saccharides

Conditions for both columns:

**Column:** Rezex RCM-Monosaccharide  
Aminex HPX-87C

**Dimensions:** 300 x 7.8 mm

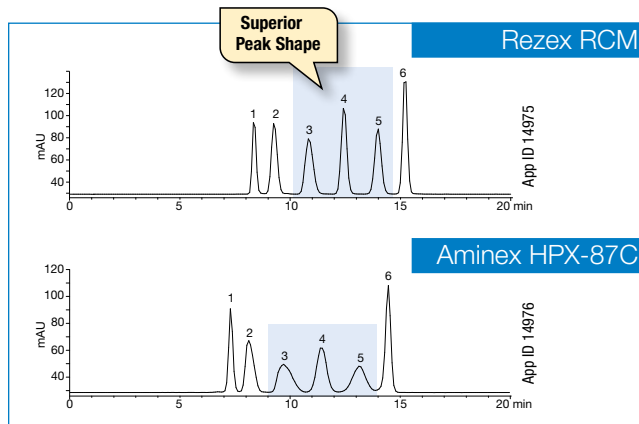
**Mobile Phase:** Water

**Flow Rate:** 0.6 mL/min

**Temperature:** 80 °C

**Detection:** ELSD

**Sample:** 1. Melezitose 4. Mannose  
2. Maltose 5. Fructose  
3. Glucose 6. Ribitol



Comparative separations may not be representative of all applications.

### Baseline Separation of Critical Sample Components

Due to improved resolution

#### Sugars

Conditions for both columns:

**Column:** Rezex RCM-Monosaccharide  
Aminex HPX-87C

**Dimensions:** 300 x 7.8 mm

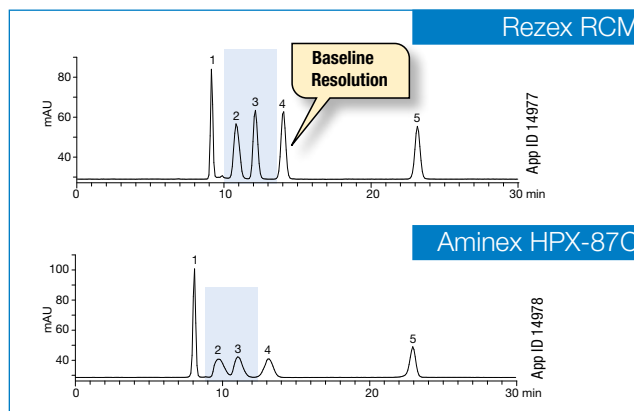
**Mobile Phase:** Water

**Flow Rate:** 0.6 mL/min

**Temperature:** 80 °C

**Detection:** ELSD

**Sample:** 1. Sucrose 4. Fructose  
2. Glucose 5. Sorbitol  
3. Galactose



## Applications

### Food Softeners

**Column:** Rezex RCM-Monosaccharide

**Dimensions:** 300 x 7.8 mm

**Part No.:** [0QH-0130-K0](#)

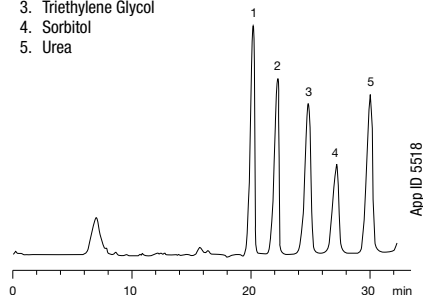
**Mobile Phase:** Water

**Flow Rate:** 0.5 mL/min

**Temperature:** 60 °C

**Detection:** RI

**Sample:** 1. Glycerol  
2. Methoxypolyethylene Glycol  
3. Triethylene Glycol  
4. Sorbitol  
5. Urea



### Amino Sugars

**Column:** Rezex ROA-Organic Acid

**Dimensions:** 300 x 7.8 mm

**Part No.:** [0QH-0138-K0](#)

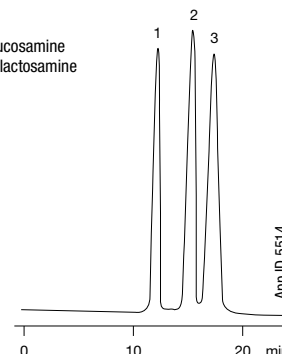
**Mobile Phase:** 1% Phosphoric Acid

**Flow Rate:** 0.6 mL/min

**Temperature:** Ambient

**Detection:** RI

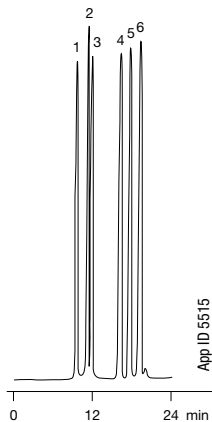
**Sample:** 1. Glucose  
2. N-Acetylglucosamine  
3. N-Acetylgalactosamine



# Rezex™ Organic Acid and Carbohydrate Columns

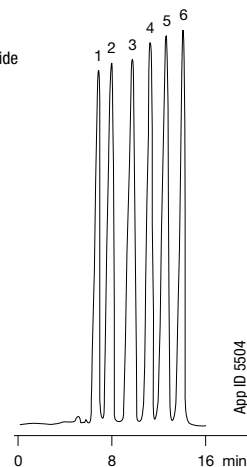
## Organic Acids

**Column:** Rezex ROA-Organic Acid  
**Dimensions:** 300 x 7.8 mm  
**Part No.:** [00H-0138-KO](#)  
**Guard Cartridge:** [AJ0-4490](#)  
**Guard Holder:** [KJ0-4282](#)  
**Mobile Phase:** 0.005 N Sulfuric Acid  
**Flow Rate:** 0.5 mL/min  
**Detection:** UV @ 210 nm  
**Vial:** [ARO-9925-13](#)  
**Filter:** [AF0-8103-52](#)  
**Temperature:** 55 °C  
**Sample:** 1. Oxalic  
 2. Citric  
 3. Tartaric  
 4. Succinic  
 5. Formic  
 6. Acetic



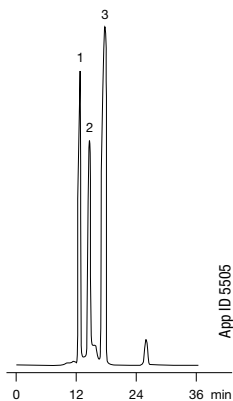
## Saccharides

**Column:** Rezex RCM-Monosaccharide  
**Dimensions:** 300 x 7.8 mm  
**Part No.:** [00H-0130-KO](#)  
**Guard Cartridge:** [AJ0-4493](#)  
**Guard Holder:** [KJ0-4282](#)  
**Mobile Phase:** Water  
**Flow Rate:** 0.6 mL/min  
**Detection:** RI  
**Vial:** [ARO-9925-13](#)  
**Filter:** [AF0-8103-52](#)  
**Temperature:** 85 °C  
**Sample:** 1. Melezitose  
 2. Maltose  
 3. Glucose  
 4. Mannose  
 5. Fructose  
 6. Ribitol



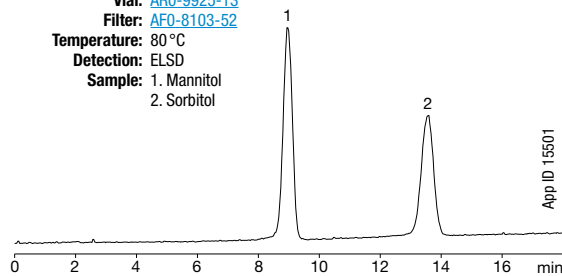
## Apple Juice

**Column:** Rezex RCM-Monosaccharide  
**Dimensions:** 300 x 7.8 mm  
**Part No.:** [00H-0130-KO](#)  
**Guard Cartridge:** [AJ0-4493](#)  
**Guard Holder:** [KJ0-4282](#)  
**Mobile Phase:** Water  
**Flow Rate:** 0.6 mL/min  
**Vial:** [ARO-9925-13](#)  
**Filter:** [AF0-8103-52](#)  
**Temperature:** 75 °C  
**Detection:** RI  
**Sample:** 1. Sucrose  
 2. Glucose  
 3. Fructose



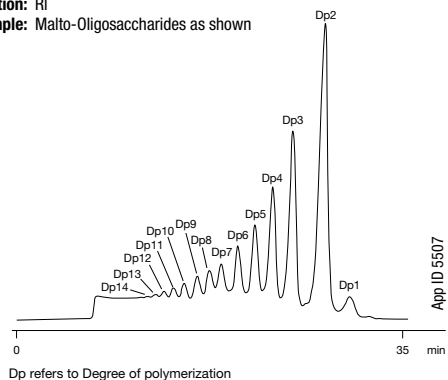
## Mannitol and Sorbitol

**Column:** Rezex RPM-Monosaccharide  
**Dimensions:** 100 x 7.8 mm  
**Part No.:** [00D-0135-KO](#)  
**Guard Cartridge:** [AJ0-4492](#)  
**Guard Holder:** [KJ0-4282](#)  
**Mobile Phase:** Water  
**Flow Rate:** 0.6 mL/min  
**Vial:** [ARO-9925-13](#)  
**Filter:** [AF0-8103-52](#)  
**Temperature:** 80 °C  
**Detection:** ELSD  
**Sample:** 1. Mannitol  
 2. Sorbitol



## Oligosaccharides

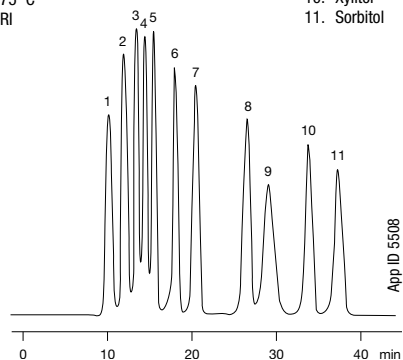
**Column:** Rezex RSO-Oligosaccharide  
**Dimensions:** 200 x 10 mm  
**Part No.:** [00P-0133-NO](#)  
**Mobile Phase:** Water  
**Flow Rate:** 0.3 mL/min  
**Vial:** [ARO-9925-13](#)  
**Filter:** [AF0-8103-52](#)  
**Temperature:** 75 °C  
**Detection:** RI  
**Sample:** Malto-Oligosaccharides as shown



## Saccharides

**Column:** Rezex RPM-Monosaccharide  
**Dimensions:** 300 x 7.8 mm  
**Part No.:** [00H-0135-KO](#)  
**Guard Cartridge:** [AJ0-4492](#)  
**Guard Holder:** [KJ0-4282](#)  
**Mobile Phase:** Water  
**Flow Rate:** 0.6 mL/min  
**Vial:** [ARO-9925-13](#)  
**Filter:** [AF0-8103-52](#)  
**Temperature:** 75 °C  
**Detection:** RI


**Sample:** 1. Stachyose  
 2. Maltose  
 3. Glucose  
 4. Xylose  
 5. Galactose  
 6. Fructose  
 7. Meso-Erythritol  
 8. Mannitol  
 9. Salicin  
 10. Xylitol  
 11. Sorbitol






# Rezex™ Organic Acid and Carbohydrate Columns

## Specifications and Operating Recommendations

	RCM-Monosaccharide	RSO-Oligosaccharide	RNM-Carbohydrate	RPM-Monosaccharide	RHM-Monosaccharide
Part Number	<a href="#">00H-0130-K0</a>	<a href="#">00P-0133-N0</a>	<a href="#">00H-0136-K0</a>	<a href="#">00H-0135-K0</a>	<a href="#">00H-0132-K0</a>
Ionic Form	Calcium	Silver	Sodium	Lead	Hydrogen
Standard Dimensions	300 x 7.8 mm	200 x 10 mm	300 x 7.8 mm	300 x 7.8 mm	300 x 7.8 mm
Matrix	Sulfonated Styrene Divinyl Benzene				
Cross Linking	8%	4%	8%	8%	8%
Particle Size	8 µm	12 µm	8 µm	8 µm	8 µm
Min. Efficiency (p/m) based on last peak	35,000	N/A	30,000	35,000	35,000
Typical Pressure (psi @ Testing Flow Rate)	260	115	170	190	275
Max. Pressure (psi @ Max Flow Rate)	1,000	300	1,000	1,000	1,000
Max. Flow Rate (mL/min)	1.0 (see pressure)	0.3	1.0	1.0	1.0
Max. Temperature (°C)	85	85	85	85	85
Typical Mobile Phase	Water	Water	Water	Water	Water
pH Range	Neutral	Neutral	Neutral	Neutral	1-8
Guard Column Part No.	<a href="#">03B-0130-K0</a>	<a href="#">03R-0133-N0</a>	<a href="#">03B-0136-K0</a>	<a href="#">03B-0135-K0</a>	<a href="#">03B-0132-K0</a>
<b>Cleaning, Regeneration and Storage</b>					
Organic Modifiers (Max)	5% Methanol, IPA, EtOH				
Inorganic Modifiers	5% CaSO <sub>4</sub> , Ca(NO <sub>3</sub> ) <sub>2</sub> , CaCl <sub>2</sub>	5% Silver Nitrate	5% Sodium Salts	5% Lead Nitrate	5% HNO <sub>3</sub> , H <sub>3</sub> PO <sub>4</sub>
Avoid 	Acids, Bases, Non-Calcium Salts/ Metal Ions, >30% Acetonitrile	Acids, Bases, Non-Silver Salts/ Metal Ions, >30% Acetonitrile	Acids, Bases, Non-Sodium Salts/ Metal Ions, >30% Acetonitrile	Acids, Bases, Non-Lead Salts/ Metal Ions, >30% Acetonitrile	Acids, Bases, Salts/ Metal Ions, >30% Acetonitrile
Cleaning Solvent	100% Water	100% Water	100% Water	100% Water	100% Water
Flow Rate(mL/min)	0.4	0.1	0.4	0.4	0.4
Temperature (°C)	85	85	85	85	85
Duration (hrs)	12	12	12	12	12
Regeneration Solvent	0.1 M Ca(NO <sub>3</sub> ) <sub>2</sub>	0.1 M AgNO <sub>3</sub>	0.1 M NaNO <sub>3</sub>	0.1 M Pb(NO <sub>3</sub> ) <sub>2</sub>	0.025 M H <sub>2</sub> SO <sub>4</sub>
Flow Rate (mL/min)	0.2	0.1	0.2	0.2	0.2
Duration (hrs)	4-16	4-16	4-16	4-16	4-16
Ship/Storage Solvent	Water	Water	Water	Water	Water

	ROA-Organic Acid	RFQ-Fast Acid	RCU-Sugar Alcohols
Part Number	<a href="#">00H-0138-K0</a>	<a href="#">00D-0223-K0</a>	<a href="#">00G-0130-D0</a>
Ionic Form	Hydrogen	Hydrogen	Calcium
Standard Dimensions	300 x 7.8 mm	100 x 7.8 mm	250 x 4.0 mm
Matrix	Sulfonated Styrene Divinyl Benzene		
Cross Linking	8%	8%	8%
Particle Size	8 µm	8 µm	8 µm
Min. Efficiency (p/m) based on last peak	50,000 (Acetic Acid)	30,000	12,000
Typical Pressure (psi @ Testing Flow Rate)	580	365	90
Max. Pressure (psi @ Max Flow Rate)	1,000	1,000	1,000
Max. Flow Rate (mL/min)	1.0	1.0	0.5
Max. Temperature (°C)	85	85	85
Typical Mobile Phase	0.005 N H <sub>2</sub> SO <sub>4</sub>	0.005 N H <sub>2</sub> SO <sub>4</sub>	Water
pH Range	1-8	1-8	Neutral
Guard Column Part No.	<a href="#">03B-0138-K0</a>	<a href="#">03B-0223-K0</a>	<a href="#">03A-0130-D0</a>
<b>Cleaning, Regeneration and Storage</b>			
Organic Modifiers (Max)	5% Methanol, IPA, EtOH		
Inorganic Modifiers	5% HNO <sub>3</sub> , H <sub>3</sub> PO <sub>4</sub>	5% HNO <sub>3</sub> , H <sub>3</sub> PO <sub>4</sub>	5% CaSO <sub>4</sub> , Ca(NO <sub>3</sub> ) <sub>2</sub> , CaCl <sub>2</sub>
Avoid 	Acids, Bases, Salts, Metal Ions, pH > 3, >30% Acetonitrile	Acids, Bases, Salts, Metal Ions, pH > 3, >30% Acetonitrile	Acids, Bases, Non-Calcium Salts, or Metal Ions, >30% Acetonitrile
Cleaning Solvent	100% Water	100% Water	100% Water
Flow Rate(mL/min)	0.4	0.4	0.1
Temperature (°C)	85	85	85
Duration (hrs)	12	12	12
Regeneration Solvent	0.025 M H <sub>2</sub> SO <sub>4</sub>	0.025 M H <sub>2</sub> SO <sub>4</sub>	0.1 M Ca(NO <sub>3</sub> ) <sub>2</sub>
Flow Rate (mL/min)	0.2	0.2	0.1
Duration (hrs)	4-16	4-16	4-16
Ship/Storage Solvent	0.005 N H <sub>2</sub> SO <sub>4</sub>	0.005 N H <sub>2</sub> SO <sub>4</sub>	Water

# Rezex™ Organic Acid and Carbohydrate Columns

## Retention Times for Some Carbohydrates and Sugar Alcohols

Counter Ion	Analyte	RAM Ag <sup>+</sup>	RCM Ca <sup>+2</sup>	RNM Na <sup>+</sup>	RHM H <sup>+</sup>	RPM Pb <sup>+2</sup>
	Adonitol (Ribitol)	11.54	14.93	11.10	11.11	20.15
	D-Altrose	11.95	12.71	11.45	10.21	15.82
	D-(-)-Arabinose	13.01	13.56	12.65	11.24	16.47
	D-(+)-Cellobiose	8.86	8.60	8.49	8.02	11.00
	D-(+)-Digitoxose	11.90	13.82	11.39	12.59	15.32
	Dulcitol	11.64	21.61	11.10	10.71	33.25
	Meso-Erythritol	12.31	15.49	11.78	12.14	19.82
	D-(-)-Fructose	12.05	13.65	11.76	10.31	17.71
	L-(-)-Fucose	12.75	13.19	12.30	11.65	16.19
	D-(+)-Galactose	11.87	11.73	11.47	10.19	14.94
	Gentiobiose	8.70	8.40	8.40	7.87	10.53
	D-(+)-Glucose	11.04	10.37	10.71	9.62	12.92
	Inositol	12.59	13.35	12.14	9.98	18.87
	Isomaltose	9.11	8.74	8.76	8.02	11.28
	Lactose	9.27	9.03	8.78	8.32	11.89
	Lactulose	9.75	10.32	9.23	8.57	13.95
	D- Lyxose	12.41	14.06	11.98	10.68	16.66
	D- Maltose	9.16	8.81	8.75	8.18	11.59
	Maltotriose	8.27	8.10	7.94	7.51	11.02
	Maltulose	9.25	9.47	8.82	8.27	12.40
	D- Mannitol	11.36	17.82	10.80	10.59	24.90
	D-(+)-Mannose	12.04	12.04	11.54	10.16	16.39
	Melibiose	9.26	9.04	8.82	8.14	11.97
	D-(+)-Melezitose	8.00	7.93	7.66	7.54*	9.94
	D-(+)-Raffinose	8.10	8.16	7.76	7.88*	10.28
	L-(+)-Rhamnose	11.50	12.18	11.00	10.90	14.47
	D-(-)-Ribose	14.59	23.38	14.34	11.42	33.48
	Salicin	18.51	18.58	17.36	14.98	26.81
	D-Sorbitol	11.91	22.45	11.39	10.83	35.97
	Stachyose	7.60	7.59	7.30	7.27	9.72
	Sucrose	9.03	8.71	8.65	9.24*	11.00
	Trehalose	8.91	8.72	8.49	8.32	11.01
	Xylitol	12.69	22.01	12.16	11.78	32.38
	D-(+)-Xylose	12.06	11.62	11.68	10.24	13.84

\* Partial hydrolysis results.

