



CHIRAL LC

325 - 338

Chiral LC

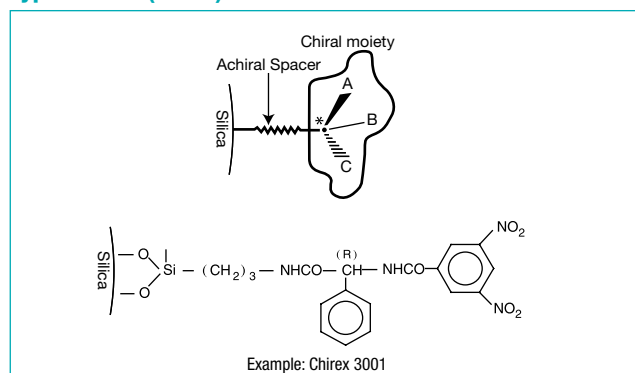
Chiral LC Column Types	326
Cerasopher and Chiral CD-Ph.....	327
Chiral Column Protection Systems.....	331
Chirex.....	328
Hypercarb	331
Lux Polysaccharide-Based Columns	332
Sumichiral OA.....	338
Ultron ES.....	338

Chiral LC Column Types

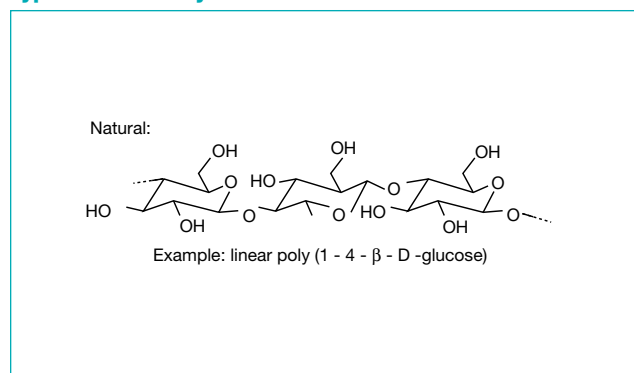
LC Chiral Stationary Phase (CSP) Classification Diagram

Type	Description	Chemistry	Mechanism	Brands
I	Brush (Pirkle)	Low molecular weight chiral selectors Ionic or covalent bonding	Attractive interactions Hydrogen bonding Charge transfer (π - π interaction) Dipole stacking	Chirex Sumichiral OA
II	Helical Polymers	Cellulose and amylose derivatives Poly methacrylates Poly acrylamides	Attractive interactions Insertion complexes	Lux Cellulose and Amylose
III	Cavity	Cyclodextrins, Crown ether	Inclusion complexes	Chiral CD-Ph Sumichiral OA
IV	Ligand Exchange	Amino acid-metal complex	Diastereomeric metal complex	Chirex Sumichiral OA
V	Protein	α -acid glycoprotein Bovine Serum Albumin	Hydrophobic interactions Polar interactions	Ultron ES
VI	Macrocyclic	Antibiotics Glycopeptides	Hydrogen bonding Charge transfer (π - π interaction) Inclusion complexation Ionic interactions Peptide bonding	None
Other Types Carbon-Based (Hypercarb) and Ceramic-based (Ceraspher)				

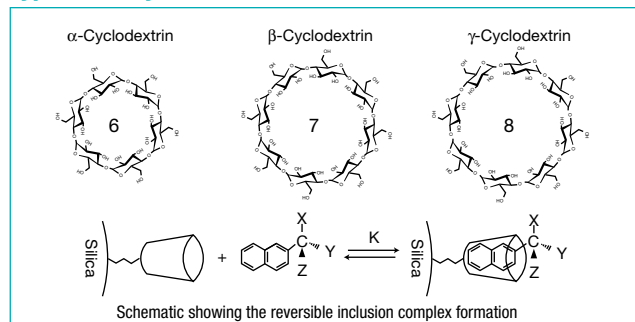
Type I Brush (Pirkle)



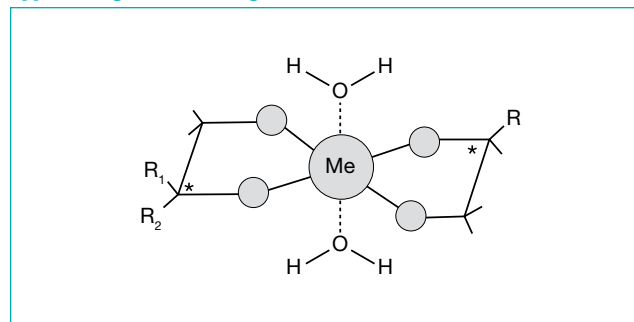
Type II Helical Polymers



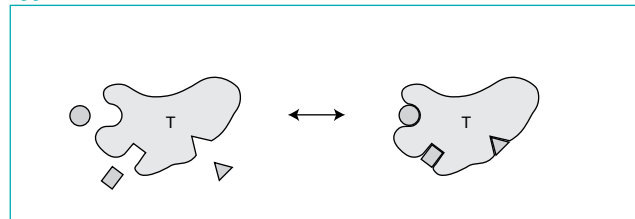
Type III Cavity



Type IV Ligand Exchange



Type V Protein



Ceramospher® and Chiral CD-Ph

By Shiseido Co., Ltd.