### Conditions:

**Dimensions:** 300 x 7.8 mm  
**Mobile Phase:** Water (degassed)  
**Flow Rate:** 0.6 mL/min  
**Temperature:** 80 °C  
**Detection:** RI @ 40 °C

## Column Cross Reference Chart

Phenomenex Rezex™	Bio-Rad® Aminex®	Supelco® SUPELCOGEL™	Waters® Sugar-Pak™	Transgenomic® CARBOSep™	Sepax® Carbomix®
RCM-Monosaccharide	HPX-87C 125-0095	SUPELCOGEL Ca	Sugar-Pak 1	CARBOSep CHO-820	Carbomix Ca
RHM-Monosaccharide	HPX-87H 125-0140	SUPELCOGEL C-610H & H	N/A	ICSep ION-300	Carbomix H
RPM-Monosaccharide	HPX-87P 125-0098	SUPELCOGEL Pb	N/A	CARBOSep COREGEL-87P	Carbomix Pb
RNM-Carbohydrate	HPX-87N 125-0143	N/A	N/A	N/A	Carbomix Na
RSO-Oligosaccharide	HPX-42A 125-0097	SUPELCOGEL Ag1 & Ag2	N/A	N/A	N/A
ROA-Organic Acid	HPX-87H 125-0140	SUPELCOGEL C-610H & H	N/A	N/A	N/A
RFQ-Fast Acid	Fast Acid 125-0100	N/A	N/A	N/A	N/A
RKP-Potassium	HPX-87K 125-0142	SUPELCOGEL K	N/A	CARBOSep COREGEL-87K	Carbomix K
RCU-USP Sugar Alcohols	Sugar Alcohols 125-0094	N/A	N/A	N/A	N/A

## Ordering Information

Columns					Guards		SecurityGuard™ Cartridges (mm)
Description	Part No.	Cross Linkage	Ionic Form	Size (mm)	Part No.	Size (mm)	4 x 3.0* /10pk
RCM-Monosaccharide	<a href="#">00F-0130-K0</a>	8%	Calcium	150 x 7.8	<a href="#">03B-0130-K0</a>	50 x 7.8	<a href="#">AJ0-4493</a>
RCM-Monosaccharide	<a href="#">00H-0130-K0</a>	8%	Calcium	300 x 7.8	<a href="#">03B-0130-K0</a>	50 x 7.8	<a href="#">AJ0-4493</a>
RHM-Monosaccharide	<a href="#">00H-0132-K0</a>	8%	Hydrogen	300 x 7.8	<a href="#">03B-0132-K0</a>	50 x 7.8	<a href="#">AJ0-4490</a>
RSO-Oligosaccharide	<a href="#">00P-0133-N0</a>	4%	Silver	200 x 10.0	<a href="#">03R-0133-N0</a>	60 x 10.0	—
RPM-Monosaccharide	<a href="#">00H-0135-K0</a>	8%	Lead	300 x 7.8	<a href="#">03B-0135-K0</a>	50 x 7.8	<a href="#">AJ0-4492</a>
RPM-Monosaccharide	<a href="#">00D-0135-K0</a>	8%	Lead	100 x 7.8	<a href="#">03B-0135-K0</a>	50 x 7.8	<a href="#">AJ0-4492</a>
RNM-Carbohydrate	<a href="#">00H-0136-K0</a>	8%	Sodium	300 x 7.8	<a href="#">03B-0136-K0</a>	50 x 7.8	—
ROA-Organic Acid	<a href="#">00F-0138-E0</a>	8%	Hydrogen	150 x 4.6	—	—	<a href="#">AJ0-4490</a>
ROA-Organic Acid	<a href="#">00G-0138-E0</a>	8%	Hydrogen	250 x 4.6	—	—	<a href="#">AJ0-4490</a>
ROA-Organic Acid	<a href="#">00F-0138-K0</a>	8%	Hydrogen	150 x 7.8	<a href="#">03B-0138-K0</a>	50 x 7.8	<a href="#">AJ0-4490</a>
ROA-Organic Acid	<a href="#">00H-0138-K0</a>	8%	Hydrogen	300 x 7.8	<a href="#">03B-0138-K0</a>	50 x 7.8	<a href="#">AJ0-4490</a>
RKP-Potassium	<a href="#">00H-3252-K0</a>	8%	Potassium	300 x 7.8	—	—	—
RFQ-Fast Acid	<a href="#">00D-0223-K0</a>	8%	Hydrogen	100 x 7.8	<a href="#">03B-0223-K0</a>	50 x 7.8	<a href="#">AJ0-4490</a>
RCU-USP Sugar Alcohols	<a href="#">00G-0130-D0</a>	8%	Calcium	250 x 4.0	<a href="#">03A-0130-D0</a>	30 x 4.0	<a href="#">AJ0-4493</a>

for ID: 3.2-8.0 mm

\*SecurityGuard Analytical Cartridges require universal holder Part No.: [KJ0-4282](#)



For Column Heater, see p. 416



For our full line of Column Performance Check Standards, see pp. 424-425

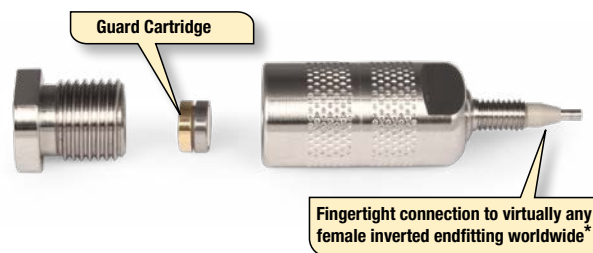
# SecurityGuard™ Standard HPLC and SFC Column Protection

U.S. Patent No. 6, 162, 362

## Column Protection for UHPLC, HPLC, SFC to PREP Your Results and Your Column are Too Important Not to Protect

- Protect HPLC and UHPLC columns and extend lifetime
- Virtually no change in chromatography
- Available in analytical, semi-prep, and preparative sizes
- Simple to use

Did you know a common cause of high backpressure, split peaks, broad peaks, baseline noise, baseline drift and loss of resolution is contaminants? The fact is all mobile phases contain some chemical contaminants or microparticulates, from the sample, solvent, or wear on the polymeric seals of the pump or injector. These contaminants can clog frits, irreversibly bind to columns, degrade performance, and even damage the flow cell. An easy solution, SecurityGuard is a universal column protection system designed to effectively (and inexpensively), protect your valuable columns, from the damaging effects of chemical contaminants, without altering your chromatographic results.



See SecurityGuard Standard in action video:

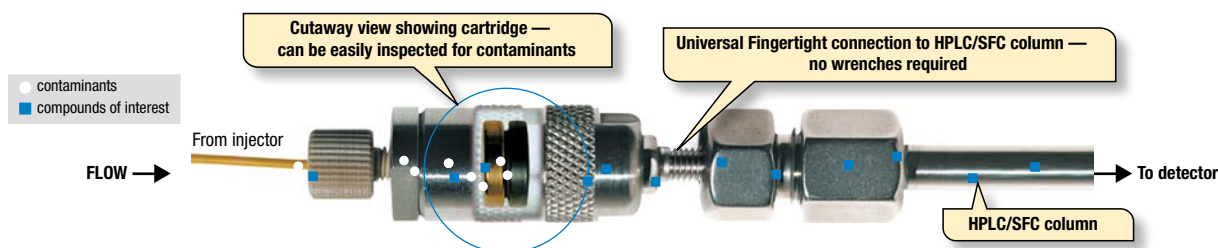
[www.phenomenex.com/SecurityGuardInstallation](http://www.phenomenex.com/SecurityGuardInstallation)

### A Universal Guard Cartridge System

#### How SecurityGuard Standard Works\*

The SecurityGuard Standard analytical cartridge holder (patented) directly finger-tightens into virtually any manufacturer's non core-shell and  $\geq 3 \mu\text{m}$  particle columns. Contaminants are retained by

an inexpensive, 4 mm, disposable cartridge instead of fouling your expensive analytical column.



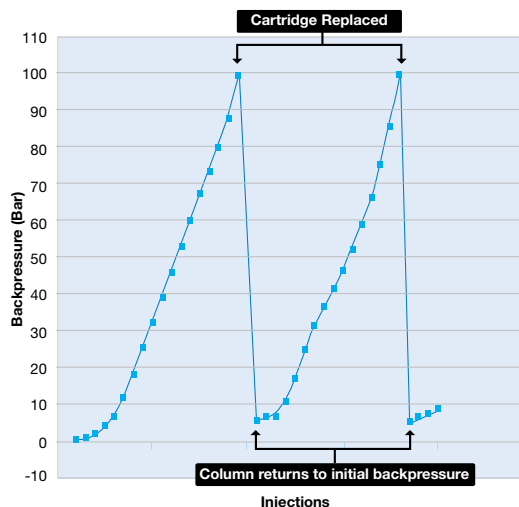
### Increases HPLC Column Lifetime, Guaranteed!

Simply replace SecurityGuard cartridges instead of your expensive HPLC/SFC columns. In this graph, once the expired SecurityGuard Standard cartridge was replaced, the pressure immediately dropped and the column performance was restored allowing for extended column use.



The SecurityGuard Standard holder and cartridges are pressure rated to 5000 psi (345 bar).

For all core-shell and / or  $< 3 \mu\text{m}$  particle columns, and all applications at higher pressures, use SecurityGuard ULTRA, see p.335. For available Semi-Preparative and PREP sizes, see pp. 332-334. For preparative SFC applications, use holder [AJ0-8617](#) for 15 x 21.2 mm cartridges or [AJ0-8618](#) for 15 x 30 mm cartridges. For Kinetex and Aeris Core-Shell SecurityGuard SemiPrep and PREP cartridges, see p. 334.



\*Feature applies to traditional analytical-sized guard system only, and does not apply to SemiPrep or PREP guard cartridges.

Accelerated lifetime test using endogenous biomolecule matrix on a reversed phase C18 column, 5  $\mu\text{m}$ , 50 x 4.6 mm with SecurityGuard Standard C18 cartridges. Backpressure values represent additional backpressure contributed by SecurityGuard.

# SecurityGuard™ Standard HPLC and SFC Column Protection

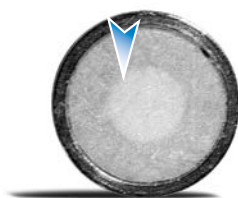
U.S. Patent No. 6, 162, 362

## “See Your Dirt” Feature

The “see your dirt” feature lets you know exactly when it’s time to replace your cartridge.

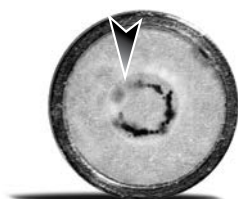
Visually inspect the surface of the cartridge’s packing material any time, without disturbing the packing bed. Now you can easily monitor visual contaminant build-up, and change your guard cartridge before it’s too late!

If your contaminants are colorless, replace the cartridge as often as needed to maintain chromatographic performance.



### CLEAN

If it looks clean, the cartridge may be reinserted for further use.



### DIRTY

If either discoloration or particle build-up is observed, it’s time to replace the cartridge.

*“The SecurityGuard is easy to use and cartridge replacement is simple.”*

*F. Shakir, Sheffield Pharmaceuticals*

*“We didn’t see any change in retention time or difference in the peaks. The SecurityGuard has increased the life of the column.”*

*B. Dietz, ADM*

The opinions stated herein are solely those of the individual and not necessarily those of any company or organization.

## Analytical HPLC/SFC Holder Kit and Replacement Accessories

For 2.0 and 3.0 mm ID cartridges, use with 2.0 to 8.0 mm ID columns

### Ordering Information

#### Analytical Kit

Part No.	Description
<a href="#">KJO-4282</a>	SecurityGuard Standard Kit* (includes holder)

#### Replacement Parts and Accessories

Part No.	Description	Unit
<a href="#">AJ0-4283</a>	PEEK Ferrules	3/pk
<a href="#">AJ0-4285</a>	Stacking Rings	2/pk
<a href="#">AQ0-1389</a>	PEEK Fingertight Fittings	10/pk
<a href="#">AJ0-4284</a>	SecurityGuard Wrenches	2/pk

## UHPLC / HPLC / SFC / PREP Guard Finder

Having a difficult time finding the best column protection device for your specific UHPLC, HPLC, SFC or Prep column?

- Guard Finder matches over 57,000 column part numbers
- Interactive selection tool finds the appropriate column guard in seconds
- Quickly find column protection for any column from any of the top column manufacturers
- Search by brand, part number, technique, or column phase

Try it today at:

[www.phenomenex.com/GuardIT](http://www.phenomenex.com/GuardIT)

### \*Kit KJO-4282 Includes:





## Semi-Preparative HPLC/SFC Holder

For 10.0 mm ID cartridges, use with 9 to 16 mm ID columns

### Ordering Information

#### SecurityGuard SemiPrep Guard Cartridge Holder

Part No.	Description	Unit
<a href="#">AJ0-9281</a>	Holder for 10.0 mm ID cartridges	ea

#### Accessories

Part No.	Description	Unit
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#### Nut and Ferrule

<a href="#">AQ0-3018</a>	10-32 Threaded Male Nut and Ferrule Set for 1/16 in. OD capillary tubing	ea
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#### Sure-Lok™ Fingertight Fittings

<a href="#">AQ0-1388</a>	PEEK Sure-Lok Male Nut	ea
<a href="#">AQ0-1389</a>	PEEK Sure-Lok Male Nut	10/pk

#### Sure-Lok Couplers

<a href="#">AQ0-1392</a>	PEEK Sure-Lok Coupler	ea
<a href="#">AQ0-1393</a>	PEEK Sure-Lok Coupler	10/pk

#### Column Sealing Plugs

<a href="#">AQ0-0217</a>	Column Sealing Plug, 10-32 Thread size	10/pk
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#### SemiPrep Guard Holder Wrench

<a href="#">AQ0-8904</a>	Wrench, Open End, 1/2 x 9/16 in.	ea
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For Semi-Preparative and Preparative Cartridges, see pp. 333-334

## Preparative HPLC/SFC Holder (Two Sizes)

For 21.2 mm ID cartridges, use with 18 to 29 mm ID columns

### Ordering Information

#### SecurityGuard Prep Guard Cartridge Holders

Part No.	Description	Unit
<a href="#">AJ0-8223</a>	HPLC Holder Kit for 21.2 mm ID cartridges, includes column coupler	ea
<a href="#">AJ0-8617</a>	SFC Holder Kit for 21.2 mm ID cartridges, includes column coupler	ea

For 30.0 mm ID cartridges, use with 30 to 49 mm ID columns

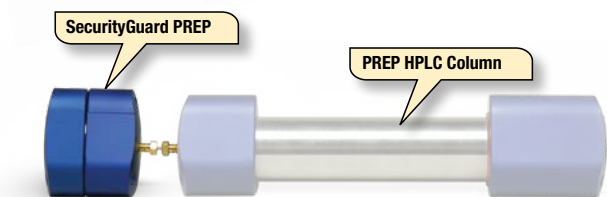
### Ordering Information

#### SecurityGuard Prep Guard Cartridge Holder

Part No.	Description	Unit
<a href="#">AJ0-8277</a>	HPLC Holder Kit for 30.0 mm ID cartridges, includes column coupler	ea
<a href="#">AJ0-8618</a>	SFC Holder Kit for 30.0 mm ID cartridges, includes column coupler	ea

#### Replacement Parts and Accessories

Part No.	Description	Unit
<a href="#">AQ0-8376</a>	PREP Coupler, SS Tube, Nuts, and Ferrules, 10-32 Threads, 1/16 in. OD x 0.030 in. ID	ea
<a href="#">AQ0-8222</a>	PREP Replacement O-Rings, Kalrez® For 15 x 21.2 mm SG HPLC Holder, Size 2-021	2/pk
<a href="#">AQ0-8318</a>	PREP Replacement O-Rings, Kalrez® For 15 x 30 mm SG HPLC Holder, Size 2-025	2/pk
<a href="#">AQ0-8500</a>	PREP Replacement O-Rings, Teflon® For 15 x 21.2 mm SG SFC Holder, Size 2-021	2/pk
<a href="#">AQ0-8501</a>	PREP Replacement O-Rings, Teflon® For 15 x 30 mm SG SFC Holder, Size 2-025	2/pk
<a href="#">AT0-0465</a>	Capillary S.S. Tubing, 0.020 in. ID x 0.062 in. (1/16 in.) OD x 10 cm length	5/pk
<a href="#">AT0-0466</a>	Capillary S.S. Tubing, 0.020 in. ID x 0.062 in. (1/16 in.) OD x 20 cm length	5/pk
<a href="#">AQ0-8903</a>	Wrench, Open End, 1/4 x 9/16 in.	ea



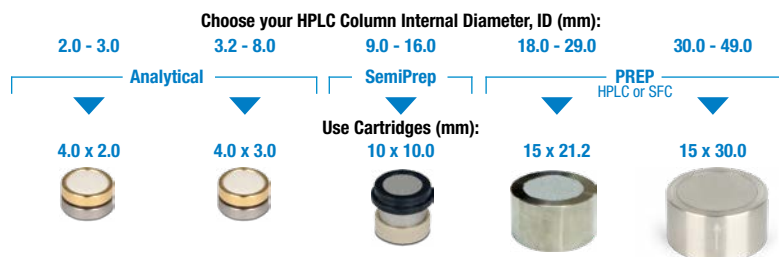
Holders		Cartridges
PREP	SFC	
21.2 mm ID HPLC Holder	21.2 mm ID SFC Holder	Cartridge (15 x 21.2 mm ID)
30 mm ID HPLC Holder	30 mm ID SFC Holder	Cartridge (15 x 30.0 mm ID)
O-Rings		Coupler
Kalrez O-Rings	Teflon O-Rings	PREP Coupler



## Cartridges and Holders

Step 1: Choose column ID

Step 2: Match column phase



### Ordering Information

Material	Description	pH Stability	Analytical		SemiPrep	PREP HPLC or SFC	
Cartridges for General Purpose/Pharmaceutical			/10pk	/10pk	/3pk	ea	ea
C18	(ODS, Octadecyl)	1.5 - 10	<a href="#">AJ0-4286</a>	<a href="#">AJ0-4287</a>	<a href="#">AJ0-7221</a>	<a href="#">AJ0-7839</a>	<a href="#">AJ0-8301</a>
C12	(Dodecyl)	1.5 - 10	<a href="#">AJ0-6073</a>	<a href="#">AJ0-6074</a>	<a href="#">AJ0-7275</a>	<a href="#">AJ0-7842</a>	<a href="#">AJ0-8304</a>
C8	(MOS, Octyl)	1.5 - 10	<a href="#">AJ0-4289</a>	<a href="#">AJ0-4290</a>	<a href="#">AJ0-7222</a>	<a href="#">AJ0-7840</a>	<a href="#">AJ0-8302</a>
C5	(Pentyl)	1.5 - 10	<a href="#">AJ0-4292</a>	<a href="#">AJ0-4293</a>	<a href="#">AJ0-7372</a>	—	—
C1	(TMS)	2 - 9	—	<a href="#">AJ0-4299</a>	—	—	—
Silica	—	—	<a href="#">AJ0-4347</a>	<a href="#">AJ0-4348</a>	<a href="#">AJ0-7223</a>	<a href="#">AJ0-7229</a>	<a href="#">AJ0-8312</a>
HILIC	(HILIC)	1.5 - 8	<a href="#">AJ0-8328</a>	<a href="#">AJ0-8329</a>	<a href="#">AJ0-8902</a>	—	—
NH <sub>2</sub>	(Amino, Aminopropyl)	1.5 - 11	<a href="#">AJ0-4301</a>	<a href="#">AJ0-4302</a>	<a href="#">AJ0-7364</a>	<a href="#">AJ0-8162</a>	<a href="#">AJ0-8309</a>
CN	(Cyano, Cyanopropyl)	2 - 7.5	<a href="#">AJ0-4304</a>	<a href="#">AJ0-4305</a>	<a href="#">AJ0-7313</a>	<a href="#">AJ0-8220</a>	<a href="#">AJ0-8311</a>
Phenyl	(Phenylhexyl)	1.5 - 10	<a href="#">AJ0-4350</a>	<a href="#">AJ0-4351</a>	<a href="#">AJ0-7314</a>	<a href="#">AJ0-7841</a>	<a href="#">AJ0-8303</a>
PPFP(2)	(Pentafluorophenyl)	1.5 - 8	<a href="#">AJ0-8326</a>	<a href="#">AJ0-8327</a>	<a href="#">AJ0-8376</a>	<a href="#">AJ0-8377</a>	<a href="#">AJ0-8378</a>
SCX	(SA, Strong Cation Exchanger)	2.5 - 7.5	<a href="#">AJ0-4307</a>	<a href="#">AJ0-4308</a>	—	<a href="#">AJ0-8595</a>	<a href="#">AJ0-8596</a>
SAX	(SB, Strong Anion Exchanger)	2.5 - 7.5	—	<a href="#">AJ0-4311</a>	—	—	—
RP-1	(Reversed Phase - Polymer)	0 - 14	—	<a href="#">AJ0-5809</a>	<a href="#">AJ0-7368</a>	<a href="#">AJ0-8358</a>	—
Polar-RP	(Ether-linked Phenyl)	1.5 - 7	<a href="#">AJ0-6075</a>	<a href="#">AJ0-6076</a>	<a href="#">AJ0-7276</a>	<a href="#">AJ0-7845</a>	—
Fusion-RP	(C18 Polar Embedded)	1.5 - 10	<a href="#">AJ0-7556</a>	<a href="#">AJ0-7557</a>	<a href="#">AJ0-7558</a>	<a href="#">AJ0-7844</a>	—
AQ C18	(Polar Endcapped C18)	1.5 - 7.5	<a href="#">AJ0-7510</a>	<a href="#">AJ0-7511</a>	<a href="#">AJ0-7512</a>	<a href="#">AJ0-7843</a>	<a href="#">AJ0-8305</a>
Gemini™ NX-C18	(C18 Twin-NX™ Technology)	1 - 12	<a href="#">AJ0-8367</a>	<a href="#">AJ0-8368</a>	<a href="#">AJ0-8369</a>	<a href="#">AJ0-8370</a>	<a href="#">AJ0-8371</a>
Gemini C18	(C18 Twin™ Technology)	1 - 12	<a href="#">AJ0-7596</a>	<a href="#">AJ0-7597</a>	<a href="#">AJ0-7598</a>	<a href="#">AJ0-7846</a>	<a href="#">AJ0-8308</a>
Gemini C6-Phenyl	(C6-Phenyl Twin Technology)	1 - 12	<a href="#">AJ0-7914</a>	<a href="#">AJ0-7915</a>	<a href="#">AJ0-9156</a>	<a href="#">AJ0-9157</a>	<a href="#">AJ0-9158</a>
Luna™ Omega Polar C18	(Polar Functional C18)	1.5 - 10	<a href="#">AJ0-7600</a>	<a href="#">AJ0-7601</a>	<a href="#">AJ0-9519</a>	<a href="#">AJ0-7603</a>	<a href="#">AJ0-7604</a>
Luna Omega PS C18	(Mixed-Mode C18)	1.5 - 10	<a href="#">AJ0-7605</a>	<a href="#">AJ0-7606</a>	<a href="#">AJ0-9520</a>	<a href="#">AJ0-7608</a>	<a href="#">AJ0-7609</a>
Cartridges for Chiral			/10pk	/10pk	/3pk	ea	ea
<i>For use with chiral columns, such as Lux™ Cellulose-1, -2, -3, -4, i-Cellulose-5, i-Amylose-1, -3, &amp; Amylose-1, -2 (Phenomenex); CHIRALCEL® OD-H®, OJ-H® &amp; CHIRALPAK® AD®-H, IA®, IC®, IG® (DAICEL Corporation)</i>							
Lux i-Amylose-1	Amylose tris (3, 5-dimethylphenylcarbamate)	2 - 9	—	<a href="#">AJ0-8641</a>	<a href="#">AJ0-8642</a>	<a href="#">AJ0-8643</a>	<a href="#">AJ0-8644</a>
Lux i-Amylose-3	Amylose tris (3-chloro-5-methylphenylcarbamate)	2 - 9	<a href="#">AJ0-8651</a>	<a href="#">AJ0-8650</a>	<a href="#">AJ0-8652</a>	<a href="#">AJ0-8653</a>	<a href="#">AJ0-8654</a>
Lux i-Cellulose-5	Cellulose tris (3, 5-dichlorophenylcarbamate)	2 - 9	<a href="#">AJ0-8631</a>	<a href="#">AJ0-8632</a>	<a href="#">AJ0-8633</a>	<a href="#">AJ0-8634</a>	—
Lux Cellulose-1	Cellulose tris (3, 5-dimethylphenylcarbamate)	2 - 9	<a href="#">AJ0-8402</a>	<a href="#">AJ0-8403</a>	<a href="#">AJ0-8404</a>	<a href="#">AJ0-8405</a>	<a href="#">AJ0-8406</a>
Lux Cellulose-2	Cellulose tris (3-chloro-4-methylphenylcarbamate)	2 - 9	<a href="#">AJ0-8398</a>	<a href="#">AJ0-8366</a>	<a href="#">AJ0-8399</a>	<a href="#">AJ0-8400</a>	—
Lux Cellulose-3	Cellulose tris (4-methylbenzoate)	2 - 9	<a href="#">AJ0-8621</a>	<a href="#">AJ0-8622</a>	<a href="#">AJ0-8623</a>	<a href="#">AJ0-8624</a>	<a href="#">AJ0-8625</a>
Lux Cellulose-4	Cellulose tris (4-chloro-3-methylphenylcarbamate)	2 - 9	<a href="#">AJ0-8626</a>	<a href="#">AJ0-8627</a>	<a href="#">AJ0-8628</a>	<a href="#">AJ0-8629</a>	<a href="#">AJ0-8630</a>
Lux Amylose-1	Amylose tris (3, 5-dimethylphenylcarbamate)	2 - 9	<a href="#">AJ0-9337</a>	<a href="#">AJ0-9336</a>	<a href="#">AJ0-9344</a>	<a href="#">AJ0-9338</a>	<a href="#">AJ0-9339</a>
Lux AMP	—	1 - 11.5	<a href="#">AJ0-8475</a>	<a href="#">AJ0-8476</a>	—	—	—
HPLC Guard Cartridge Holders (one-time purchase only)			/kit	/holder	/kit	/kit	/kit
Reusable Holder			<a href="#">KJ0-4282</a>	<a href="#">AJ0-9281</a>	<a href="#">AJ0-8223</a>	<a href="#">AJ0-8277</a>	
SFC Guard Cartridge Holders			/kit	/holder	/kit	/kit	/kit
Reusable Holder			<a href="#">KJ0-4282</a>	<a href="#">AJ0-9281</a>	<a href="#">AJ0-8617</a>	<a href="#">AJ0-8618</a>	

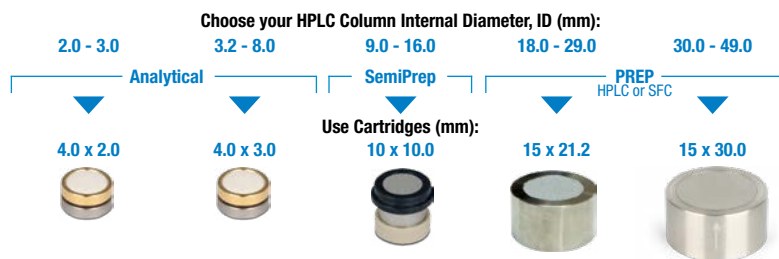
\*For all core-shell and/or < 3µm particle columns use 2.1 to 4.6mm ID SecurityGuard ULTRA Holder and Cartridges, see page 335

Continued on next page

## Cartridges and Holders (cont'd)

Step 1: Choose column ID

Step 2: Match column phase



### Ordering Information (continued)

Material	Description	pH Stability					
<b>Cartridges for Core-Shell Media</b>			—	—	/3pk	ea	ea
<i>For core-shell media columns, such as Kinetex™ and Aeris™ (Phenomenex).</i>							
EVO C18	(ODS, Octadecyl)	1 - 12	*	*	AJO-9306	AJO-9304	AJO-9305
C18	(ODS, Octadecyl)	1.5 - 8.5	*	*	AJO-9278	AJO-9145	AJO-9204
C8	(MOS, Octyl)	1.5 - 8.5	*	*	—	AJO-9205	—
PFP	(Pentafluorophenyl)	1.5 - 8.5	*	*	—	AJO-9146	—
F5	(Pentafluorophenylpropyl)	1.5 - 8.5	*	*	AJO-9323	AJO-9324	—
Phenyl-Hexyl	(Phenylhexyl)	1.5 - 9	*	*	—	AJO-9147	AJO-9216
Biphenyl	(Biphenyl)	1.5 - 8.5	*	*	AJO-9280	AJO-9272	—
HILIC	(HILIC)	2 - 7.5	*	*	—	AJO-9277	—
C18-Peptide	(ODS, Octadecyl)	1.5 - 9	*	*	AJO-9317	AJO-9318	—
<b>Cartridges for Protein and Polypeptide Reversed Phase</b>			/10pk	/10pk	/3pk	ea	ea
<i>For use with silica columns for separation of proteins &amp; peptides, such as Jupiter™ (Phenomenex) and other widepore or 300 Å brands.</i>							
Widepore C18	(ODS, Octadecyl)	1.5 - 10	AJO-4320	AJO-4321	AJO-7224	AJO-7230	AJO-8313
Widepore C5	(Pentyl)	1.5 - 10	AJO-4326	AJO-4327	AJO-7371	—	—
Widepore C4	(Butyl)	1.5 - 10	AJO-4329	AJO-4330	AJO-7225	AJO-7231	AJO-8314
<i>For use with columns like Biozen™ (Phenomenex).</i>							
Peptide PS-C18 3µm	(Positive Functional C18)	1.5 - 8.5	AJO-7605	AJO-7606	—	—	—
Ion-Exchange	(Weak Cation Exchanger)	2 - 12	AJO-9401	AJO-9400	—	—	—
<b>Cartridges for Synthetic DNA / RNA Analysis</b>			/10pk	/10pk	/3pk	ea	ea
<i>For use with columns like Clarity™ (Phenomenex).</i>							
Oligo-RP™	(C18 Twin Technology)	1 - 12	AJO-8134	AJO-8135	AJO-8136	AJO-8210	—
Oligo-XT	(ODS, Octadecyl)	1 - 12	*	*	AJO-9516	AJO-9517	AJO-9518
<b>Cartridges for Silica GFC (Gel Filtration Chromatography)</b>			—	/10pk	—	ea	—
<i>(Aqueous SEC) For use with silica GFC columns, such as Yarra™ and BioSep™ (Phenomenex); ZORBAX™ GF-Series (Agilent); Bio-Sil® (Bio-Rad®).</i>							
GFC-2000	—	2 - 7.5	—	AJO-4487	—	AJO-8588	—
GFC-3000	—	2 - 7.5	—	AJO-4488	—	AJO-8589	—
GFC-4000	—	2 - 7.5	—	AJO-4489	—	AJO-8590	—
<b>Cartridges for Polymer GPC (Gel Permeation Chromatography)</b>			—	/3pk	—	—	—
<i>(Organic GPC) For use with polymer GPC columns, such as Phenogel™ (Phenomenex); PLgel™ (Agilent®); SDV® (PSS); Styragel® (Waters®); GPC Series (Shodex®); TSKgel® (Tosoh Bioscience®)</i>							
GPC***	—	0 - 14	—	AJO-9292	—	—	—
<b>Cartridges for Carbohydrate/Organic Acid</b>			—	/10pk	—	—	—
<i>For organic acid and carbohydrate analysis, such as Rezex™ (Phenomenex); Aminex® (Bio-Rad); Sugar-Pak™ (Waters).</i>							
Carbo-H <sup>+</sup>	—	1 - 8	—	AJO-4490	—	—	—
Carbo-Ag <sup>+</sup>	—	Neutral	—	AJO-4491	—	—	—
Carbo-Pb <sup>+2</sup>	—	Neutral	—	AJO-4492	—	—	—
Carbo-Ca <sup>+2</sup>	—	Neutral	—	AJO-4493	—	—	—
<b>HPLC Guard Cartridge Holders (one-time purchase only)</b>			/kit	/holder	/kit	/kit	/kit
Reusable Holder	—	—	KJO-4282	AJO-9281	AJO-8223	AJO-8277	—
							—
<b>SFC Guard Cartridge Holders</b>			/kit	/holder	/kit	/kit	/kit
Reusable Holder	—	—	KJO-4282	AJO-9281	AJO-8617	AJO-8618	—

\*For all core-shell and/or < 3µm particle columns use 2.1 to 4.6mm ID SecurityGuard ULTRA Holder and Cartridges, see page 335

\*\*For use with saccharide and oligosaccharide columns in Ag<sup>+</sup> form.

\*\*\*Not compatible with HFIP solvent.

## UHPLC Column Protection

- Extends HPLC, core-shell, and < 3µm particle column lifetime
- Virtually no change in chromatography
- Pressure rated to 20000 psi (1378 bar)
- Simple to use

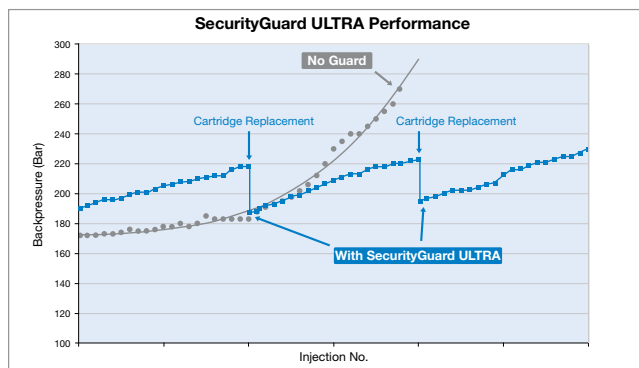
### Universal Fit

Use SecurityGuard ULTRA with virtually all UHPLC columns 2.1 to 4.6mm ID. The extremely low dead volume of this unique product minimizes sample peak dispersion. It will efficiently remove microparticulates and chemical contaminants from the flow stream without contributing to system backpressure or dead volume (<0.3µL).

### Increases Column Lifetime, Guaranteed!

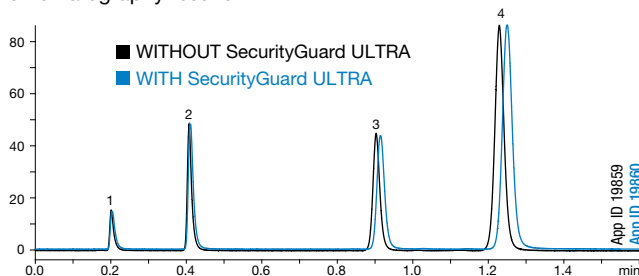
When contaminants and particulates build up at the head of your column or on the guard cartridge, system backpressures can increase dramatically. By simply replacing the SecurityGuard ULTRA cartridge, instead of your column, you are able to regain normal operating conditions and reclaim original column performance.

### Accelerated lifetime test using endogenous biological matrix on Kinetex 2.6µm C18 50 x 4.6 mm ID column



### Protects with No Loss of Column Performance!

SecurityGuard ULTRA's unique design minimizes sample peak dispersion to maintain column performance without altering your chromatography results.



Conditions for both columns:

Column: Kinetex 1.7µm XB-C18  
 Dimensions: 50 x 2.1 mm  
 Guard Cartridge: SecurityGuard ULTRA C18 (ODS) 2.1 mm ID  
 Part No.: [AJ0-8768](#)  
 Mobile Phase: Acetonitrile / Water (50:50)  
 Flow Rate: 0.5 mL/min

Detection: UV @ 254 nm  
 Sample: 1. Uracil  
 2. Acetophenone  
 3. Toluene  
 4. Naphthalene

See SecurityGuard ULTRA in action:  
[www.phenomenex.com/SecurityGuardULTRA](http://www.phenomenex.com/SecurityGuardULTRA)

2012 R&D 100 Award Recipient



## SecurityGuard ULTRA Cartridges

### Ordering Information

Material	Description	pH Stability	Column ID (mm)		
			2.1	3.0	4.6
<b>Cartridges for General Purpose/ Pharmaceutical</b>					
			/3pk	/3pk	/3pk
EVO C18	(ODS, Octadecyl)	1.0 – 12.0	<a href="#">AJ0-9298</a>	<a href="#">AJ0-9297</a>	<a href="#">AJ0-9296</a>
C18	(ODS, Octadecyl)	1.5 – 8.5*	<a href="#">AJ0-8782</a>	<a href="#">AJ0-8775</a>	<a href="#">AJ0-8768</a>
C8	(MOS, Octyl)	1.5 – 8.5*	<a href="#">AJ0-8784</a>	<a href="#">AJ0-8777</a>	<a href="#">AJ0-8770</a>
PFP	(Pentafluorophenyl)	1.5 – 8.5*	<a href="#">AJ0-8787</a>	<a href="#">AJ0-8780</a>	<a href="#">AJ0-8773</a>
F5	(Pentafluorophenyl)	1.5 – 8.5*	<a href="#">AJ0-9322</a>	<a href="#">AJ0-9321</a>	<a href="#">AJ0-9320</a>
Biphenyl	(Biphenyl)	1.5 – 8.5*	<a href="#">AJ0-9209</a>	<a href="#">AJ0-9208</a>	<a href="#">AJ0-9207</a>
Phenyl	(Phenylhexyl)	1.5 – 8.5*	<a href="#">AJ0-8788</a>	<a href="#">AJ0-8781</a>	<a href="#">AJ0-8774</a>
HILIC	(HILIC)	2.0 – 7.5	<a href="#">AJ0-8786</a>	<a href="#">AJ0-8779</a>	<a href="#">AJ0-8772</a>
Polar C18	(Polar Functional C18)	1.5 – 8.5*	<a href="#">AJ0-9532</a>	<a href="#">AJ0-9531</a>	<a href="#">AJ0-9530</a>

### Cartridges for General Purpose/Pharmaceutical (Fully Porous Columns)

For fully porous columns like Luna™ Omega (Phenomenex)

C18	(ODS, Octadecyl)	1.5 – 8.5*	<a href="#">AJ0-9502</a>	<a href="#">AJ0-9501</a>	<a href="#">AJ0-9500</a>
Polar C18	(Polar Functional C18)	1.5 – 8.5*	<a href="#">AJ0-9505</a>	—	—
PS C18	(Positive Functional C18)	1.5 – 8.5*	<a href="#">AJ0-9508</a>	—	—

### Cartridges for Protein and Peptide Reversed Phase

For use with columns like Aeris™ (Phenomenex)

Widepore C18	(ODS, Octadecyl)	1.5 – 8.5*	<a href="#">AJ0-8783</a>	—	<a href="#">AJ0-8769</a>
Widepore C8	(MOS, Octyl)	1.5 – 8.5*	<a href="#">AJ0-8785</a>	—	<a href="#">AJ0-8771</a>
Widepore C4	(Butyl)	1.5 – 8.5*	<a href="#">AJ0-8899</a>	—	<a href="#">AJ0-8901</a>
Peptide C18	(ODS, Octadecyl)	1.5 – 8.5*	<a href="#">AJ0-8948</a>	—	<a href="#">AJ0-8946</a>

For use with columns like Biozen™ (Phenomenex)

Glycan	(Amide Polyol)	2.0 – 7.5	<a href="#">AJ0-9800</a>	—	—
Peptide PS-C18 1.6µm (Positive Functional C18)		1.5 – 8.5*	<a href="#">AJ0-9803</a>	—	—
Peptide XB-C18	(ODS, Octadecyl)	1.5 – 9.0**	<a href="#">AJ0-9806</a>	—	<a href="#">AJ0-9808</a>
WidePore C4	(Butyl)	1.5 – 9.0**	<a href="#">AJ0-9816</a>	—	<a href="#">AJ0-9818</a>
Intact XB-C18	(MOS, Octyl)	1.5 – 9.0**	<a href="#">AJ0-9812</a>	—	<a href="#">AJ0-9814</a>
Oligo	(ODS, Octadecyl)	1.0 – 12.0	<a href="#">AJ0-9820</a>	—	<a href="#">AJ0-9822</a>
SEC-2	(Diol)	1.5 – 8.5	—	—	<a href="#">AJ0-9850</a>
SEC-3	(Diol)	1.5 – 8.5	—	—	<a href="#">AJ0-9851</a>

### Cartridges for Synthetic DNA / RNA Analysis

For use with columns like Clarity™ (Phenomenex)

Oligo-MS C18	(ODS, Octadecyl)	1.5 – 8.5*	<a href="#">AJ0-9068</a>	—	—
Oligo-XT	(ODS, Octadecyl)	1.0 – 12.0	<a href="#">AJ0-9515</a>	—	<a href="#">AJ0-9514</a>

### Cartridges for Silica GFC (Gel Filtration Chromatography)

(Aqueous SEC) For use with silica GFC columns such as Yarra™ (Phenomenex)

X150	—	1.5 – 8.5	—	—	<a href="#">AJ0-9512</a>
X300	—	1.5 – 8.5	—	—	<a href="#">AJ0-9513</a>

\*pH stable 1.5–8.5 under gradient conditions, pH stable 1.5–10 under isocratic conditions.  
 \*\*pH range is 1.5–9 under gradient conditions, pH range is 1.5–10 under isocratic conditions.  
[AJ0-9000](#) is the universal holder designed for use with 2.1 mm, 3.0 mm and 4.6 mm ID cartridges.



Holder



Holder with cartridge, assembled

## SecurityGuard ULTRA Cartridge Holder

### Ordering Information

Part No.	Description	Unit
<a href="#">AJ0-9000</a>	SecurityGuard ULTRA Cartridge Holder	ea

Initial SecurityGuard ULTRA installation and cartridge replacement requires 3 wrenches, which must be purchased separately: one 3/8 in. wrench ([AQ0-8959](#); fits Kinetex, Aeris, and Oligo-MS column end-fittings), and two 5/16 in. wrenches ([AQ0-8903](#); fits ULTRA cartridge and holder). See p. 427

## SecurityLINK UHPLC Connections in a Click

The SecurityLINK UHPLC fingertight fitting system simplifies your system and column connections and provides consistent performance with torque limiting technology that prevents column damaging overtightening.

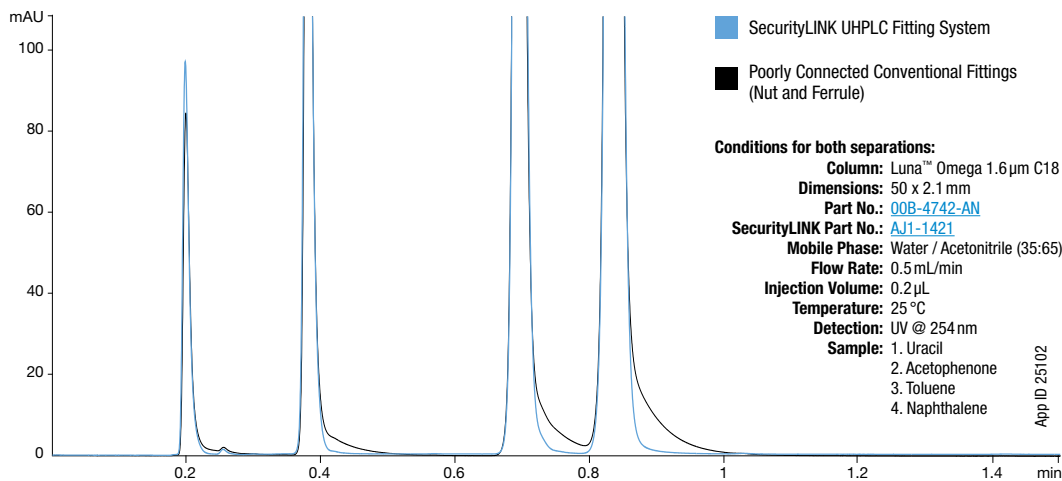


### SecurityLINK UHPLC Fittings

- No tools required for quick and easy installation
- Fitting self-adjusts at column inlet to ensure zero dead-volume for better chromatographic results
- Torque limiting technology prevents system and column port damage
- UHPLC and HPLC compatibility: pressure rated to 19000 psi (1310 bar)

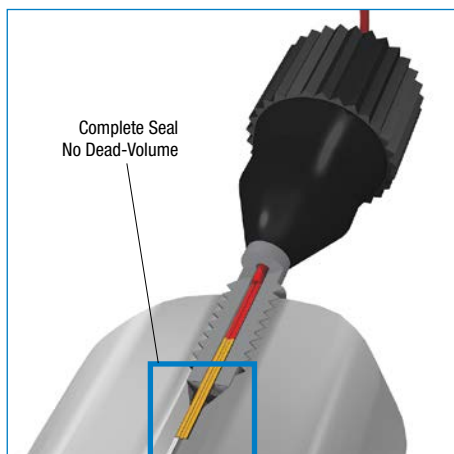
### SecurityLINK vs. Poorly Connected Conventional Fittings

Poorly connected fittings are often the causes of carryover, band broadening, and peak tailing. SecurityLINK offers zero dead-volume connections every time.

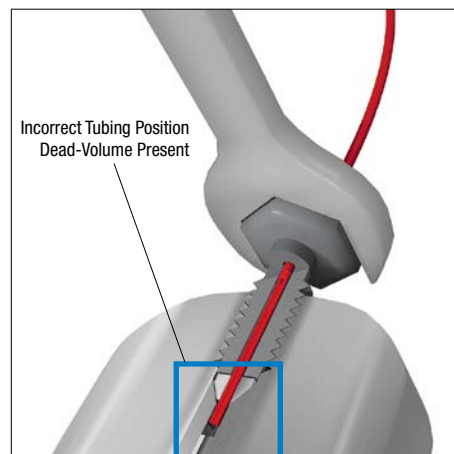


SECURITYLINK | UHPLC

SecurityLINK UHPLC Fitting System



Poorly Connected Conventional Fittings (Nut and Ferrule)



VS.