Ceramospher® Chiral Columns

- High-efficiency, pressure-stable ceramic-based materials
- Choice of normal or aqueous mobile phase conditions
- Enantioselectivity for acidic, basic and neutral chiral compounds
- High loadability combined with long column lifetimes

Based on 5 µm 40 Å spherical sodium magnesium silicate particles, Ceramospher phases RU-1 and RU-2 are novel materials for chiral HPLC separations. Enantiomer resolution is accomplished on an ion-exchange adduct of the base clay material in combination with an optically-active metal complex (based on ruthenium).

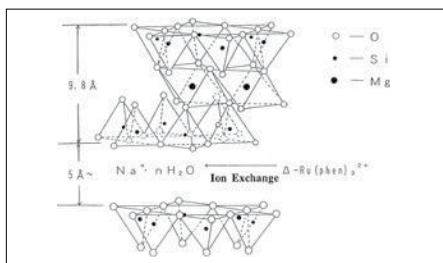
Ceramospher Phases

RU-1. Used for normal phase separations of a wide variety of chiral compounds, typical mobile phases include: 1% isopropanol-amine or dimethylamine in alcohol (methanol or ethanol) for basic compounds, and 1% acetic acid in alcohol for acidic compounds. Retention can be controlled by adding small percentages of hexane to these eluents.

RU-2. Treating the base material with a hydrophobic agent imparts excellent stability under aqueous conditions. Water is typically combined with methanol or acetonitrile in the mobile phase. When the content of water in the eluent is 30% or higher, the retention mechanism appears to be based on typical reversed phase partitioning; when water makes up 5% or less of the eluent, separations appear to be based on normal phase partitioning. Because of the long lifetime expected, this material is well suited for preparative use.



Call Phenomenex for a complete listing of Ceramospher chiral applications.



Ordering Information

Ceramospher and Chiral CD-Ph Chiral Columns

Part No.	Mfr. No.	Dimensions (mm)	Price
RU-1			
CH0-3904	50503	150 x 4.6	
CH0-3905	50504	250 x 4.6	
RU-2			
CH0-3906	50603	150 x 4.6	
CH0-3907	50604	250 x 4.6	
Chiral CD-Ph			
CH0-5862	80054	250 x 4.6	

Phenomenex

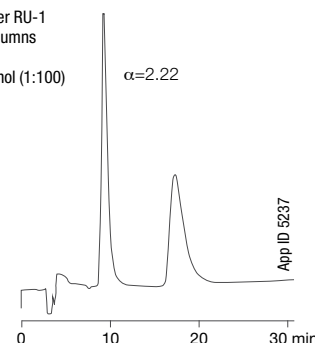
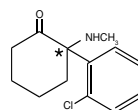
Chiral CD-Ph Columns

Made of precisely classified high-purity silica, this versatile chiral stationary phase is modified with phenylcarbamated β-cyclodextrin.

- Suitable for separation of basic, neutral, and amphoteric optical isomers
- Usable with both aqueous and non-aqueous mobile phases
- High durability
- High sample loadability

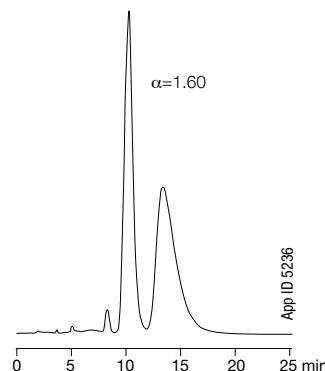
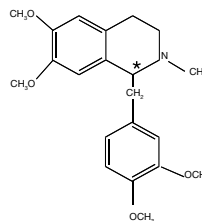
Ketamine

Column: Shiseido Ceramospher RU-1
Dimensions: 250 x 4.6 mm x 2 columns
Part No.: CH0-3905
Mobile Phase: Triethylamine/Methanol (1:100)
Flow Rate: 1.0 mL/min
Temperature: 50 °C
Detection: UV @ 254 nm



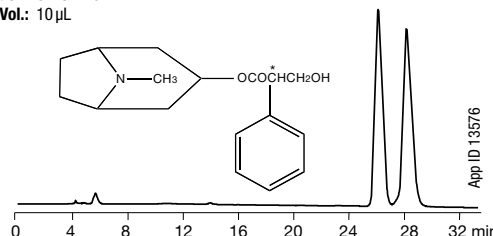
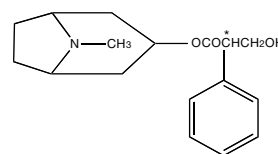
Laudanosine

Column: Shiseido Ceramospher RU-2
Dimensions: 250 x 4.6 mm
Part No.: CH0-3907
Mobile Phase: Diethylamine/Water/Acetonitrile (0.1:10:90)
Flow Rate: 0.5 mL/min
Temperature: 50 °C
Detection: UV @ 254 nm



Atropine

Column: Shiseido Chiral CD-Ph
Dimensions: 250 x 4.6 mm
Part No.: CH0-5862
Mobile Phase: 0.5 mol/L NaClO₄/CH₃CN (70:30)
Flow Rate: 0.5 mL/min
Temperature: 25 °C
Detection: UV @ 220 nm
Injection Vol.: 10 µL



- High enantioselectivity
- Fast run times
- Rugged, long-lived columns
- Easy scale-up to preparative
- Allow direct/indirect resolution of enantiomeric amines, amino acids, hydroxy acids, alcohols, carboxylic acids, ketones, ethers, and esters

Chiral separations are extremely important to the pharmaceutical and biotechnology industries, as well as most other areas of natural products chemistry. Optically active therapeutic drugs require selective and sensitive techniques. Government regulations also continue to spur and require the development of rapid, accurate and reproducible methods for the analysis and purification of enantiomeric compounds.

The challenge is to provide selective yet versatile HPLC columns for both trace analysis and the purification of bulk drug.

Phenomenex meets these challenges with Chirex brand HPLC columns. Chirex is available in 11 different stationary phases. These chemically rugged, versatile columns are used for the direct and indirect resolution of enantiomeric amines, alcohols, carboxylic acids, hydroxy acids, amino acids, ketones, lactones, ethers, esters, and other biologically active compounds.



Hundreds of applications demonstrate the performance of Chirex phases for a multitude of pharmaceutical and agrochemical compounds. For a complete list, please contact your Phenomenex technical consultant.

Which Chirex Stationary Phase?

Stationary phase selection depends on presence/absence of chemical groupings in the chiral molecule.

Chirex Column Selection Guide

Presence of Chemical Groupings in Chiral Molecule							Recommended Columns:		
Class	Aromatic	- N -	- COOH	- OH	Other	Comment	First Choice	Second Choice	Third Choice
Group 1	Y	Y	Y			Aromatic α -amino acids, α -hydroxy acids	3126	3005 or 3001	3011 or 3012
Group 2	Y	Y		Y			3022 or 3020	3014	3018
Group 3	Y	Y			Y		3014 or 3020	3022	3018
Group 4	Y		Y				3005	3010	3001
Group 5	Y			Y			3001 or 3014	3005	3020 or 3022
Group 6	Y				Y		3001	3005	3019 or 3020
Group 7		Y	Y			Aliphatic α -amino acids, α -hydroxy acids and their derivatives	3126		
Group 8			Y				3126	3010	3001
Group 9					Y		3014	3019 or 3020	3001
Group 10					Y	Asymmetric other than carbon. Chiral center at N,S,P,B, etc	3014	3010	3005



For more information on Chirex chiral stationary phase descriptions, contact your Phenomenex technical consultant.

Chirex is a trademark of Chirex, Inc. licensed to Phenomenex.

Chiral HPLC of Amino Acids

- Pirkle-concept and Ligand Exchange type columns
- High enantioselectivity
- Excellent efficiency

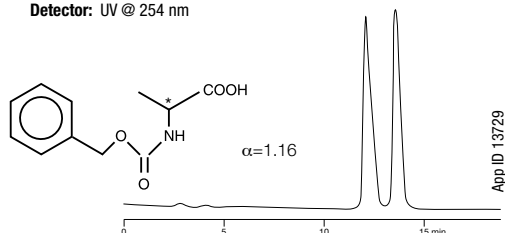
Separations of Amino Acid Derivatives

Compound	Chirex Phase	Separation Factor (α)	App ID No.
t-BOC-Derivatives (Butyloxycarbonyl)			
t-BOC-Leucine	3012	1.09	14064
t-BOC-Phenylalanine	3012	1.09	13784
t-BOC-Valine	3012	1.10	14063
N-FMOC Derivatives (9-Fluorenylmethyloxycarbonyl)			
N-FMOC-Leucine	3011	1.20	13800
N-FMOC-Phenylalanine	3011	1.10	13796
N-FMOC-Valine	3011	1.12	13798
Z-Derivatives (Benzylloxycarbonyl)			
Z-Alanine	3011	1.16	13729
Z-Asparagine	3010	1.12	13760
Z-Leucine	3011	1.17	13731
Z-Norvaline	3011	1.13	13755
Z-Phenylalanine	3012	1.08	13762
Z-Serine	3011	1.09	13758
Z-Valine	3011	1.13	13753
N-Acetyl Derivatives			
N-Acetylalanine	3126	1.17	14052
N-Acetylleucine	3126	1.39	14058
N-Acetylmethionine	3126	1.27	13728
N-Acetylvaline	3126	1.50	14055
N-Formyl Derivatives			
N-Formylvaline	3126	1.37	13721
N-Formylmethionine	3126	1.25	13722
N-Benzoyl Derivatives			
N-Benzoylglutamic acid	3012	1.14	13782
N-Benzoylleucine	3012	1.11	14460
N-Benzoylphenylalanine	3012	1.17	13730
N-Benzoylphenylglycine	3012	1.13	14461
N-Benzoylvaline	3012	1.19	13778
N-Dansyl Derivatives (5-5-Dimethyl-aminonaphthalene-1-sulfonyl derivative)			
N-Dansylnorvaline	3011	1.24	13766
N-Dansylphenylalanine	3011	1.27	13771
N-Dansylthreonine	3012	1.18	13734
N-Dansyltryptophan	3010	1.15	13774
N-Dansylvaline	3011	1.28	13763
PTH Derivatives (Phenylthiohydantoin)			
PTH-Valine	3014	1.12	13921