## Installation Instructions

1. Insert SecurityLINK UHPLC fitting into column port



2. Fingertighten until first "CLICK" feedback is received. Connection Complete!



## Ordering Information

### PEEKsil™



#### PEEKsil Double-Sided 10-32 Fittings for 1/16 in. Ports

Part No.	ID (µm)	Length (mm)
<a href="#">AJ1-2111</a>	25	100
<a href="#">AJ1-2121</a>	25	150
<a href="#">AJ1-2141</a>	25	250
<a href="#">AJ1-2151</a>	25	300
<a href="#">AJ1-2171</a>	25	500
<a href="#">AJ1-2191</a>	25	750
<a href="#">AJ1-21A1</a>	25	1000
<a href="#">AJ1-2211</a>	50	100
<a href="#">AJ1-2221</a>	50	150
<a href="#">AJ1-2231</a>	50	200
<a href="#">AJ1-2241</a>	50	250
<a href="#">AJ1-2251</a>	50	300
<a href="#">AJ1-2271</a>	50	500
<a href="#">AJ1-2291</a>	50	750
<a href="#">AJ1-22A1</a>	50	1000
<a href="#">AJ1-2321</a>	75	150
<a href="#">AJ1-2341</a>	75	250
<a href="#">AJ1-2371</a>	75	500
<a href="#">AJ1-23A1</a>	75	1000
<a href="#">AJ1-2411</a>	100	100
<a href="#">AJ1-2421</a>	100	150
<a href="#">AJ1-2441</a>	100	250
<a href="#">AJ1-2471</a>	100	500
<a href="#">AJ1-24A1</a>	100	1000

### PEEKsil



#### PEEKsil Single-Sided Fittings 1/32 in. OD PEEKsil Tubing with One 10-32 Fitting for 1/16 in. Ports, and One Side with No Fitting

Part No.	ID (µm)	Length (mm)
<a href="#">AJ1-2124</a>	25	150
<a href="#">AJ1-2174</a>	25	500
<a href="#">AJ1-2194</a>	25	750
<a href="#">AJ1-21A4</a>	25	1000
<a href="#">AJ1-21B1</a>	25	1500
<a href="#">AJ1-2224</a>	50	150
<a href="#">AJ1-2274</a>	50	500
<a href="#">AJ1-2294</a>	50	750
<a href="#">AJ1-22A4</a>	50	1000

SecurityLINK tubing material includes a sleeve that provides: ID, length and part number information.



The "CLICK" Feedback indicates the SecurityLINK Connection is Secure! This Prevents Overtightening & Saves Your Column.

## Phenomenex Column/Tubing ID Recommendation Chart

	Nano	Microbore	Analytical			Semi-Prep		
Column ID	0.05 - 0.1 mm (50 µm - 100 µm)	0.3 - 0.5 mm (300 µm - 500 µm)	1 mm	2.1 mm	3 mm	4.6 mm	7.8 mm	9.0 - 16.0 mm
Tubing ID	25 µm	50 µm	50 µm - 75 µm	100 µm	100 µm	100 µm	120 µm	254 µm

### PEEK-Lined Stainless Steel



#### PEEK-Lined Stainless Steel Double-Sided 10-32 Fittings for 1/16 in. Ports

Part No.	ID (µm)	Length (mm)
<a href="#">AJ1-3121</a>	25	150
<a href="#">AJ1-3141</a>	25	250
<a href="#">AJ1-3161</a>	25	350
<a href="#">AJ1-3171</a>	25	500
<a href="#">AJ1-3181</a>	25	600
<a href="#">AJ1-3221</a>	50	150
<a href="#">AJ1-3241</a>	50	250
<a href="#">AJ1-3261</a>	50	350
<a href="#">AJ1-3271</a>	50	500
<a href="#">AJ1-3281</a>	50	600
<a href="#">AJ1-3321</a>	75	150
<a href="#">AJ1-3341</a>	75	250
<a href="#">AJ1-3361</a>	75	350
<a href="#">AJ1-3371</a>	75	500
<a href="#">AJ1-3381</a>	75	600
<a href="#">AJ1-3421</a>	100	150
<a href="#">AJ1-3441</a>	100	250
<a href="#">AJ1-3461</a>	100	350
<a href="#">AJ1-3471</a>	100	500
<a href="#">AJ1-3481</a>	100	600

### Stainless Steel



#### Stainless Steel Double-Sided 10-32 Fittings for 1/16 in. Ports

Part No.	ID (µm)	Length (mm)
<a href="#">AJ1-14A1</a>	100	1000
<a href="#">AJ1-1411</a>	100	100
<a href="#">AJ1-1414</a>	100	100
<a href="#">AJ1-1421</a>	100	150
<a href="#">AJ1-1441</a>	100	250
<a href="#">AJ1-1461</a>	100	350
<a href="#">AJ1-1471</a>	100	500
<a href="#">AJ1-1481</a>	100	600
<a href="#">AJ1-15A1</a>	125	1000
<a href="#">AJ1-1521</a>	125	150
<a href="#">AJ1-1541</a>	125	250
<a href="#">AJ1-1561</a>	125	350
<a href="#">AJ1-1571</a>	125	500
<a href="#">AJ1-1581</a>	125	600
<a href="#">AJ1-1611</a>	254	100
<a href="#">AJ1-1621</a>	254	150
<a href="#">AJ1-1641</a>	254	250
<a href="#">AJ1-1661</a>	254	350
<a href="#">AJ1-1671</a>	254	500
<a href="#">AJ1-1681</a>	254	600



By Showa Denko K.K.

- High efficiency polymer columns
- Wide application range



## Guide for Shodex Column Selection

Solubility	Molecular Weight	Separation Mode	Column	Page	
Sample	Water-insoluble	over 2000	SEC	Inquire	
		under 2000	SEC RPC	Inquire RSpak DE-413, 413L, DM-614	340
	Water-soluble	over 2000	SEC	OHpak SB-803-806HQ, SUGAR KS-803-804, PROTEIN KW-802.5-804	339
			IEC	IEC QA-825, DEAE-825, SP-825, CM-825	340
			HIC	HIC PH-814	340
		under 2000	SEC	SB-802-802.5HQ, SUGAR KS-801, 803-804	339
			LEC	SUGAR SC1011, SP0810	340
			IEX	RSpak KC-811, SUGAR SH1011, SUGAR SH1821	339, 340
			IC	IC SI-90 4E, SI-50 4E, IC I-524A, YK-421	340
			RPC	RSpak DE-613, 413	340
NPC	SUGAR SZ5532	340			

# chat now

If you need additional support, chat with a live technical expert!

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By Showa Denko K.K.

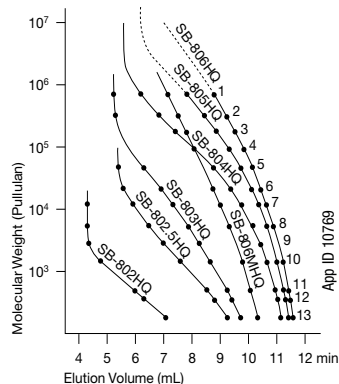
## GFC (Aqueous GPC) Columns

Shodex has a wide variety of columns for GFC. Three types of GFC columns packed with different gel materials are available.

Series Name	Packing Material	Applications
OHpak SB-800HQ	PHM gel	Used for general purpose GFC of water-soluble polymers, proteins and enzymes
SUGAR KS-800	Sulfonated PS gel	Mono, di, tri, oligo and polysaccharides, starches and celluloses
PROTEIN KW-800	Porous silica gel	GFC of proteins, glycoproteins and peptides

### Calibration Curves for OHpak SB-800HQ Series

Column: Shodex OHpak SB-800HQ  
 Dimensions: 8 x 300 mm  
 Eluent: Water  
 Sample: 1. P-800  
 2. P-400  
 3. P-200  
 4. P-100  
 5. P-50  
 6. P-20  
 7. P-10  
 8. P-5  
 9. P-3  
 10. P-1  
 11. Maltotriose  
 12. Maltose  
 13. Glucose



### Ordering Information

#### Aqueous GPC Columns

Column Type/ Part No.	ID x Length (mm)	Plate Number	Exclusion Limit
OHpak SB-802.5HQ	8 x 300	>15,000	1 x 10 <sup>4</sup>
OHpak SB-803HQ	8 x 300	>15,000	1 x 10 <sup>5</sup>
OHpak SB-804HQ	8 x 300	>15,000	1 x 10 <sup>6</sup>
OHpak SB-806HQ	8 x 300	>10,000	(2 x 10 <sup>7</sup> )
OHpak SB-806MHQ	8 x 300	>10,000	(2 x 10 <sup>7</sup> )
SUGAR KS-801 (Na <sup>+</sup> )	8 x 300	>15,000	1 x 10 <sup>3</sup>
SUGAR KS-803 (Na <sup>+</sup> )	8 x 300	>15,000	5 x 10 <sup>4</sup>
SUGAR KS-804 (Na <sup>+</sup> )	8 x 300	>15,000	4 x 10 <sup>5</sup>
PROTEIN KW-802.5	8 x 300	>20,000	5 x 10 <sup>4</sup>
PROTEIN KW-803	8 x 300	>20,000	1.5 x 10 <sup>5</sup>

Note: Exclusion Limits in parentheses, ( ), are estimated values.

## Calibration Standards

### Ordering Information

#### Calibration Standards

Standard Type/Part No.	Material	Content	MW Range	Applications
STANDARD P-82	Pullulan	0.2 g x 8 grades	5,000 - 800,000	GFC (aqueous GPC)

## Columns for Organic Acids

KC-811 enables an effective organic acids separation using a mixed mode of IEX, SEC and P&A. Organic acids also can be separated by RPC using RSpak DE-613.

### Ordering Information

#### RSpak

Column Type/ Part No.	ID x Length (mm)	Plate Number	Packing Material	Counter Ion
RSpak KC-811	8 x 300	>17,000	S-DVB gel	H+

\*Note: RSpak KC-811 was formerly known as Ionpak KC-811.

By Showa Denko K.K.

## Ion Chromatography Columns

- Great alternative to Dionex® IonPac® AS4, AS4A, and AS14 columns
- High efficiency, general purpose IC column

Shodex offers an innovative IC column for the suppressor method that improves both the separation speed and resolution of anions in most matrices. With high theoretical plates (>5000/m for Sulfate), the column easily and efficiently separates organic and inorganic anions such as EPA Method 300 analytes, acetate, formate, methacrylate and oxalate. High loading and exceptional resistance to loading combine with features such as improved separation of the fluoride peak from the water dip.

### Ordering Information

#### IC Columns

Column Type/ Part No.	ID x Length (mm)	Plate Number	Packing Material	Functional Group	Applications
IC SI-90 4E	4.0 x 250	>5,000 (S04)	PVA	Quaternary ammonium	Inorganic anions and organic acids
IC SI-90 G	4.6 x 10	(Guard)	—	—	(General purpose)
IC SI-50 4E*	4.0 x 250	>14,000	PVA	Quaternary ammonium	Inorganic anions and organic acids
IC I-524A	4.6 x 100	>2,000	PHM gel	Quaternary ammonium	Inorganic anions
IC YK-421	4.6 x 125	>2,500	Hydrophilic Polymer	Carboxyl Coated Silica	Simultaneous separation of monovalent and divalent cations

\*Use IC SI-90G guard.

## Columns for Proteins and Nucleic Acids

### Ion-Exchange Columns

IEC series columns are suited for the analysis of proteins and nucleic acids.

### Ordering Information

#### IEC Series Columns

Column Type/Part No.	ID x Length (mm)	Plate Number	Packing Material	Functional Group
IEC DEAE-825	8 x 75	>2,000	PHM gel	Diethylaminoethyl (weak anion)

#### Other Columns

Column Type/Part No.	ID x Length (mm)	Plate Number	Packing Material	Functional Group	Separation Mode	Applications
HIC PH-814	8 x 75	>2,000	PHM gel	Phenyl	HIC	Proteins

## Columns for Sugar Analysis

### Ordering Information

#### Sugar Columns

Column Type/ Part No.	ID x Length (mm)	Plate Number	Exclusion Limit	Packing Material	Counter Ion	Separation Mode
SUGAR SH1011	8 x 300	>15,000	1,000	S-DVB gel	H <sup>+</sup>	SEC + IEX
SUGAR SH1821	8 x 300	>15,000	10,000	S-DVB gel	H <sup>+</sup>	SEC + IEX
SUGAR SC1011	8 x 300	>12,000	1,000	S-DVB gel	Ca <sup>2+</sup>	SEC + IEX
SUGAR SP0810	8 x 300	>10,000	1,000	S-DVB gel	Pb <sup>2+</sup>	SEC + LEC
SUGAR SC1211	6 x 250	>5,000		S-DVB gel	Ca <sup>2+</sup>	P&A + LEC
SUGAR SZ5532	6 x 150	>5,000		S-DVB gel	Zn <sup>2+</sup>	P&A + LEC
SUGAR KS-801	8 x 300	>15,000	1,000	S-DVB gel	Na <sup>+</sup>	SEC + LEC



For improved carbohydrate retention and separation under HILIC conditions, see Luna Omega SUGAR p. 298

## Polymer-Based Reversed Phase Columns

### RSpak

### Applications

DE	Suited for wide applications because its characteristics are similar to those of ODS columns.
DM	Suited for analysis of amino acids and polypeptides.

### Ordering Information

#### RSpak Columns

Column Type/Part No.	Plate Number	ID x Length (mm)
RSpak DE-613	>7,000	6.0 x 150
RSpak DE-413	>11,000	4.6 x 150
RSpak DE-G (DE-613P)	(guard column)	4.6 x 10
RSpak DM-614	>4,000	6.0 x 150

# SphereClone™ Guaranteed Replacement to Spherisorb®

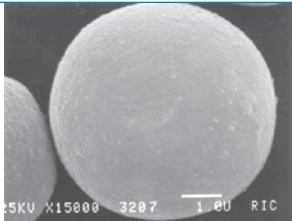
## Guaranteed Replacement to Spherisorb®

- Highly reproducible
- Long column life
- Mimics performance of Waters® Spherisorb®
- Economically priced

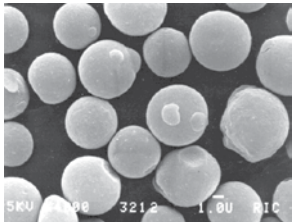
Phenomenex SphereClone columns have been developed to provide chromatographic behavior that mimics that of Waters Spherisorb columns. For comparative applications, please contact your local Phenomenex representative.

### SphereClone™

SEM of Base Silica



Surface  
15,000x Magnification



Physical Mass Distribution and Shape  
4,000x Magnification

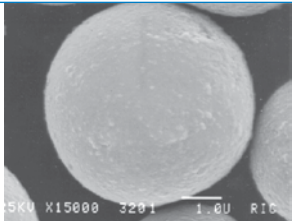
## VS.

### Material Characteristics

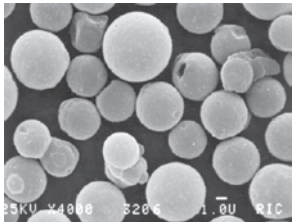
SphereClone™		Spherisorb®†	
3, 5, 10 µm	Particle Size	3, 5, 10 µm	
80 Å	Pore Size	80 Å	
200 m²/g	Surface Area	200 m²/g	
Carbon Load			
—	Silica	—	
6%	C6	6%	
6%	C8	6%	
7%	ODS(1)	6.2%	
12%	ODS(2)	12%	
2%	NH₂	2%	

### Spherisorb®†

SEM of Base Silica



Surface  
15,000x Magnification



Physical Mass Distribution and Shape  
4,000x Magnification

### Ordering Information

3 µm Columns (mm)			SecurityGuard™ Cartridges (mm)	
Phases	50 x 4.6	100 x 4.6	150 x 4.6	4 x 3.0
C8	—	<a href="#">00D-4133-E0</a>	—	<a href="#">AJ0-4290</a>
ODS(1)	—	<a href="#">00D-4134-E0</a>	<a href="#">00F-4134-E0</a>	<a href="#">AJ0-4287</a>
ODS(2)	<a href="#">00B-4135-E0</a>	<a href="#">00D-4135-E0</a>	<a href="#">00F-4135-E0</a>	<a href="#">AJ0-4287</a>
NH₂	—	—	<a href="#">00F-4137-E0</a>	<a href="#">AJ0-4302</a>

for ID: 3.2-8.0 mm

5 µm Columns (mm)			SecurityGuard™ Cartridges (mm)	
Phases	150 x 4.6	250 x 4.6	4 x 3.0	
Silica	<a href="#">00F-4139-E0</a>	<a href="#">00G-4139-E0</a>	<a href="#">AJ0-4348</a>	
C6	<a href="#">00F-4141-E0</a>	<a href="#">00G-4141-E0</a>	—	
C8	<a href="#">00F-4142-E0</a>	<a href="#">00G-4142-E0</a>	<a href="#">AJ0-4290</a>	
ODS(1)	<a href="#">00F-4143-E0</a>	<a href="#">00G-4143-E0</a>	<a href="#">AJ0-4287</a>	
ODS(2)	<a href="#">00F-4144-E0</a>	<a href="#">00G-4144-E0</a>	<a href="#">AJ0-4287</a>	
NH₂	<a href="#">00F-4147-E0</a>	<a href="#">00G-4147-E0</a>	<a href="#">AJ0-4302</a>	
SAX	<a href="#">00F-4149-E0</a>	<a href="#">00G-4149-E0</a>	<a href="#">AJ0-4311</a>	

for ID: 3.2-8.0 mm

10 µm Columns (mm)			SecurityGuard™ Cartridges (mm)	
Phases	250 x 4.6		4 x 3.0	
ODS(2)	<a href="#">00G-4156-E0</a>		<a href="#">AJ0-4287</a>	
SAX	<a href="#">00G-4160-E0</a>		<a href="#">AJ0-4311</a>	

for ID: 3.2-8.0 mm



For SecurityGuard Cartridge Holders and Cartridges, see pp. 330-334

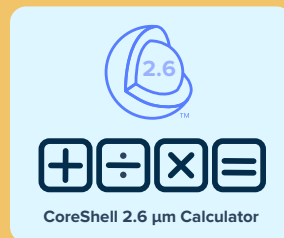
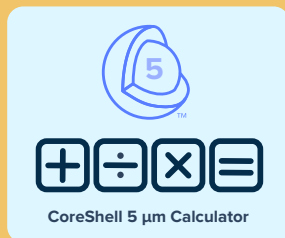
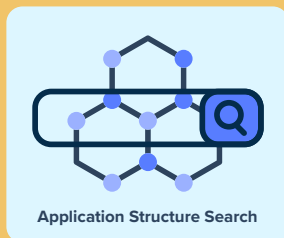
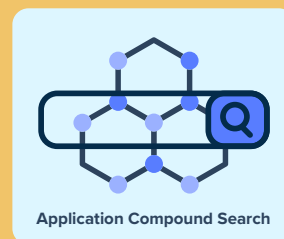
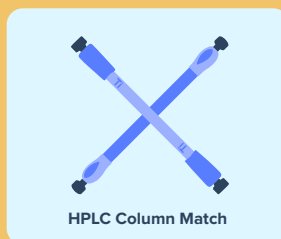
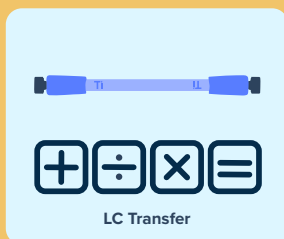
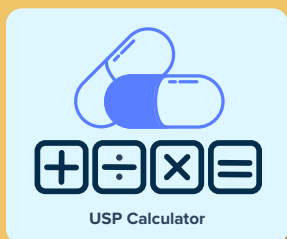
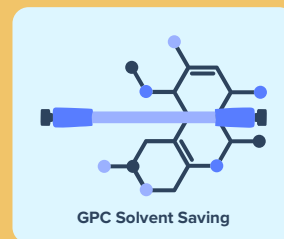
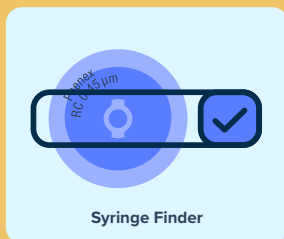
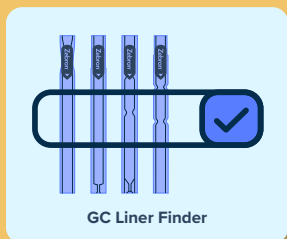
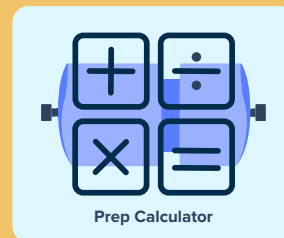
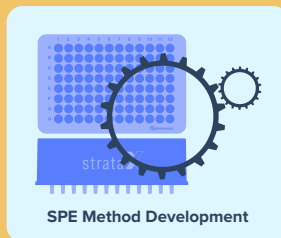
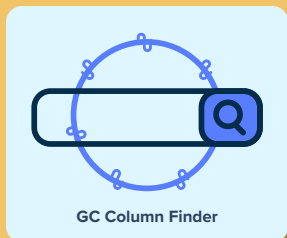
SecurityGuard™ Analytical Cartridges require holder, Part No.: [KJ0-4282](#)

\*Comparative separations may not be representative of all applications.  
\*Spherisorb columns used for comparison studies were purchased from manufacturer.

# Find your Chromatography Columns and Accessories

Using our web tools helps you find what you need quickly and request a sample or place an order with a click.

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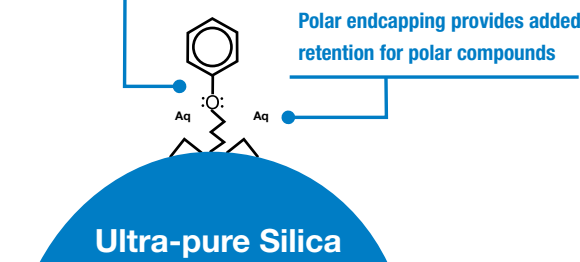
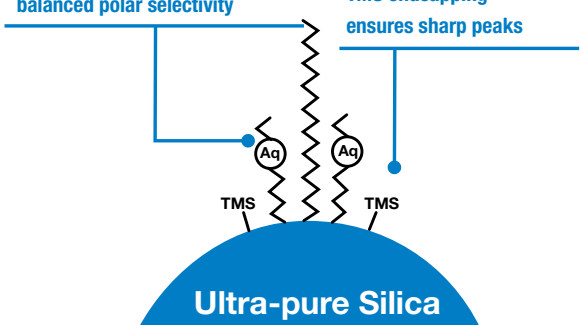
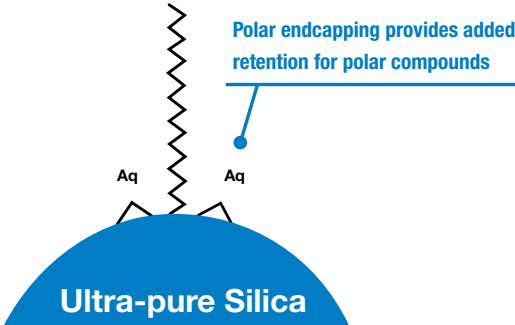
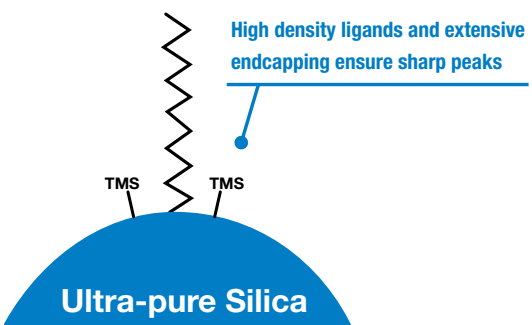
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## Full Range Selectivity for Reversed Phase Separation

Many different mechanisms of retention are utilized within reversed phase chromatography in order to retain and separate target analytes. Whether your compounds are hydrophobic or polar, Synergi columns provide you with a full range of selectivity, ensuring separation of extremely challenging and complex mixtures.