i Separation potential of some other amino acid derivatives: (Recommended columns: Chirex 3010, 3011, 3012, 3014)
 CBZ-Derivatives (carbobenzoxo; benzyloxycarbonyl); IC-Derivatives (phenylisocyanate);
 Dabsyl Derivatives (4-4-dimethylaminoazobenzene-4'-sulfonyl)

Z-Alanine

Column: Chirex 3011
Dimensions: 250 x 4.0 mm
Part No.: 00G-3011-D0
Mobile Phase: 0.01 M Ammonium Acetate in Methanol
Flow Rate: 1.0 mL/min
Detector: UV @ 254 nm



Phenomenex

Chirex HPLC columns are an excellent choice for underivatized and derivatized amino acids.

Separations of Underivatized "Free" Amino Acids

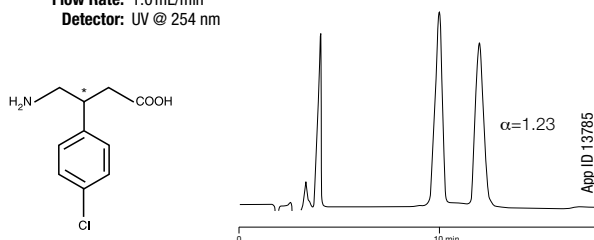
Compound	Chirex Phase	Separation Factor (α)	App ID No.
Alanine	3126	1.66	14004
Alanylglycine	3126	2.26	14080
Alanylglycyl-glycine	3126	1.62	14082
Alloisoleucine	3126	1.67	14038
Allothreonine	3126	1.19	14046
Arginine	3126	2.15	14027
Asparagine	3126	1.10	14049
Aspartic acid	3126	1.42	14019
Baclofen	3126	1.23	13785
p-Boronophenylalanine	3126	1.36	13790
2-amino-n-Butyric acid	3126	1.80	14034
Cystine	3126	2.47	14085
2,6-Diaminopimelic acid	3126	2.77	14066
3-(3,4-Dihydroxyphenyl)-alanine (DOPA)	3126	1.22	13750
Glutamic acid	3126	1.11	14047
Glutamine	3126	1.71	14022
Glycylalanine	3126	1.78	14079
Glycylvaline	3126	1.69	14081
Histidine	3126	1.32	13745
Isoleucine	3126	1.70	14035
Leucine	3126	1.56	14009
Leucylglycyl-glycine	3126	1.36	14083
Lysine	3126	1.83	14018
Methionine	3126	1.42	14024
α -Methyl Leucine	3126	1.59	14457
α -Methyl Tryptophan	3126	1.18	14456
Naphthylglycine	3126	1.42	13789
Norvaline	3126	1.95	14029
Ornithine	3126	1.38	14041
Phenylalanine	3126	1.44	13740
Phenylglycine	3126	1.78	13748
Pipecolic acid	3126	1.77	14031
Proline	3126	2.50	14011
Serine	3126	1.17	14016
Threonine	3126	1.20	14043
dl-Threo-3-phenylserine	3126	1.15	13787
Tryptophan	3126	1.11	13737
Tyrosine	3126	1.34	13743
Valine	3126	1.91	14006



Alpha (α)= Separation Factor = k_2/k_1

Baclofen

Column: Chirex 3126
Dimensions: 150 x 4.6 mm
Part No.: 00F-3126-E0
Mobile Phase: 2 mM Copper (II) sulfate in water / Isopropanol (85:15)
Flow Rate: 1.0 mL/min
Detector: UV @ 254 nm



Ordering Information

5 µm Starter™ Columns (mm)				
Phase	Chirex Phase Description	Bond Type	Linkage Type	50 x 4.6
3001	(R)-PGLY and DNB	Covalent	Amide	00B-3001-E0
3010	(S)-VAL and DNAn	Covalent	Urea	00B-3010-E0
3011	(S)-LEU and DNAn	Covalent	Urea	00B-3011-E0
3014	(S)-VAL and (R)-NEA	Covalent	Urea	00B-3014-E0
3018	(S)-PRO and (R)-NEA	Covalent	Urea	00B-3018-E0
3020	(S)-LEU and (R)-NEA	Covalent	Urea	00B-3020-E0
3022	(S)-ICA and (R)-NEA	Covalent	Urea	00B-3022-E0
3005	(R)-NGLY and DNB	Covalent	Amide	00B-3005-E0
3126	(D)-Penicillamine	Ion-Metal	Lig Exchange	00B-3126-E0
3012	(R)-PGLY and DNAn	Covalent	Urea	00B-3012-E0



Preparative Columns and Bulk Media are available in 15 and 30 µm particle sizes. Call for information on pricing and availability. Detailed notes on Care and Use, as well as performance testing, are provided with each column.



For Chiral Column Performance Check Standards, see p. 373.



For In-line Filters specifically designed to protect your chiral column investment, see p. 331.



For HPLC Column Heater System (25-90 °C), see p. 366.

5 µm Analytical and Guard Columns (mm)				Analytical				Guards
Phase	Chirex Phase Description	Bond Type	Linkage Type	150 x 2.0	250 x 2.0	150 x 4.6	250 x 4.6	30 x 4.6
3001	(R)-PGLY and DNB	Covalent	Amide	—	00G-3001-B0	00F-3001-E0	00G-3001-E0	03A-3001-E0
3010	(S)-VAL and DNAn	Covalent	Urea	—	—	—	00G-3010-E0	03A-3010-E0
3011	(S)-LEU and DNAn	Covalent	Urea	—	—	00F-3011-E0	00G-3011-E0	03A-3011-E0
3012	(R)-PGLY and DNAn	Covalent	Urea	—	—	00F-3012-E0	00G-3012-E0	03A-3012-E0
3014	(S)-VAL and (R)-NEA	Covalent	Urea	—	—	—	00G-3014-E0	03A-3014-E0
3018	(S)-PRO and (R)-NEA	Covalent	Urea	—	—	—	00G-3018-E0	03A-3018-E0
3019	(S)-LEU and (S)-NEA	Covalent	Urea	—	—	—	00G-3019-E0	03A-3019-E0
3020	(S)-LEU and (R)-NEA	Covalent	Urea	00F-3020-B0	—	00F-3020-E0	00G-3020-E0	03A-3020-E0
3022	(S)-ICA and (R)-NEA	Covalent	Urea	—	—	00F-3022-E0	00G-3022-E0	03A-3022-E0
3005	(R)-NGLY and DNB	Covalent	Amide	—	00G-3005-B0	00F-3005-E0	00G-3005-E0	03A-3005-E0
3126	(D)-Penicillamine	Ion-Metal	Lig Ex	00F-3126-B0	00G-3126-B0	00F-3126-E0	00G-3126-E0	03A-3126-E0

Chiral Method Development Kits

Kit A. For Pharmaceuticals, Agrochemicals

The broad range of Pirkle-concept (Type I, or brush type) columns carefully chosen for this Kit will enable the chiral chromatographer to quickly and easily survey stationary phase utility and separation conditions for a wide variety of enantiomeric compounds. Used with normal phase solvent systems, these chiral columns are highly efficient tools particularly well-suited for enantiomeric separations of pharmaceuticals and agrochemicals.

Kit A. For Pharmaceuticals, Agrochemicals

This kit contains five columns, 50 x 4.6 mm:

Column 1:	Chirex 3001: 3,5-dinitrobenzoic acid derivative of (R)-phenylglycine
Column 2:	Chirex 3005: 3,5-dinitrobenzoic acid derivative of (R)-1-naphthylphenylglycine
Column 3:	Chirex 3010: 3,5-dinitroaniline derivative of (S)-valine
Column 4:	Chirex 3014: (R)-1-(α -naphthyl)ethylamine derivative of (S)-valine
Column 5:	Chirex 3020: (R)-1-(α -naphthyl)ethylamine derivative of (S)-tert-leucine

Kit B. For α -Amino Acids, α -Hydroxy Acids, Carboxylic Acids, Aromatic Amines, Alcohols and Amino Alcohols

This Kit contains a collection of chiral columns for method development of enantiomeric α -amino acids, α -hydroxy acids, dipeptides, and aromatic amines, alcohols and amino alcohols. The kit includes four Pirkle-concept columns and one ligand-exchange type column. The Pirkle-concept columns are chosen for their high utility/versatility in separating derivatized amino acids, whereas the ligand-exchange column confers excellent enantioselectivity for underivatized α -amino acids, and α -hydroxy acids.

Kit B. For α -Amino Acids, α -Hydroxy Acids, Carboxylic Acids, Aromatic Amines, Alcohols and Amino Alcohols

This kit contains five columns, 50 x 4.6 mm:

Column 1:*	Chirex 3010: 3,5-dinitroaniline derivative of (S)-valine
Column 2:*	Chirex 3011: 3,5-dinitroaniline derivative of (S)-tert-leucine
Column 3:*	Chirex 3012: 3,5-dinitroaniline derivative of (R) phenylglycine
Column 4:	Chirex 3014: (R)-1-(α -naphthyl)ethylamine derivative of (S)-valine
Column 5:	Chirex 3126: Ligand-Exchange type based on (N,S) diocetyl-(D)-penicillamine complexed with copper(II)

* Especially useful for derivatized amino acid analysis (see p. 329)

Chiral Method Development Kits

Part No.	Description	Unit	Price
KHO-1892	Chiral Method Development (Kit A)	ea	

Chiral Method Development Kits

Part No.	Description	Unit	Price
KHO-1893	Chiral Method Development (Kit B)	ea	

Chiral Column Protection Systems

The following in-line filters are recommended to protect your valuable Chiral HPLC column investment from damaging microparticulates. Select the appropriate in-line filter by matching to your column's diameter as indicated.