<p><b>Synergi Polar-RP</b> <b>Phenyl Ether-Linked</b> For polar and aromatic mixtures</p> <p>Ether linkage increases aromaticity of the phenyl group and also provides <math>\pi</math>-<math>\pi</math> interactions with conjugated compounds</p> <p>Polar endcapping provides added retention for polar compounds</p>  <p>Ultra-pure Silica</p>	<p><b>Synergi Fusion-RP</b> <b>C18 Polar Embedded</b> Balanced non-polar and polar performance</p> <p>Embedded polar group complements C18 ligand with balanced polar selectivity</p> <p>TMS endcapping ensures sharp peaks</p>  <p>Ultra-pure Silica</p>
<p><b>Synergi Hydro-RP</b> <b>C18 Polar Endcapped</b> Strong non-polar and polar retention</p> <p>Polar endcapping provides added retention for polar compounds</p>  <p>Ultra-pure Silica</p>	<p><b>Synergi Max-RP</b> <b>C12 TMS Endcapped</b> Excellent for basic compounds at neutral pH</p> <p>High density ligands and extensive endcapping ensure sharp peaks</p>  <p>Ultra-pure Silica</p>

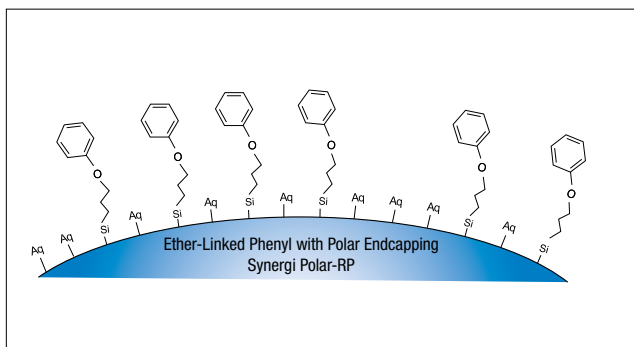


### Material Characteristics

Packing Material	Particle Shape/Size (µm)	Pore Size (Å)	Pore Volume (mL/g)	Surface Area (m <sup>2</sup> /g)	Carbon Load %	Calculated Bonded Phase Coverage (µmole/m <sup>2</sup> )	End Capping
Synergi Max-RP	Spher. 2.5	100	—	400	17	—	TMS
Synergi Hydro-RP	Spher. 2.5	100	—	400	19	—	Hydrophilic
Synergi Polar-RP	Spher. 2.5	100	—	400	11	—	Hydrophilic
Synergi Fusion-RP	Spher. 2.5	100	—	400	12	—	TMS
Synergi Max-RP	Spher. 4, 10	80	1.05	475	17	3.21	TMS
Synergi Hydro-RP	Spher. 4, 10	80	1.05	475	19	2.45	Hydrophilic
Synergi Polar-RP	Spher. 4, 10	80	1.05	475	11	3.15	Hydrophilic
Synergi Fusion-RP	Spher. 4, 10	80	1.05	475	12	N/A	TMS

## Synergi Polar-RP

### An Ether-linked Phenyl Column with Polar Endcapping



#### Synergi Polar-RP

USP: L11

**pH Stability:** 1.5 – 7.0

**Particle Size:** 2.5 µm, 4 µm, and 10 µm

**Phase:** Ether-linked phenyl with polar endcapping

**Application:** For extreme retention of polar and aromatic compounds

**Strength:** Improved peak shape for acidic and basic analytes and aromatic selectivity with methanol containing mobile phases

#### Sample Challenge:

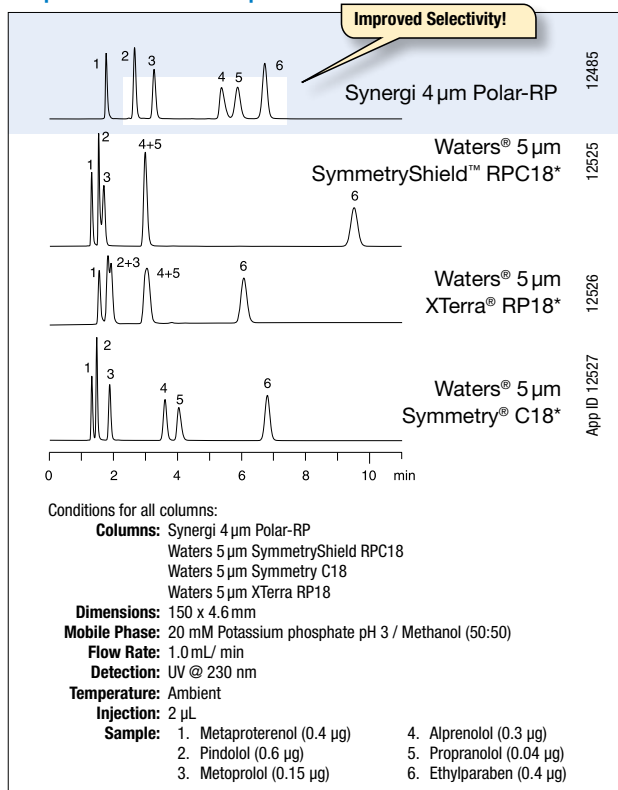
You need greater separation between polar and aromatic compounds with only slight differences chemically or structurally.

#### Selectivity Solution:

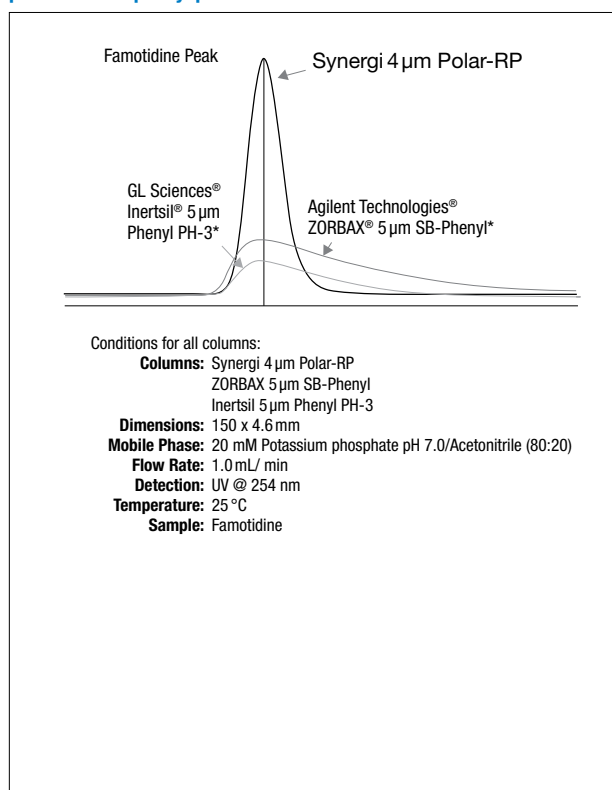
The slightest variations in polarity and aromaticity are exploited by Synergi Polar-RP in order to achieve the greatest separation between polar and/or aromatic compounds.



#### Increased resolution of polar compounds with Synergi Polar-RP compared to traditional C18 phases



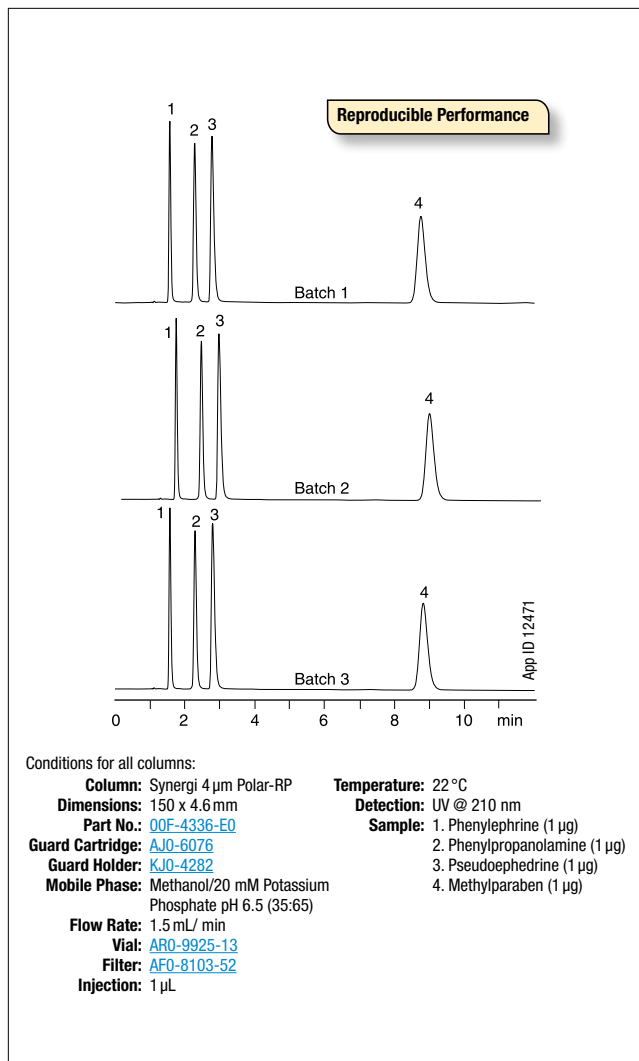
#### Improve peak symmetry of polar compounds with Synergi Polar-RP compared to other phenyl phases



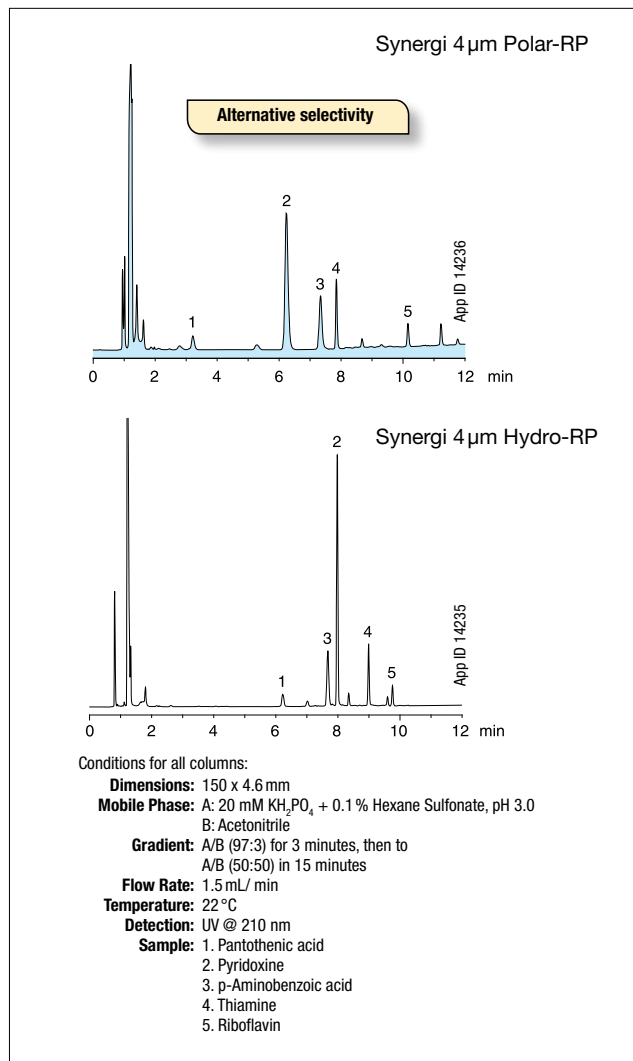
\*See p. 349 for disclaimer information. Comparative separations may not be representative of all applications.

## Synergi Polar-RP (cont'd)

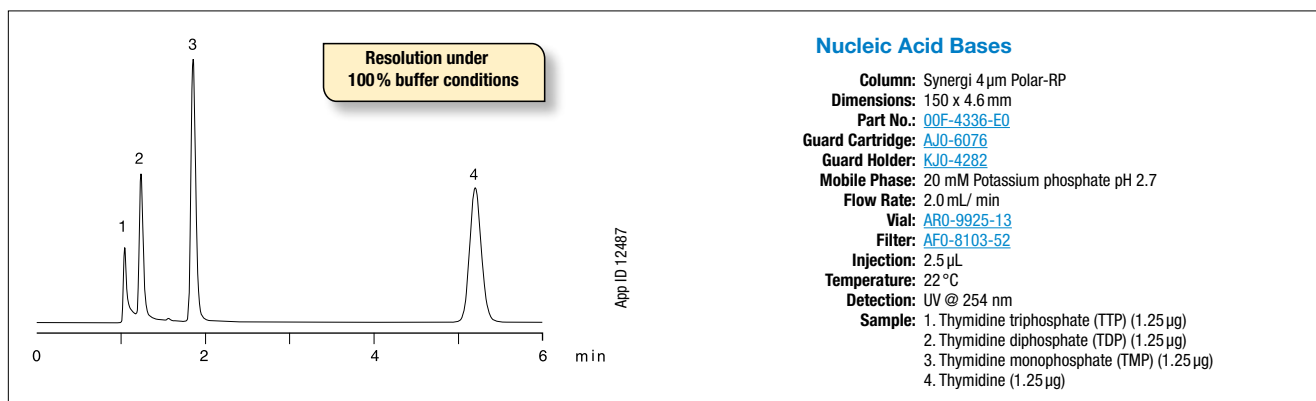
Synergi Polar-RP is highly reproducible



The selectivity of Synergi Polar-RP can provide differences in peak elution order for confirmation or better separation

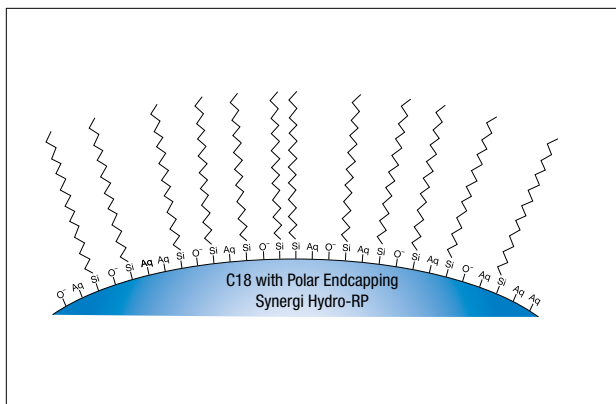


100% buffer mobile phase stability allows for separation of extremely polar compounds, like nucleic acid bases, on Synergi Polar-RP



## Synergi Hydro-RP

### A Polar Endcapped C18 Column



### Synergi Hydro-RP

USP: L1

<b>pH Stability:</b>	1.5 – 7.5
<b>Particle Size:</b>	2.5 µm, 4 µm, and 10 µm
<b>Phase:</b>	C18 with polar endcapping
<b>Application:</b>	For extreme retention of non-polar and extremely polar alkyl compounds
<b>Strength:</b>	Resolution of highly polar compounds under 100% buffer mobile phase conditions

#### Sample Challenge:

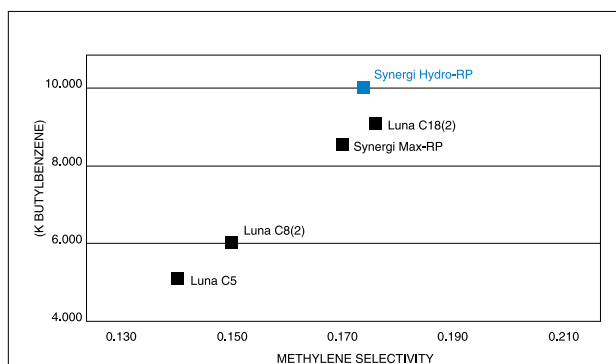
Your sample contains multiple analytes with only slight variations in hydrophobicity.

#### Selectivity Solution:

The extreme hydrophobic selectivity offered by Synergi Hydro-RP is needed to amplify the small differences in selectivity and get greater separation.



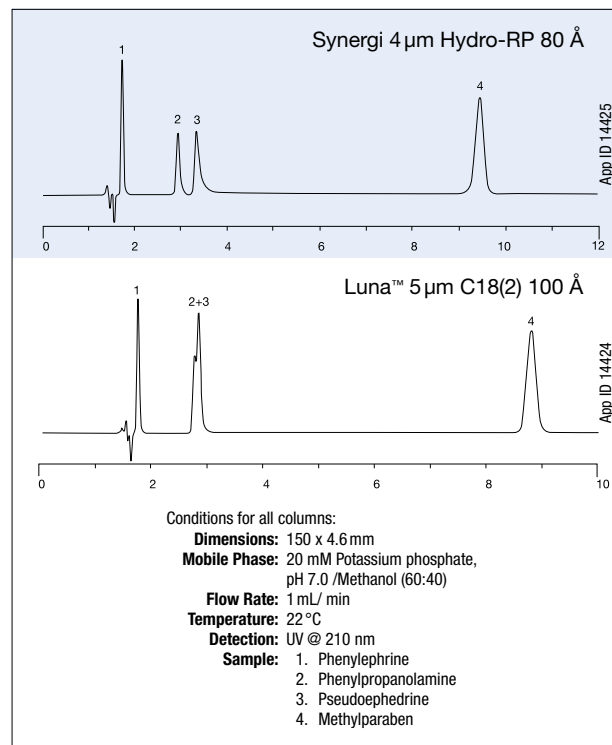
#### Extreme hydrophobic retention relative to other hydrophobic selectivity phases



Conditions for all columns:  
**Dimensions:** 150 x 4.6 mm  
**Mobile Phase:** Acetonitrile/20 mM Potassium phosphate pH 7.0 (65:35)  
**Flow Rate:** 1.5 mL/min  
**Temperature:** Ambient  
**Sample:** 1. Butylbenzene  
 2. Amylbenzene

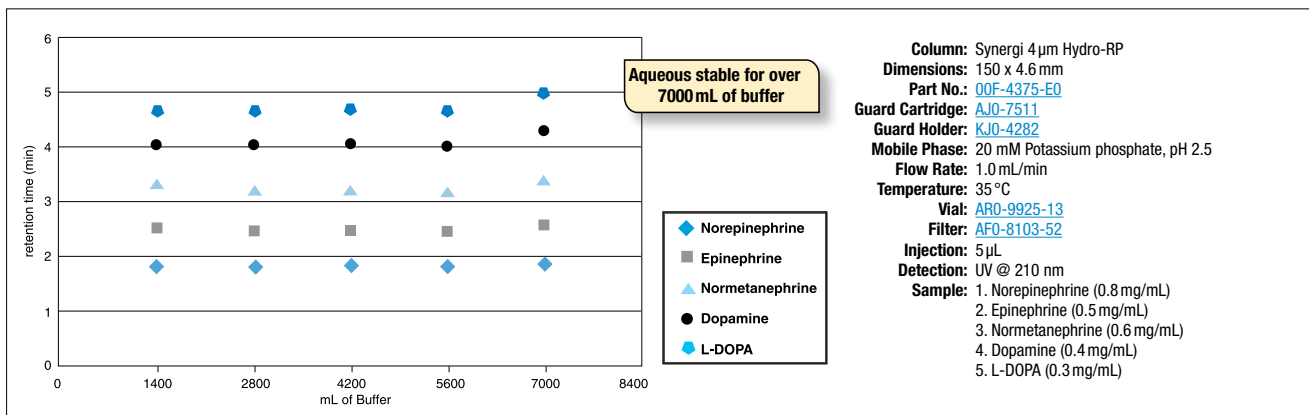
The chart was obtained by plotting hydrophobic retention (k for butylbenzene vs. methylene selectivity (log k for amylbenzene vs the number of methyl groups) under the stated conditions. A column with high hydrophobicity will better resolve two analytes which subtly differ in their overall hydrophobicity than a column with lower hydrophobic selectivity.