Ordering Information

Chiral Column Protection Systems

Part No.	In-Line Filter Description	Comment	Column Diameter Range	Unit	Price
AF0-8497	HPLC KrudKatcher Ultra Column In-Line Filter, 0.5 µm Porosity x 0.004 in. ID	Direct connect	1 - 4.6 mm ID	3/pk	
AF0-8420	HPLC SemiPrep Column In-Line Filter, 2.0 µm Porosity x 10 mm dia., Biocompatible	Requires column coupler AQ0-1393	6.0 - 16.0 mm ID	ea	
AF0-7866	HPLC PREP Column In-Line Filter, S.S., 2.0 µm Porosity x 21.2 mm dia.	Requires column coupler AQ0-8374	18.0 - 30.0 mm ID	ea	



If you need assistance selecting the appropriate In-Line Filter, please contact your Phenomenex Technical Consultant.



For Column Couplers, see p. 370

Hypercarb™ ★

Material Characteristics

Packing Material*	Particle Shape/Size* (µm)	Pore Size* (Å)	Pore Volume (mL/g)	Surface Area* (m²/g)	Carbon Load* %	Calculated Bonded Phase Coverage (µmole/m²)	End Capping*
Hypercarb	Spher. 3, 5, 7	250	0.7	120	100	n/a	—

* Specifications above taken from 2006-2007 (then) Thermo Electron Corporation catalog and 2012/2013 Thermo Scientific Chromatography Columns catalog.

Ordering Information

5 µm Columns (mm)

Part No.	Mfr. No.	Description	Size (mm)	Price
CH0-3301	35005-104630	Hypercarb	100 x 4.6	
CH0-3302	35005-103030	Hypercarb	100 x 3.0	
CH0-3303	35005-102130	Hypercarb	100 x 2.1	

7 µm Columns (mm)

Part No.	Mfr. No.	Description	Size (mm)	Price
CH0-3305	35007-104630	Hypercarb	100 x 4.6	
CH0-3309	35007-054630	Hypercarb PCB	50 x 4.6	

* Hypercarb is a trademark of Thermo Fisher Scientific. Phenomenex is not associated with Thermo Fisher Scientific.



For a complete list of applications contact your Phenomenex representative.



For additional chiral separations, see Lux columns on pp. 332-337.

Lux[®] Chiral Columns

guarantee

Replace CHIRALCEL[®] and CHIRALPAK[®] Columns with Amazingly Good Lux Columns at a Fraction of the Cost!

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

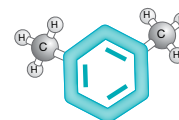
- **High efficiency and loading capacity**
- **Stable in normal phase, polar organic, SFC, and reversed phase conditions**
- **3 μ m and 5 μ m packed columns and 10 μ m and 20 μ m bulk media for scale up[†]**

Technical Specifications

Particle Size	3, 5, 10 [†] , 20 [†] μ m
pH Stability	2-9
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)

[†]Please inquire for availability

Lux columns offer a wide and complementary range of enantioselectivity for even the most difficult chiral separation projects. Our five distinct polysaccharide phases can resolve 92 % of your enantiomers*.



Cellulose-O-CONH

Lux Cellulose-1

Cellulose tris(3,5-dimethylphenylcarbamate)

Guaranteed Alternative to
CHIRALCEL OD[®], OD-H[®], OD-3, OD-RH, and OD-3R

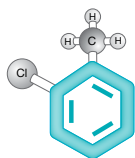


Cellulose-O

Lux Cellulose-3

Cellulose tris(4-methylbenzoate)

Guaranteed Alternative to
CHIRALCEL OJ[®], OJ-H[®], OJ-3, OJ-RH, and OJ-3R

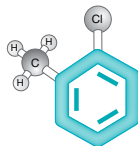


Cellulose-O-CONH

Lux Cellulose-2

Cellulose tris(3-chloro-4-methylphenylcarbamate)

Guaranteed Alternative to
CHIRALCEL OZ, OZ-H[®], OZ-3, OZ-RH, and OZ-3R

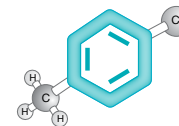


Cellulose-O-CONH

Lux Cellulose-4

Cellulose tris(4-chloro-3-methylphenylcarbamate)

Guaranteed Alternative to
CHIRALCEL OX-H, OX-3, OX-RH, and OX-3R



Amylose-O-CONH

Lux Amylose-2

Amylose tris(5-chloro-2-methylphenylcarbamate)

Guaranteed Alternative to
CHIRALPAK AY[®], AY-H[®], AY-3, AY-RH, and AY-3R

* Based on 233 compounds screened on all five Lux phases

Lux[®] Chiral Columns



Lux Chiral Stationary Phases

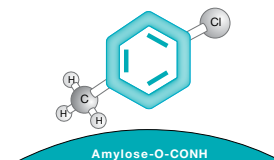
The Lux line of cellulose-based and amylose-based chiral stationary phases includes five complementary selectivities.