#### Additional polar selectivity provides separation where traditional C18 columns cannot

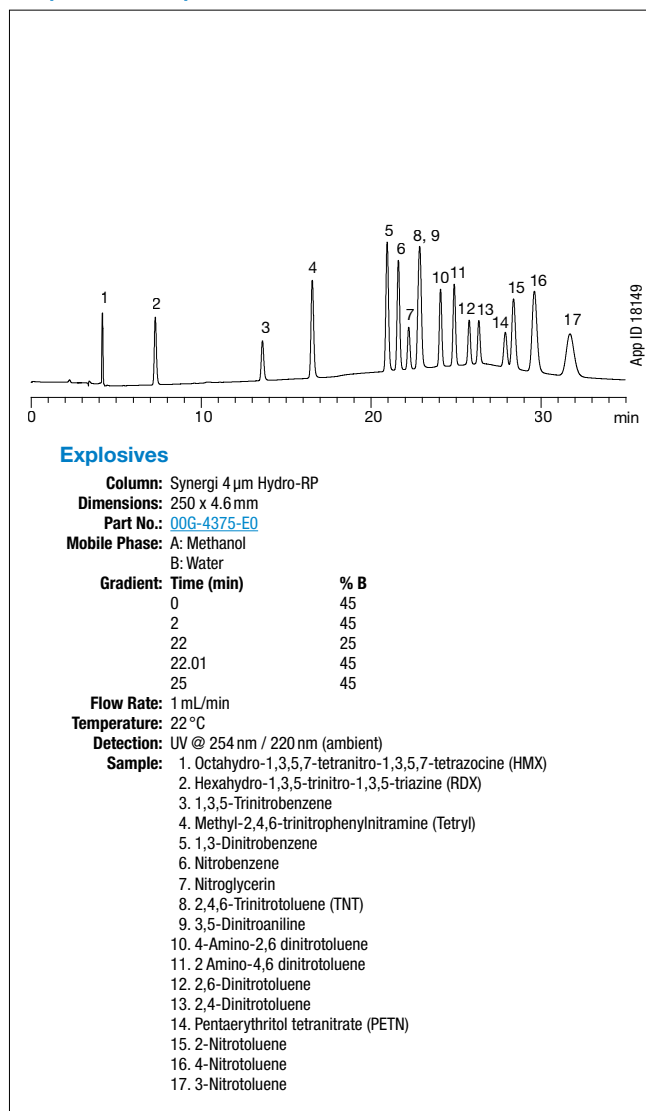
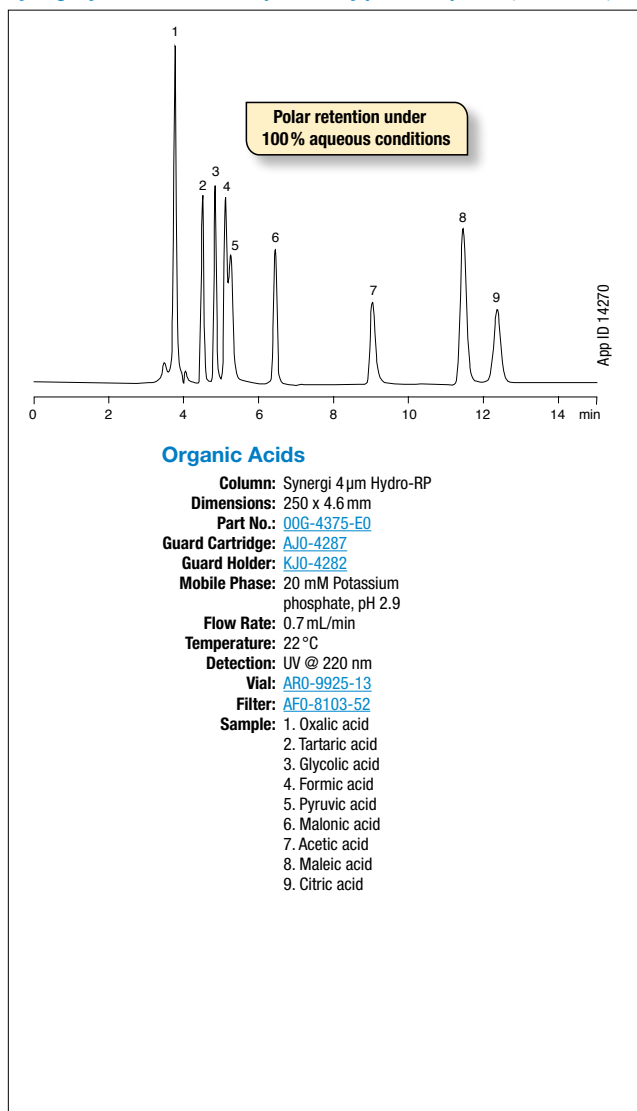


## Synergi Hydro-RP (cont'd)

Synergi Hydro-RP is stable in 100% aqueous mobile phase, providing improved retention of extremely polar compounds



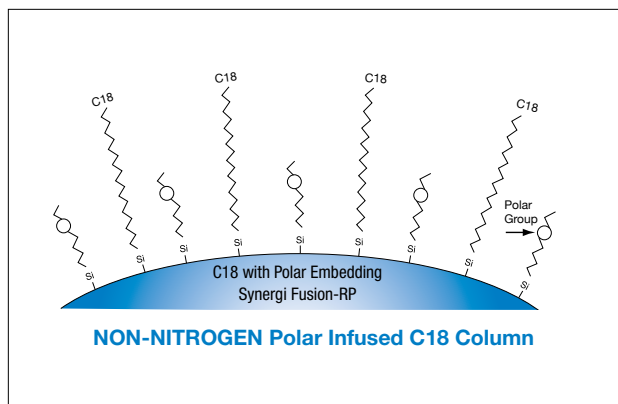
Synergi Hydro-RP is able to separate very polar compounds, as well as, mixtures of polars and non-polars





## Synergi Fusion-RP

### A Polar Embedded C18 Column



#### Synergi Fusion-RP

USP: L1

LC-MS  
Certified

**pH Stability:** 1.5 – 9.0\*\*

**Particle Size:** 2.5 µm, 4 µm, and 10 µm

**Phase:** Polar embedded C18

**Application:** For a balanced retention of polar, basic compounds and moderate retention of hydrophobics over a broad pH range

**Strength:** Analysis of polar, basic compounds with little or no MS phase bleed

\*\* pH range is 1.5 - 10.0 under isocratic conditions.  
pH range is 1.5 - 9 under gradient conditions.

#### Sample Challenge:

You need greater separation of compounds that exhibit moderately polar and hydrophobic characteristics.

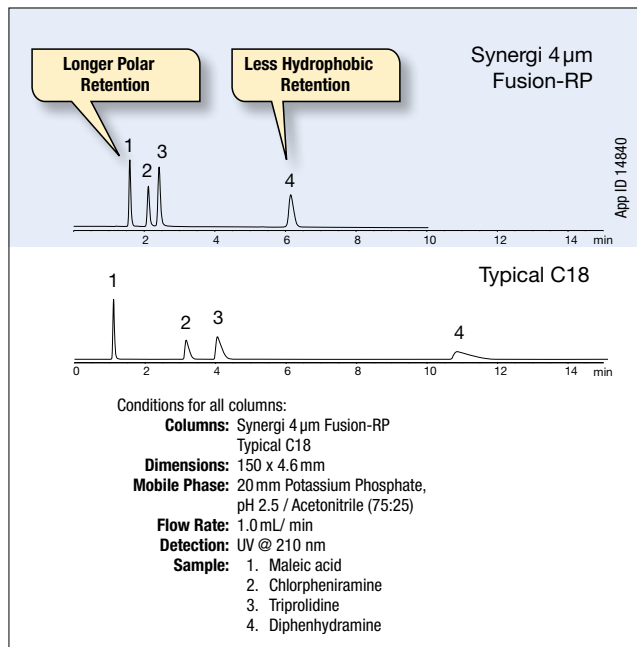
#### Selectivity Solution:

Offering a balanced combination of hydrophobic and polar selectivity, Synergi Fusion-RP will allow you to separate compounds exhibiting polar and hydrophobic characteristics.

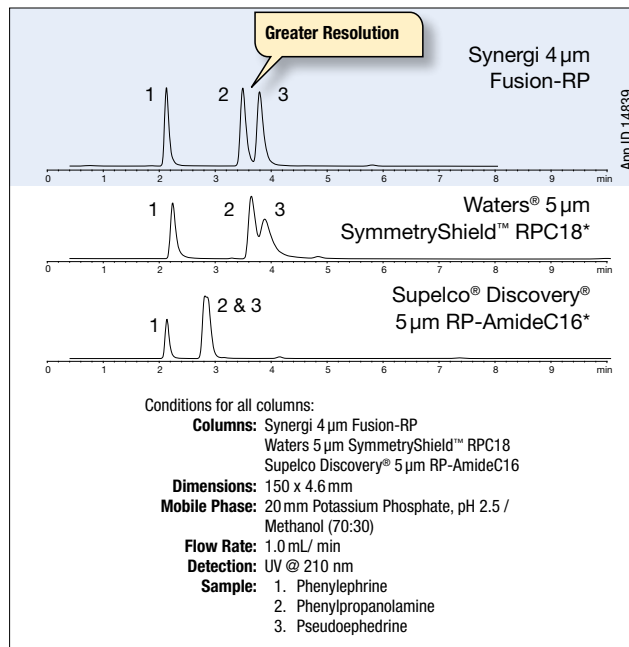


## Balanced Polar and Hydrophobic Retention Allows for Superior Selectivity

### Hydrophobic Basic Compounds



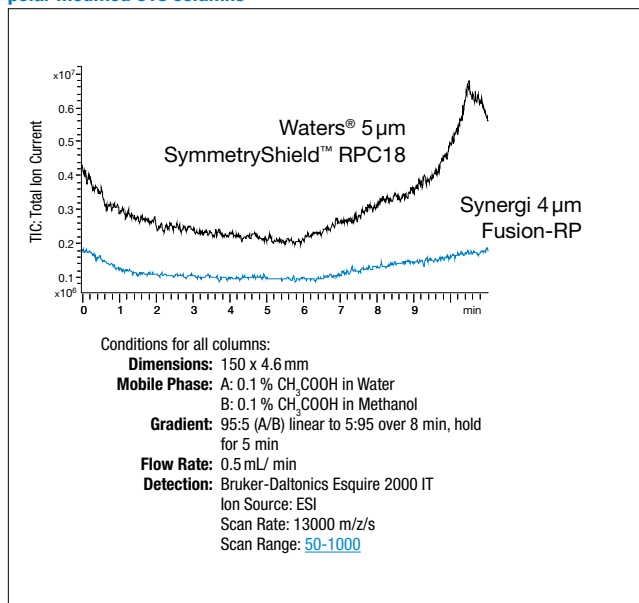
### Antihistamines



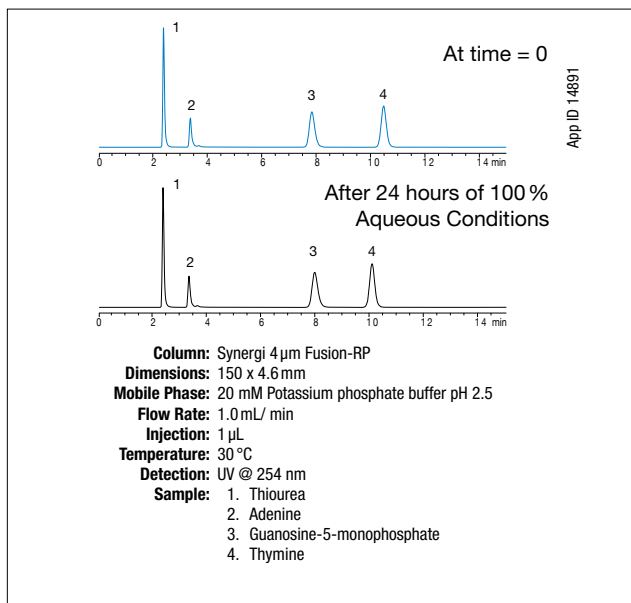
\*See p. 349 for disclaimer information. Comparative separations may not be representative of all applications.

## Synergi Fusion-RP (cont'd)

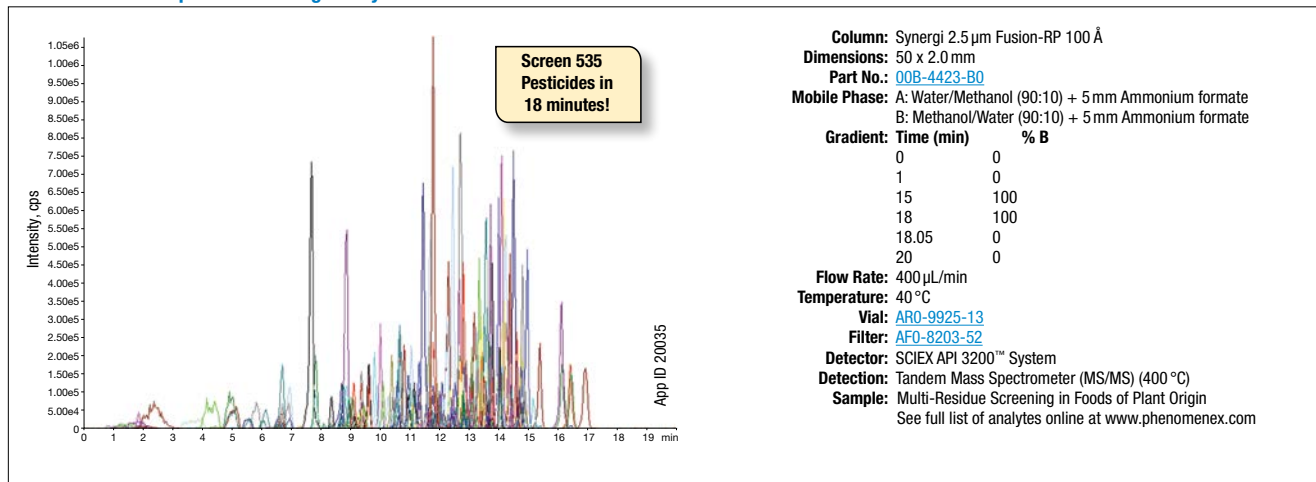
Synergi Fusion-RP has negligible MS bleed compared to other polar modified C18 columns



100% aqueous stable for added method flexibility



Excellent Multi-Compound Screening Ability

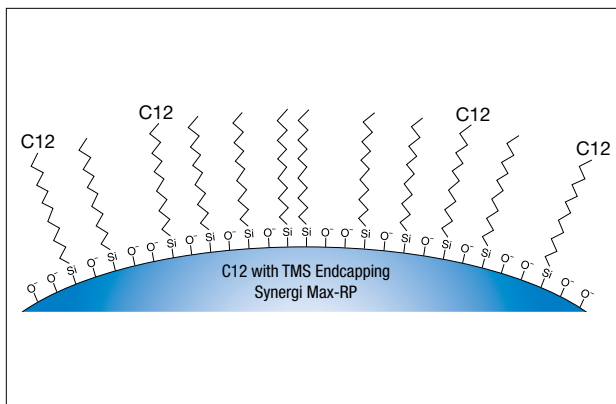


\*Comparative separations may not be representative of all applications.

Columns used for comparison studies were manufactured by and purchased from Agilent Technologies Inc., Waters Corporation, GL Sciences Inc., Macherey-Nagel, and Sigma-Aldrich Co., LLC.



## Synergi Max-RP A Reversed Phase C12 Column



### Synergi Max-RP

USP: L87

LC-MS  
Certified

**pH Stability:** 1.5 – 9.0\*\*

**Particle Size:** 2.5 µm, 4 µm, and 10 µm

**Phase:** Reversed phase C12

**Application:** For hydrophobic, non-polar compounds over a wide pH range, with little or no MS phase bleed

**Strength:** Sharp peak shape for basic compounds at neutral pH

\*\*pH range is 1.5 – 10.0 under isocratic conditions.  
pH range is 1.5 – 9 under gradient conditions.

### Sample Challenge:

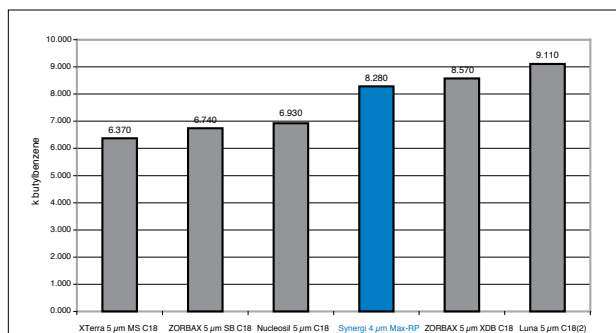
You need to retain compounds based on hydrophobic selectivity exclusively, but cannot accomplish peak separation with C18 column.

### Selectivity Solution:

The C12 ligands on Synergi Max-RP give a hydrophobic selectivity that may separate peaks where C18 columns cannot.



### Hydrophobic Retention: Synergi Max-RP (C12) Performs Like a C18\*

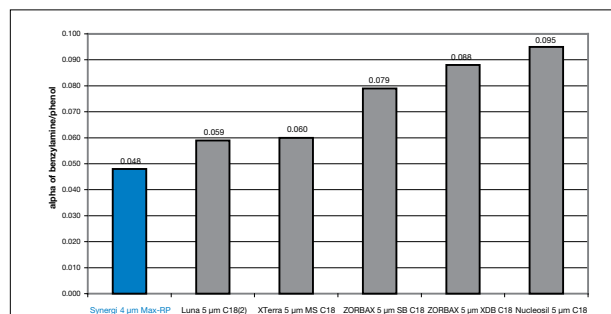


Conditions for all columns:

**Columns:** Waters Xterra 5 µm MS C18  
Agilent Technologies ZORBAX 5 µm SB C18  
Macherey Nagel Nucleosil 5 µm C18  
Synergi 4 µm Max-RP  
Agilent Technologies ZORBAX 5 µm XDB C18  
Luna 5 µm C18(2)

**Dimensions:** 150 x 4.6 mm  
**Mobile Phase:** Acetonitrile/Water (80:20)  
**Flow Rate:** 1 mL/min  
**Injection:** 1 µL  
**Temperature:** Ambient  
**Detection:** UV @ 254 nm  
**Sample:** Butylbenzene

### Silanol Activity at Low pH: C12 vs. C18 Phases



Conditions for all columns:

**Columns:** Waters Xterra 5 µm MS C18  
Agilent Technologies ZORBAX 5 µm SB C18  
Macherey Nagel Nucleosil 5 µm C18  
Synergi 4 µm Max-RP  
Agilent Technologies ZORBAX 5 µm XDB C18  
Luna 5 µm C18(2)

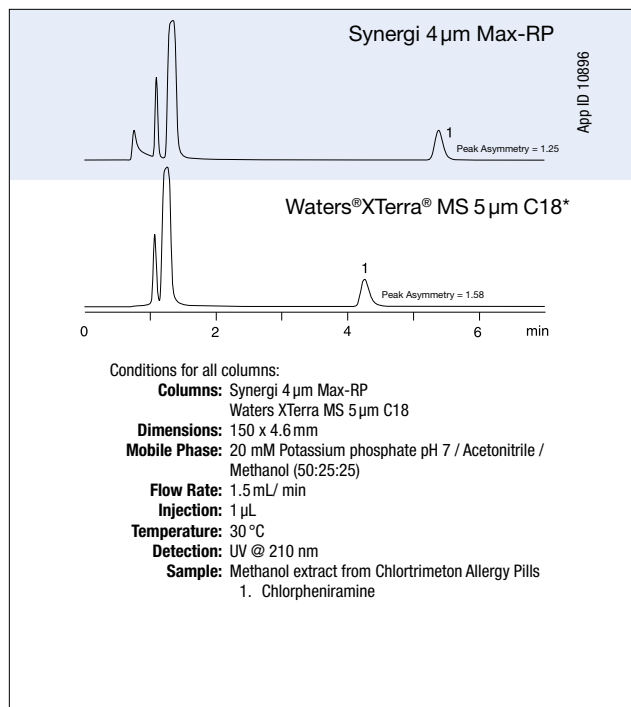
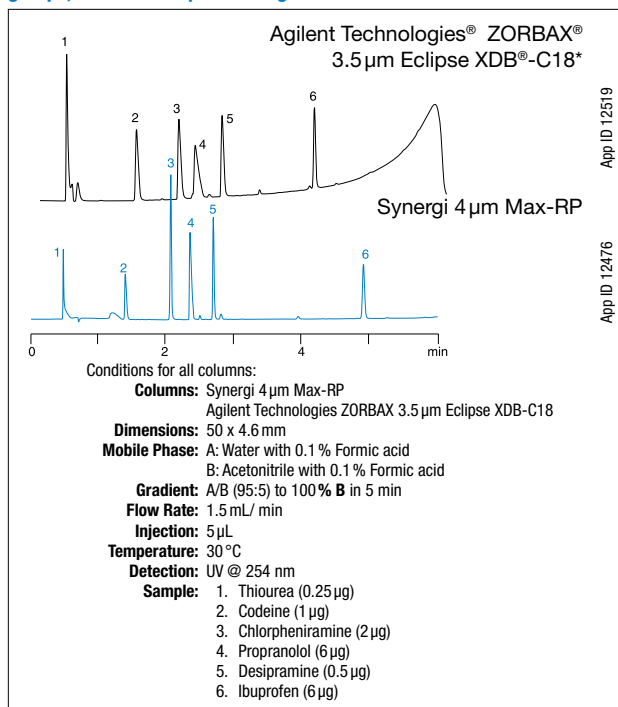
**Dimensions:** 150 x 4.6 mm  
**Mobile Phase:** Methanol/20 mM Potassium phosphate, pH 2.5 (30:70)  
**Flow Rate:** 1 mL/min  
**Injection:** 5 µL  
**Temperature:** Ambient  
**Detection:** UV @ 254 nm  
**Sample:** 1. Benzylamine  
2. Phenol

\*See p. 349 for disclaimer information. Comparative separations may not be representative of all applications.

## Synergi Max-RP (cont'd)

### Sharper Peaks

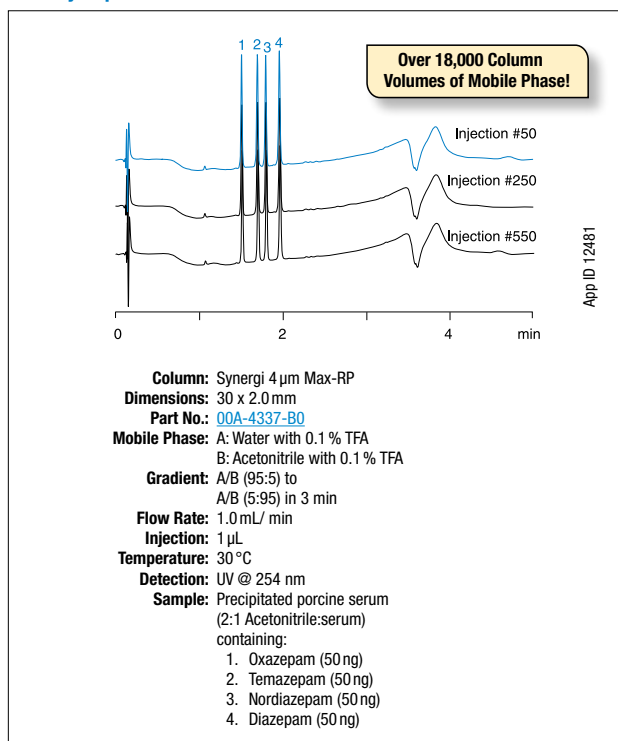
The Synergi Max-RP C12 ligands are densely bound to silica surface, significantly decreasing the number of active silanol groups, which cause peak tailing



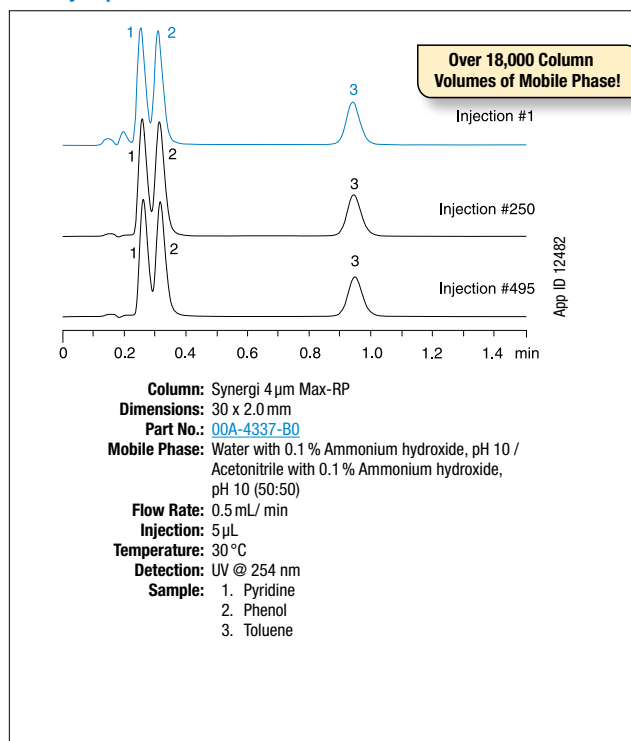
\*See p. 349 for disclaimer information. Comparative separations may not be representative of all applications.