Lux Amylose-2: Chlorinated Amylose Chiral Selector

This first-to-market chlorinated amylose phenylcarbamate derivative offers complex chiral recognition components that greatly increase the chances of achieving chiral resolution.

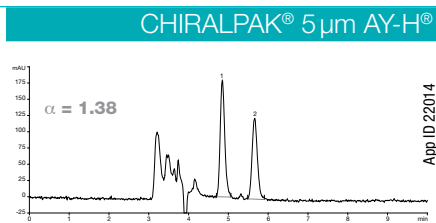
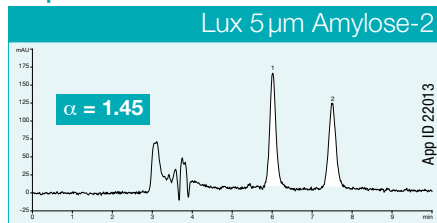


Excellent separation at a fraction of the cost.



Amylose tris(5-chloro-2-methylphenylcarbamate)

Ifenprodil



Conditions for both columns:

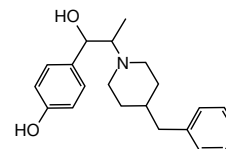
Dimensions: 250 x 4.6 mm

Mobile Phase: 0.1 % Diethylamine in Hexane /
0.1 % Diethylamine in Ethanol
(80:20)

Flow Rate: 1 mL/min

Detection: UV @ 220 nm

Temperature: Ambient

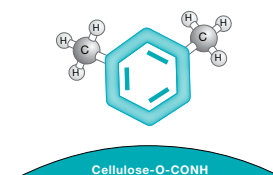


Lux Cellulose-1: Dimethyl Cellulose Chiral Selector

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

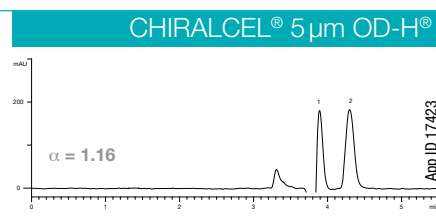
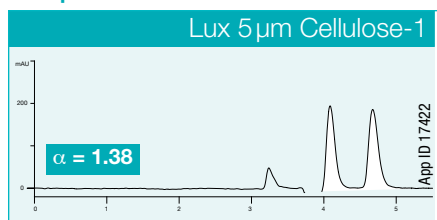


Excellent separation at a fraction of the cost.



Cellulose tris(3,5-dimethylphenylcarbamate)

Metoprolol



Conditions for both columns:

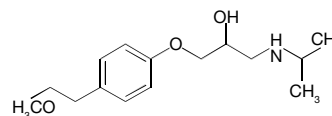
Dimensions: 250 x 4.6 mm

Mobile Phase: 0.1 % Diethylamine in Acetonitrile /
0.1 % Diethylamine in Isopropanol
(95:5)

Flow Rate: 1 mL/min

Detection: UV @ 220 nm

Temperature: Ambient



Comparative separations may not be representative of all applications.

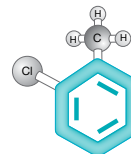
Lux[®] Chiral Columns

Lux Cellulose-2: Chlorinated Cellulose Carbamate Phase

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



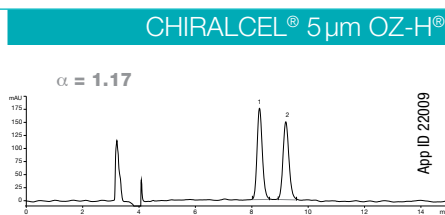
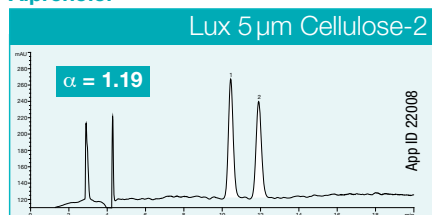
Excellent separation at a fraction of the cost.



Cellulose-O-CO-NH

Cellulose tris(3-chloro-4-methylphenylcarbamate)

Alprenolol



Conditions for both columns:

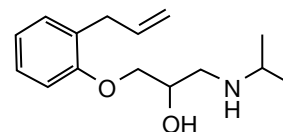
Dimensions: 250 x 4.6 mm

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



Lux Cellulose-3: Cellulose Ester Phase

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



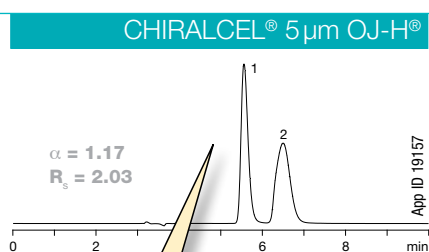
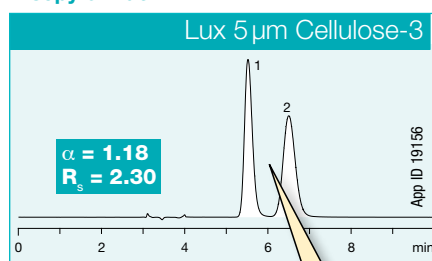
Excellent separation at a fraction of the cost.