## Achieve Reproducibility and Long Column Lifetimes Even at pH Extremes with Synergi Max-RP

### Stability @ pH 1.5



### Stability @ pH 10.0



## Fast LC Solutions

### Ordering Information

2.5 µm High Speed Technology (HST) Columns (mm)						
Phases	30 x 2.0	50 x 2.0	100 x 2.0	50 x 3.0	100 x 3.0	50 x 4.6
Max-RP	<a href="#">00A-4372-B0</a>	<a href="#">00B-4372-B0</a>	<a href="#">00D-4372-B0</a>	<a href="#">00B-4372-Y0</a>	<a href="#">00D-4372-Y0</a>	<a href="#">00B-4372-E0</a>
Hydro-RP	<a href="#">00A-4387-B0</a>	<a href="#">00B-4387-B0</a>	<a href="#">00D-4387-B0</a>	<a href="#">00B-4387-Y0</a>	<a href="#">00D-4387-Y0</a>	<a href="#">00B-4387-E0</a>
Polar-RP	<a href="#">00A-4371-B0</a>	<a href="#">00B-4371-B0</a>	<a href="#">00D-4371-B0</a>	<a href="#">00B-4371-Y0</a>	<a href="#">00D-4371-Y0</a>	<a href="#">00B-4371-E0</a>
Fusion-RP	<a href="#">00A-4423-B0</a>	<a href="#">00B-4423-B0</a>	<a href="#">00D-4423-B0</a>	<a href="#">00B-4423-Y0</a>	<a href="#">00D-4423-Y0</a>	<a href="#">00B-4423-E0</a>



For information about HST Columns, contact your Phenomenex technical consultant or local distributor.

### Ordering Information

2.5 µm MercuryMS LC-MS Cartridges (mm)			Columns (mm)		
Phases	10 x 2.0	20 x 2.0	20 x 4.0	20 x 2.0	20 x 4.0
Max-RP	—	<a href="#">00M-4372-B0-CE</a>	<a href="#">00M-4372-D0-CE</a>	—	—
Hydro-RP	—	—	—	—	—
Polar-RP	<a href="#">00N-4371-B0-CE</a>	<a href="#">00M-4371-B0-CE</a>	—	<a href="#">00M-4377-B0</a>	—
Fusion-RP	<a href="#">00N-4423-B0-CE</a>	—	—	—	<a href="#">00M-4423-D0</a>

## MercuryMS™ Cartridge Holders



Direct-Connect Holder



Standard Holder

### Ordering Information

#### Direct-Connect Cartridge Holders

Part No.	Description
<a href="#">CHO-7187</a>	10 mm direct-connect holder
<a href="#">CHO-7188</a>	20 mm direct-connect holder

#### Standard Cartridge Holders

Part No.	Description
<a href="#">CHO-5846</a>	10 mm standard holder
<a href="#">CHO-5845</a>	20 mm standard holder



Increase lab safety with HPLC / UHPLC solvent protection, see SecurityCAP™ products on pp. 417-418

## Micro LC Columns

### Ordering Information

4 µm Synergi Micro LC Columns (mm)					
Phases	50 x 0.3	150 x 0.3	50 x 0.5	150 x 0.5	250 x 0.5
Max-RP	—	—	<a href="#">00B-4337-AF</a>	<a href="#">00F-4337-AF</a>	—
Hydro-RP	<a href="#">00B-4375-AC</a>	<a href="#">00F-4375-AC</a>	<a href="#">00B-4375-AF</a>	—	<a href="#">00G-4375-AF</a>
Fusion-RP	—	<a href="#">00F-4424-AC</a>	—	<a href="#">00F-4424-AF</a>	—
Polar-RP	—	—	—	<a href="#">00F-4336-AF</a>	—



For information on Micro LC Columns, Traps, and Fittings, see pp. 359-361





## HPLC Columns

### Ordering Information

4 μm Microbore and Minibore Columns (mm)							SecurityGuard™ Cartridges (mm)	
Phases	50 x 1.0	150 x 1.0	30 x 2.0	50 x 2.0	75 x 2.0	150 x 2.0	250 x 2.0	4 x 2.0*
Max-RP	00B-4337-AO	—	00A-4337-B0	00B-4337-B0	00C-4337-B0	00F-4337-B0	—	AJO-6073
Hydro-RP	00B-4375-AO	00F-4375-AO	00A-4375-B0	00B-4375-B0	00C-4375-B0	00F-4375-B0	00G-4375-B0	AJO-7510
Polar-RP	—	—	00A-4336-B0	00B-4336-B0	00C-4336-B0	00F-4336-B0	00G-4336-B0	AJO-6075
Fusion-RP	00B-4424-AO	00F-4424-AO	00A-4424-B0	00B-4424-B0	00C-4424-B0	00F-4424-B0	00G-4424-B0	AJO-7556

for ID: 2.0-3.0 mm

4 μm MidBore™ Columns (mm)				SecurityGuard Cartridges (mm)	
Phases	30 x 3.0	50 x 3.0	150 x 3.0	250 x 3.0	4 x 2.0*
Max-RP	—	00B-4337-YO	00F-4337-YO	00G-4337-YO	AJO-6073
Hydro-RP	—	00B-4375-YO	00F-4375-YO	00G-4375-YO	AJO-7510
Polar-RP	00A-4336-YO	00B-4336-YO	00F-4336-YO	00G-4336-YO	AJO-6075
Fusion-RP	—	00B-4424-YO	00F-4424-YO	00G-4424-YO	AJO-7556

for ID: 2.0-3.0 mm



For UHPLC system connections, see SecurityLINK™ UHPLC fingertight fitting system on pp. 336-337

4 μm Analytical Columns (mm)					SecurityGuard Cartridges (mm)	
Phases	30 x 4.6	50 x 4.6	75 x 4.6	150 x 4.6	250 x 4.6	4 x 3.0*
Max-RP	00A-4337-E0	00B-4337-E0	00C-4337-E0	00F-4337-E0	00G-4337-E0	AJO-6074
Hydro-RP	00A-4375-E0	00B-4375-E0	00C-4375-E0	00F-4375-E0	00G-4375-E0	AJO-7511
Polar-RP	—	00B-4336-E0	00C-4336-E0	00F-4336-E0	00G-4336-E0	AJO-6076
Fusion-RP	—	00B-4424-E0	00C-4424-E0	00F-4424-E0	00G-4424-E0	AJO-7557

for ID: 3.2-8.0 mm

## Preparative Columns

### Ordering Information

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**
<b>4 μm</b>					/ea
Max-RP	—	—	00F-4337-PO-AX	00G-4337-PO-AX	AJO-7842
Hydro-RP	00B-4375-PO-AX	—	00F-4375-PO-AX	00G-4375-PO-AX	AJO-7843
Polar-RP	00B-4336-PO-AX	00D-4336-PO-AX	00F-4336-PO-AX	00G-4336-PO-AX	AJO-7845
Fusion-RP	—	00D-4424-PO-AX	00F-4424-PO-AX	00G-4424-PO-AX	AJO-7844
<b>10 μm</b>					/ea
Hydro-RP	—	—	Inquire	00G-4376-PO-AX	AJO-7843
Polar-RP	—	—	Inquire	00G-4351-PO-AX	AJO-7845
Fusion-RP	—	—	00F-4425-PO-AX	00G-4425-PO-AX	AJO-7844

for ID: 18-29 mm

### Ordering Information

Axia™ Packed Preparative Columns (mm) continued		SecurityGuard Cartridges (mm)
Phases	250 x 30	15 x 30.0*
<b>4 μm</b>		
Max-RP	00G-4337-UO-AX	AJO-8304

for ID: 30-49 mm

### Ordering Information

4 μm Semi-Prep Columns (mm)		SecurityGuard Cartridges (mm)
Phases	250 x 10	10 x 10†
<b>4 μm</b>		
Max-RP	00G-4337-NO	AJO-7275
Hydro-RP	00G-4375-NO	AJO-7512
Polar-RP	00G-4336-NO	AJO-7276
Fusion-RP	00G-4424-NO	AJO-7558

for ID: 9-16 mm

\*SecurityGuard™ Analytical Cartridges require holder, Part No.: [KJO-4282](#)

†SemiPrep SecurityGuard™ Cartridges require holder, Part No.: [AJO-9281](#)

\*\*PREP SecurityGuard™ Cartridges require holder, Part No.: [AJO-8223](#)

\*PREP SecurityGuard™ Cartridges require holder, Part No.: [AJO-8277](#)



For more dimensions and phases of Axia packed preparative columns, see pp. 393-394, or contact your Phenomenex Technical Consultant

## Pilot Scale Columns and Bulk Material

### Ordering Information

10 μm Analytical and Semi-Prep Columns (mm)			SecurityGuard Cartridges (mm)	
Phases	250 x 4.6	250 x 10	4 x 3.0*	10 x 10†
<b>4 μm</b>				
Max-RP	—	00G-4350-NO	AJO-6074	AJO-7275
Hydro-RP	00G-4376-E0	00G-4376-NO	AJO-7511	AJO-7512
Polar-RP	00G-4351-E0	00G-4351-NO	AJO-6076	AJO-7276
Fusion-RP	00G-4425-E0	00G-4425-NO	AJO-7557	AJO-7558

for ID: 3.2-8.0 mm

9-16 mm

### 10 μm Bulk Packings

Phases	100 g	1 kg
Max-RP	04G-4350	04K-4350
Hydro-RP	04G-4376	04K-4376
Polar-RP	04G-4351	04K-4351
Fusion-RP	04G-4425	04K-4425

Larger quantities of bulk media available upon request.

### Synergi Bulk Media

Beyond our largest preparative column dimensions, Synergi phases are available in bulk quantities for HPLC purification at the process, pilot, and commercial scale. These medias offer a complementary selectivity to the standard C18, C8, or Silica phases traditionally employed in larger scale HPLC. Additionally, due to the diverse chemical properties of each of the Synergi phases, dramatic differences in chromatographic parameters such as retention time, selectivity, and resolution are often observed. For those challenging purifications where chromatography still makes the most sense, the Synergi family offers an excellent alternative to evaluate! Get your Synergi preparative scout column(s) and evaluate these phases today!



# Ultracarb™

- Excellent peak shape for basic compounds, free fatty acids, triglycerides, fat-soluble vitamins, and other lipophilic compounds

Ultracarb C8 offers a high carbon load material with somewhat different selectivity than the two Ultracarb ODS phases.

## Ordering Information

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
3 µm ODS (20)	<a href="#">00B-0205-E0</a>	<a href="#">00D-0205-E0</a>	<a href="#">00F-0205-E0</a>	—	<a href="#">AJ0-4287</a>
5 µm C8	—	—	<a href="#">00F-2134-E0</a>	<a href="#">00G-2134-E0</a>	<a href="#">AJ0-4290</a>
5 µm ODS (20)	—	—	<a href="#">00F-0206-E0</a>	<a href="#">00G-0206-E0</a>	<a href="#">AJ0-4287</a>
5 µm ODS (30)	—	<a href="#">00D-0351-E0</a>	<a href="#">00F-0351-E0</a>	<a href="#">00G-0351-E0*</a>	<a href="#">AJ0-4287</a>

for ID: 3.2-8.0 mm



\*IMPORTANT: Phenomenex highly recommends the use of 150 mm column length, as opposed to the “traditional” 250 mm column length, when the 5 µm ODS (30) phase is desired. In those cases when the additional retention and resolution of a 250 mm column is desired, please be aware that column backpressure with Ultracarb 5 µm ODS (30) can be 50 to 100 % higher than that experienced with “standard” ODS columns. This relatively high backpressure is a function of the hydrophobicity of the 5 µm ODS (30) phase; higher backpressure is completely “natural” with this phase and will have no ill consequence for the column.

SecurityGuard™ Analytical Cartridges require holder, Part No.: [KJ0-4282](#)

# Ultremex™

- For all new methods we recommend Luna columns
- Spherical, silica material

## Ordering Information

5 µm Analytical Columns (mm)			SecurityGuard™ Cartridges (mm)
Phases	150 x 4.6	250 x 4.6	4 x 3.0
C18	<a href="#">00F-0048-E0</a>	<a href="#">00G-0048-E0</a>	<a href="#">AJ0-4287</a>

for ID: 3.2-8.0 mm

SecurityGuard™ Analytical Cartridges require holder, Part No.: [KJ0-4282](#)

# Web Features and Tools

www.phenomenex.com



## High Resolution Size Exclusion for Biomolecules

- Extremely high efficiency 3 μm particle
- Huge cost savings
- Extreme surface inertness

Starting with 3 μm ultra-pure silica, Yarra particles are densely bonded with a proprietary hydrophilic surface chemistry. Coupled with tight particle and pore size distribution as well as strict packing and QC specifications, Yarra columns allow for very high efficiency and resolution.

**Higher Efficiency, Much Lower Price Compared to TSKgel® — GUARANTEED!**

Yarra

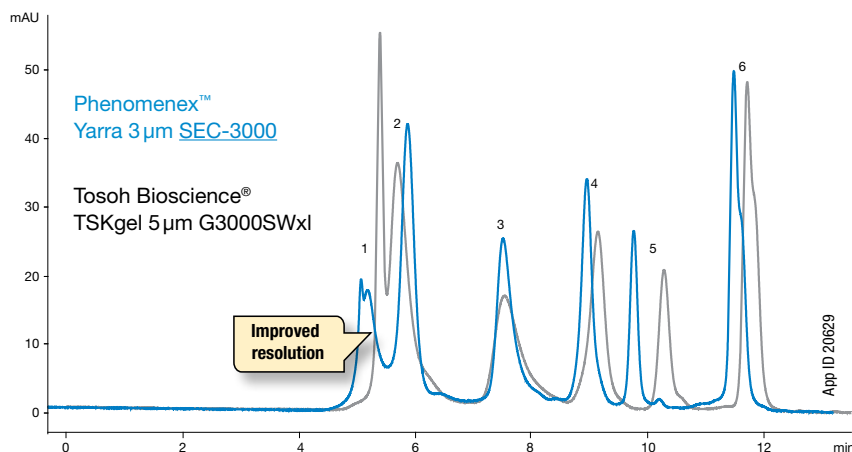
VS.

TSKgel\*†

Yarra 300 x 7.8 mm				TSKgel 300 x 7.8 mm		
				G2000SWxl	G3000SWxl	G4000SWxl
3	3	3	<b>Particle Size (μm)</b>	5	5	8
145	290	500	<b>Pore Size (Å)</b>	125	250	450
1 k - 300 k	5 k - 700 k	15 k - 1,500 k	<b>MW Range in native conditions (Da)</b>	5 k - 150 k	10 k - 500 k	20 k - 7,000 k
2.5 - 7.5	2.5 - 7.5	2.5 - 7.5	<b>pH Stability</b>	2.5 - 7.5	2.5 - 7.5	2.5 - 7.5
3000	3000	1700	<b>Maximum Backpressure (psi)</b>	1015	1015	508
50	50	50	<b>Maximum Temperature (°C)</b>	30	30	30
1.5	1.5	1.2	<b>Maximum Flow Rate (mL/min)</b>	1.2	1.2	1.2
48,000	48,000	38,000	<b>Efficiency (minimum theoretical plates)</b>	20,000	20,000	16,000

\*Also guaranteed against other aqueous GFC columns 3 μm or above.

## Compare Yarra's Resolving Power to TSKgel's



Conditions for both columns:

**Columns:** Yarra 3 μm SEC-3000  
TSKgel 5 μm G3000SWxl

**Dimensions:** 300 x 7.8 mm

**Mobile Phase:** 50 mM Sodium Phosphate pH 6.8 / 0.3 M Sodium Chloride

**Flow Rate:** 1 mL/min

**Backpressure:** 99 bar

**Temperature:** Ambient

**Detection:** UV @ 220 nm

**Sample:** 1. IgM  
2. Thyroglobulin (669 kDa)  
3. Beta Amylase  
4. Ovalbumin (44 kDa)  
5. Myoglobin (17 kDa)  
6. Uridine

Comparative separations may not be representative of all applications.

†All TSKgel specifications were taken from Tosoh Bioscience 2004-5 Laboratory Products Catalog

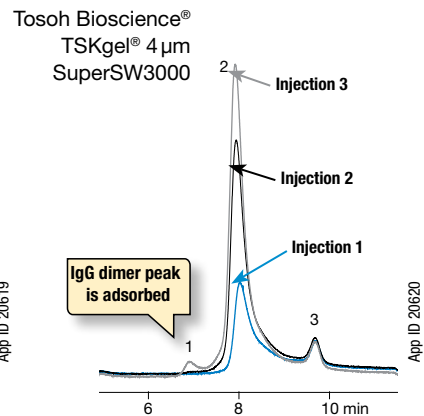
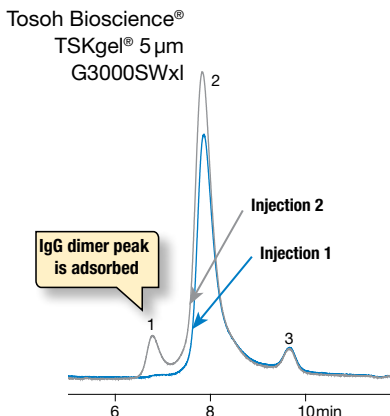
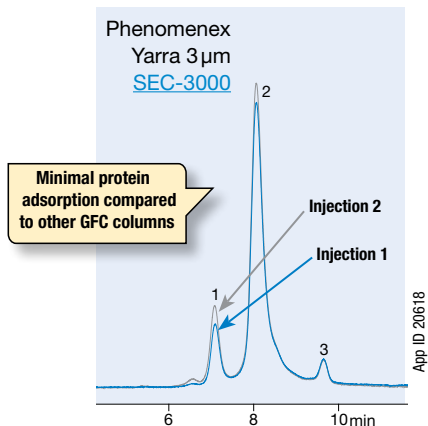
# Yarra™ 3 μm Aqueous GFC/SEC Columns

## Extreme Surface Inertness for Accurate and Confident Recoveries

Phenomenex's proprietary surface chemistry provides an inertness hard to match by other GFC columns. The result is minimal

adsorption of proteins and other protein aggregates leading to more accurate quantitation.

### Minimal "Priming Effect" with Yarra Columns



Conditions for all columns (except where noted):

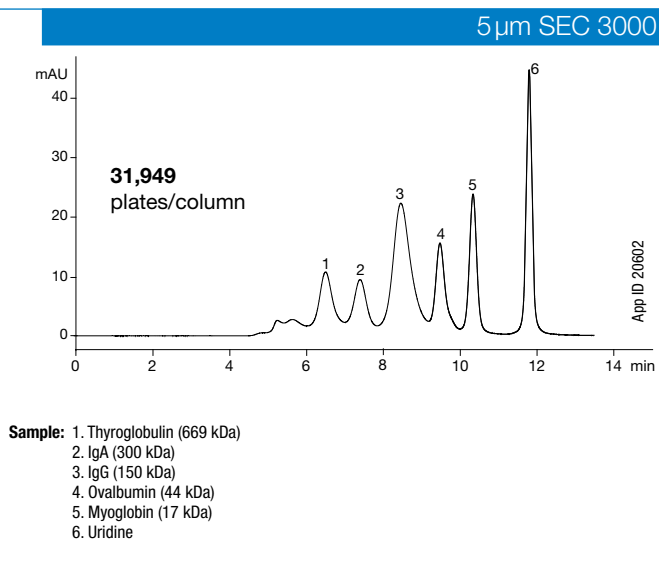
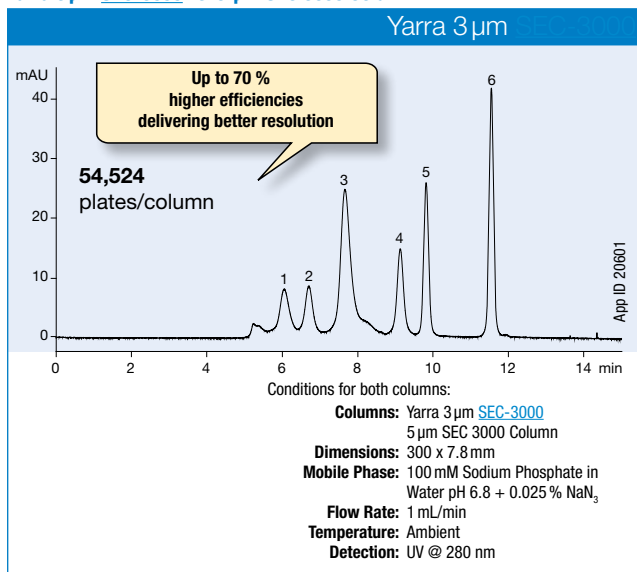
**Columns:** Yarra 3 μm SEC-3000  
TSKgel 5 μm G3000SWxl  
TSKgel 4 μm SuperSW3000  
**Dimensions:** 300 x 7.8 mm

**Mobile Phase:** 50 mM Sodium Phosphate pH 5.0/  
0.1 M Sodium Sulfate  
**Flow Rate:** 1 mL/min  
0.35 mL/min (SuperSW3000)  
**Temperature:** Ambient

**Detection:** UV @ 280 nm  
**Sample:** 1. IgG Dimer  
2. IgG Monomer  
3. Albumin

## Ultra-High Resolution Size Exclusion for Biomolecules

### Yarra 3 μm SEC-3000 vs. 5 μm SEC 3000 Column



Comparative separations may not be representative of all applications.

### Ordering Information

Yarra 3 μm SEC Columns (mm)	Narrow Bore	Analytical	Analytical	SecurityGuard™ Cartridges (mm)
Phases	300 x 4.6	150 x 7.8	300 x 7.8	4 x 3.0*
Yarra 3 μm SEC-2000	00H-4512-E0	00F-4512-K0	00H-4512-K0	AJO-4487
Yarra 3 μm SEC-3000	00H-4513-E0	00F-4513-K0	00H-4513-K0	AJO-4488
Yarra 3 μm SEC-4000	00H-4514-E0	—	00H-4514-K0	AJO-4489

\*SecurityGuard™ Analytical Cartridges require holder, Part No.: KJO-4282

for ID: 4.6 - 7.8 mm



For information on SecurityGuard column protection, see p. 330

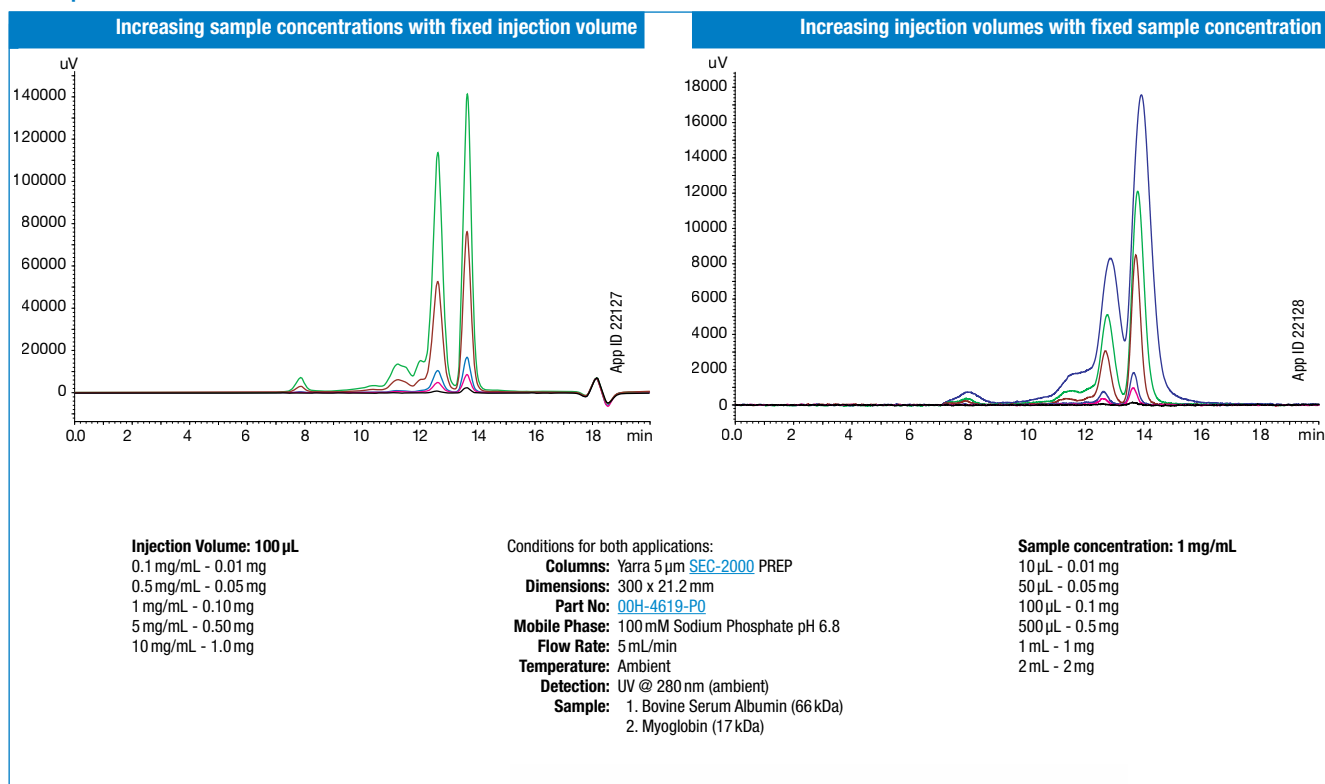


# Yarra™ 5 μm PREP Aqueous GFC/SEC Columns

## Higher Performance for Preparative BioSeparations at a Lower Price

Enjoy the same selectivity and ultra-high efficiency of Yarra 3 μm for your preparative gel filtration applications. Yarra SEC PREP features a 5 μm particle size version of the original Yarra 3 μm particle with the same chemistry on a 21.2 mm ID column for preparative purification, desalting, and characterization of biomolecules. Yarra 5 μm PREP is available at an affordable price while maintaining the high performance given with the analytical columns.

### Yarra 5 μm SEC/GFC PREP Column



Yarra 5 μm PREP SEC Columns (mm)	Preparative	SecurityGuard™ Cartridges (mm)
Phases	300 x 21.2	15 x 21.2**
		/ea
Yarra 5 μm <a href="#">SEC-2000</a> PREP	<a href="#">00H-4619-P0</a>	<a href="#">AJ0-8588</a>
Yarra 5 μm <a href="#">SEC-3000</a> PREP	<a href="#">00H-4620-P0</a>	<a href="#">AJ0-8589</a>
Yarra 5 μm <a href="#">SEC-4000</a> PREP	<a href="#">00H-4621-P0</a>	<a href="#">AJ0-8590</a>

\*\*PREP SecurityGuard™ Cartridges require holder, Part No.: [AJ0-8223](#) for ID: 18 - 29 mm

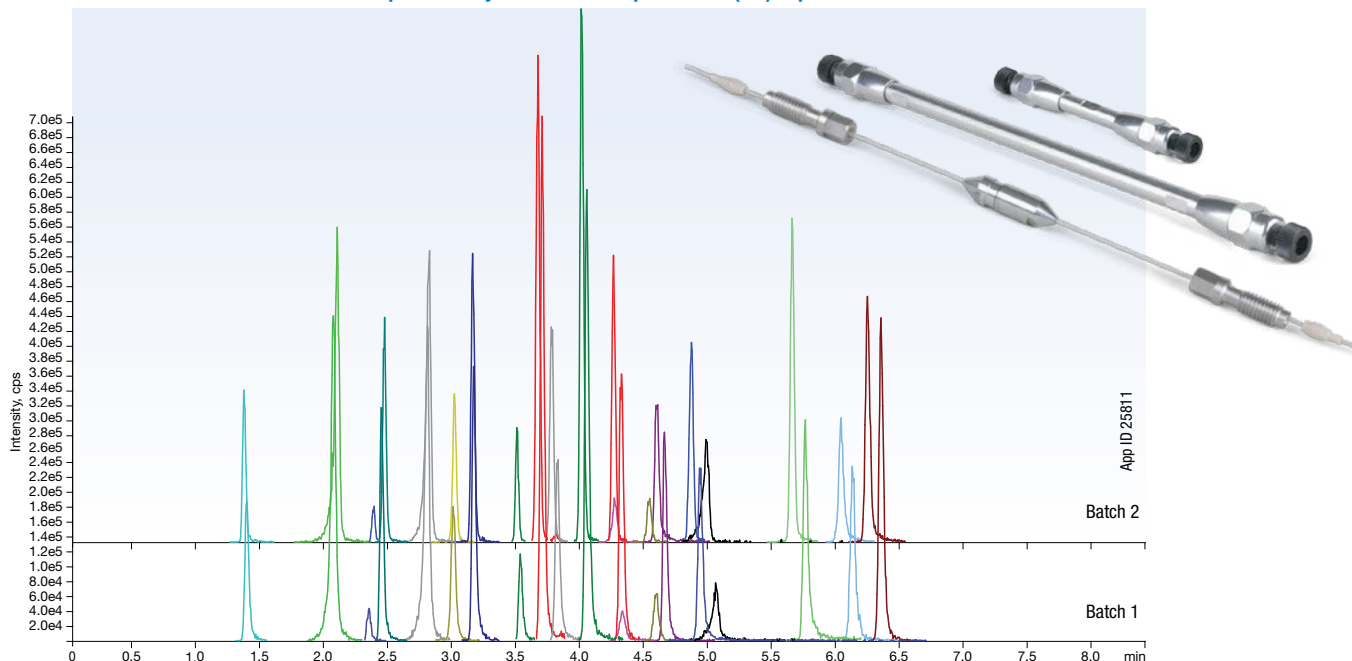


# Micro LC Columns, Traps, and Fittings

## Reproducible Micro Columns

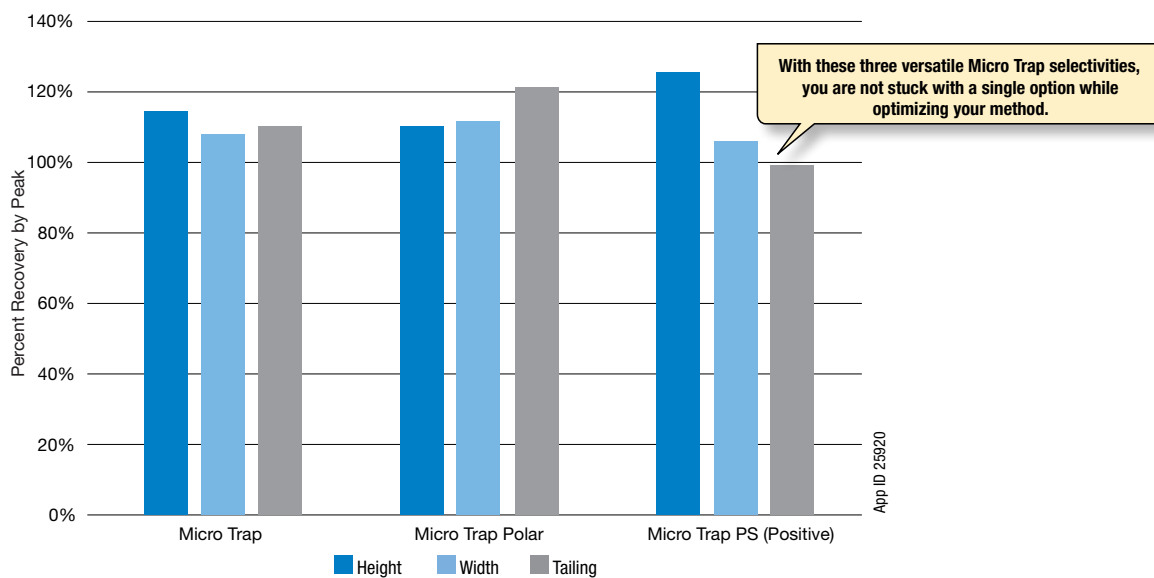
Our micro columns are manufactured with hardware and surface chemistries that are designed to be consistent analytical tools for your analysis. They undergo extensive quality testing to ensure dependability and reproducibility to bring confidence to your application.

Micro LC Kinetex™ Batch-to-Batch Reproducibility: 20 Stable-Isotope-Labeled (SIL) Peptides



## Complementary Micro LC Column and Trap Selectivity

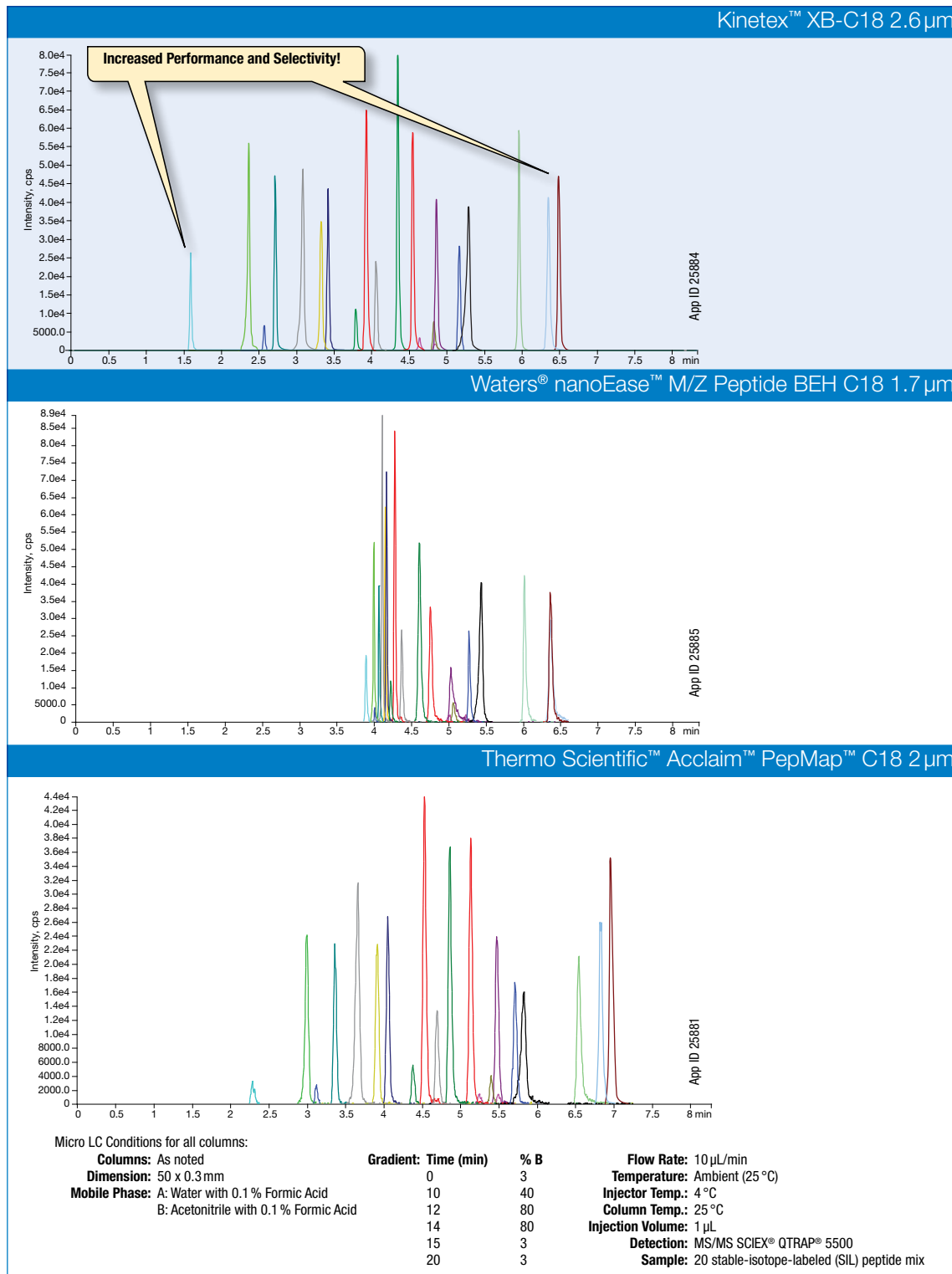
Luna™ Omega Polar Column with Micro Trap C18, MicroTrap Polar, or MicroTrap PS



Micro Trap Phases & Dimension		
Micro Trap C18	10 x 0.3 mm	10 x 0.5 mm
Micro Trap Polar	10 x 0.3 mm	10 x 0.5 mm
Micro Trap PS	10 x 0.3 mm	10 x 0.5 mm

## Bring Diverse Micro Selectivity and Improved Performance to Your Lab!

Kinetex Core-Shell Technology packed in a highly compatible micro LC column hardware makes choosing easy; now you get both selectivity and performance gains.



# Micro LC Columns, Traps, and Fittings

## Micro LC Columns

### Ordering Information

2.6 µm Micro LC Columns (mm)						
Phase	30 x 0.3	50 x 0.3	100 x 0.3	150 x 0.3	50 x 0.5	150 x 0.5
Kinetex™ Biphenyl 100Å	—	<a href="#">00B-4622-AC</a>	—	<a href="#">00F-4622-AC</a>	<a href="#">00B-4622-AF</a>	—
Kinetex C18 100Å	<a href="#">00A-4462-AC</a>	<a href="#">00B-4462-AC</a>	—	<a href="#">00F-4462-AC</a>	<a href="#">00B-4462-AF</a>	—
Kinetex EVO C18 100Å	—	<a href="#">00B-4725-AC</a>	—	<a href="#">00F-4725-AC</a>	<a href="#">00B-4725-AF</a>	—
Kinetex F5 100Å	—	<a href="#">00B-4723-AC</a>	<a href="#">00D-4723-AC</a>	<a href="#">00F-4723-AC</a>	<a href="#">00B-4723-AF</a>	—
Kinetex XB-C18 100Å	<a href="#">00A-4496-AC</a>	<a href="#">00B-4496-AC</a>	<a href="#">00D-4496-AC</a>	<a href="#">00F-4496-AC</a>	<a href="#">00B-4496-AF</a>	<a href="#">00F-4496-AF</a>

3 µm Micro LC Columns (mm)							
Phase	30 x 0.3	50 x 0.3	100 x 0.3	150 x 0.3	50 x 0.5	100 x 0.5	150 x 0.5
Luna™ C8(2)100Å	—	<a href="#">00B-4248-AC</a>	—	—	<a href="#">00B-4248-AF</a>	—	—
Luna C18(2) 100Å	—	<a href="#">00B-4251-AC</a>	<a href="#">00D-4251-AC</a>	<a href="#">00F-4251-AC</a>	<a href="#">00B-4251-AF</a>	<a href="#">00D-4251-AF</a>	<a href="#">00F-4251-AF</a>
Luna NH <sub>2</sub> 100Å	—	—	—	<a href="#">00F-4377-AC</a>	—	—	—
Luna HILIC 200Å	—	—	—	—	<a href="#">00B-4449-AF</a>	—	—
Luna Phenyl-Hexyl 100Å	—	—	<a href="#">00D-4256-AC</a>	—	—	<a href="#">00D-4256-AF</a>	—
Luna Omega C18	<a href="#">00A-4784-AC</a>	—	—	—	—	—	—
Luna Omega PS C18 100Å	—	<a href="#">00B-4758-AC</a>	<a href="#">00D-4758-AC</a>	<a href="#">00F-4758-AC</a>	<a href="#">00B-4758-AF</a>	<a href="#">00D-4758-AF</a>	<a href="#">00F-4758-AF</a>
Luna Omega Polar C18 100Å	—	<a href="#">00B-4760-AC</a>	<a href="#">00D-4760-AC</a>	<a href="#">00F-4760-AC</a>	<a href="#">00B-4760-AF</a>	<a href="#">00D-4760-AF</a>	<a href="#">00F-4760-AF</a>
Gemini™ C18 110Å	—	<a href="#">00B-4439-AC</a>	—	<a href="#">00F-4439-AC</a>	<a href="#">00B-4439-AF</a>	—	—

4 µm Micro LC Columns (mm)						
Phase	50 x 0.3	150 x 0.3	250 x 0.3	50 x 0.5	150 x 0.5	250 x 0.5
Synergi™ Max-RP 80Å	—	—	—	<a href="#">00B-4337-AF</a>	<a href="#">00F-4337-AF</a>	—
Synergi Hydro-RP 80Å	<a href="#">00B-4375-AC</a>	<a href="#">00F-4375-AC</a>	<a href="#">00G-4375-AC</a>	<a href="#">00B-4375-AF</a>	—	<a href="#">00G-4375-AF</a>
Synergi Fusion-RP 80Å	—	<a href="#">00F-4424-AC</a>	—	—	<a href="#">00F-4424-AF</a>	—
Synergi Polar-RP 80Å	—	—	—	—	<a href="#">00F-4336-AF</a>	—
Jupiter™ Proteo 90Å	<a href="#">00B-4396-AC</a>	<a href="#">00F-4396-AC</a>	—	—	<a href="#">00F-4396-AF</a>	—

5 µm Micro LC Columns (mm)					
Phase	50 x 0.3	150 x 0.3	50 x 0.5	150 x 0.5	250 x 0.5
Luna C8(2) 100Å	—	<a href="#">00F-4249-AC</a>	—	—	—
Luna C18(2)100Å	—	<a href="#">00F-4252-AC</a>	—	<a href="#">00F-4252-AF</a>	<a href="#">00G-4252-AF</a>
Luna Phenyl-Hexyl 100Å	<a href="#">00B-4257-AC</a>	—	<a href="#">00B-4257-AF</a>	—	—
Luna Omega Polar C18 100Å	<a href="#">00B-4760-AC</a>	<a href="#">00F-4760-AC</a>	<a href="#">00B-4760-AF</a>	<a href="#">00F-4760-AF</a>	—
Luna Omega PS C18 100Å	<a href="#">00B-4758-AC</a>	<a href="#">00F-4758-AC</a>	<a href="#">00B-4758-AF</a>	<a href="#">00F-4758-AF</a>	—
Jupiter C18 300Å	<a href="#">00B-4053-AC</a>	—	<a href="#">00B-4053-AF</a>	<a href="#">00F-4053-AF</a>	—
Jupiter C4 300Å	<a href="#">00B-4167-AC</a>	—	<a href="#">00B-4167-AF</a>	—	—

## Micro LC Trap Selectivities

### Ordering Information

Micro Traps			
Phase	10 x 0.3 mm	10 x 0.5 mm	Unit
Micro Trap C18	<a href="#">05N-4252-AC</a>	<a href="#">05N-4252-AF</a>	3/pk
Micro Trap Polar	<a href="#">05N-4754-AC</a>	<a href="#">05N-4754-AF</a>	3/pk
Micro Trap PS	<a href="#">05N-4753-AC</a>	<a href="#">05N-4753-AF</a>	3/pk
Micro Trap WP C4	<a href="#">05N-4167-AC</a>	<a href="#">05N-4167-AF</a>	3/pk

### Ordering Information

Micro Traps Fittings		
Part No.	Description	Unit
<a href="#">AQO-7602</a>	PEEKlok™ fittings with 6-40 thread for 1/32" OD tubing (2 x fittings, 6 x ferrules and 1 x tightening tool)	ea
<a href="#">AQO-7603</a>	PEEKlok fittings with 6-32 thread for 1/32" OD tubing (2 x fittings, 6 x ferrules and 1 x tightening tool)	ea
<a href="#">AQO-7601</a>	PEEKlok fittings with 10-32 thread for 1/16" OD tubing with low profile hex head (2 x fittings, 6 x ferrules and 1 x wrench)	ea



**i** It's recommended that you optimize the selectivity between your Micro LC trap and column configuration to maximize your separation performance.



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