Cellulose-O

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:

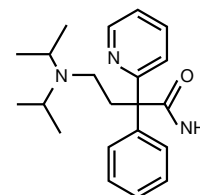
Dimensions: 250 x 4.6 mm

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



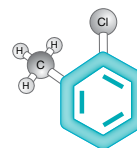
Lux[®] Chiral Columns

Lux Cellulose-4: Chlorinated Cellulose Carbamate Phase

This chlorinated cellulose phenylcarbamate derivative offers unique chiral recognition abilities.



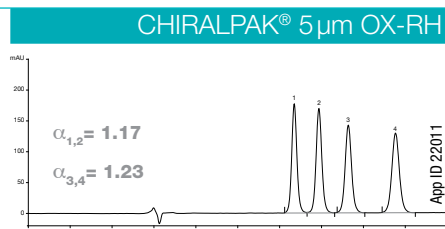
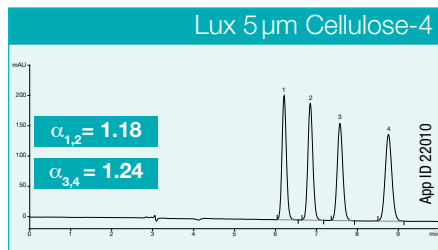
Excellent separation at a fraction of the cost.



Cellulose-O-CONH

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

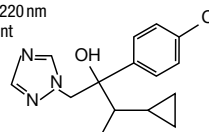
Ammonium bicarbonate

(60:40)

Flow Rate: 1 mL/min

Detection: UV @ 220 nm

Temperature: Ambient



Comparative separations may not be representative of all applications.

FREE Chiral Screening for HPLC and SFC

Have a sample and need a separation method? We can help!

Reliable methods and fast turnarounds are our specialty. Depending on compound type, we screen multiple chiral stationary phases under different conditions and return a detailed report of the recommended separation method so you can begin work right away.



We provide the following services:

Chiral Screening

- Normal Phase
- Reversed Phase
- Polar Organic
- SFC

Method Optimization Services

- Fast Turnaround
- Easy Method Transfer
- Continued Support

Preparative and Process Scale-Up

- Media Screening
- Small Scale Purification
- DAC Packing Assistance

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

or email us at:

phenologix@phenomenex.com

You can also visit us online:

www.phenomenex.com/phenologix

phenoLogixSM
Your Method. Our Scientists.

LUX | CHIRAL LC



Lux[®] Chiral Columns

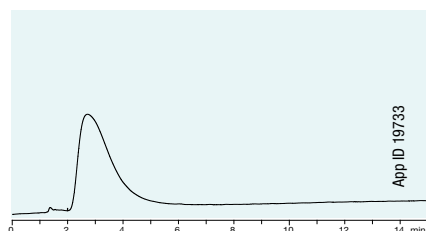
Achieve Optimal Resolution by Screening All Five Complementary Lux Chiral Columns

Utilizing differences in selectivity can help develop methods more efficiently by offering broad and contrasting chiral recognition abilities. Lux chiral selectors provide a variety of selectivities that give you the opportunity to screen for the ideal chiral separation.

Rabeprazole

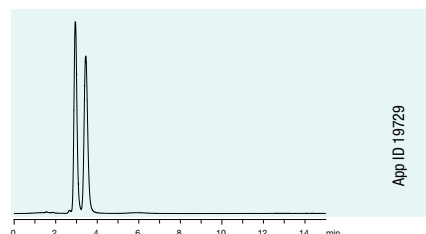
Lux 5 μ m Amylose-2

$\alpha = 0.00$



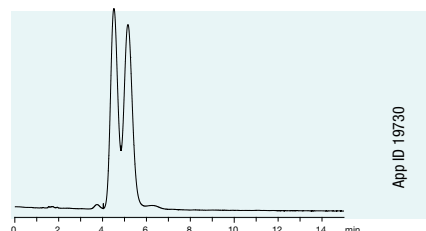
Lux 5 μ m Cellulose-1

$\alpha = 1.30$



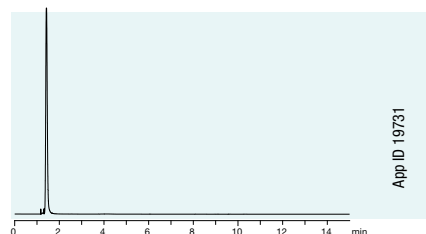
Lux 5 μ m Cellulose-2

$\alpha = 1.19$



Lux 5 μ m Cellulose-3

$\alpha = 0.00$



Conditions for all columns:

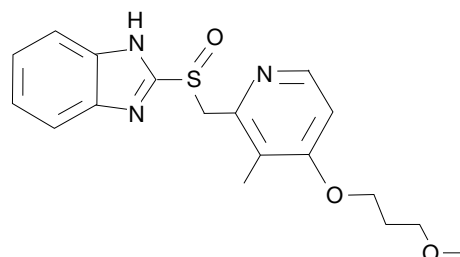
Dimensions: 150 x 4.6 mm

Mobile Phase: 0.1 % Diethylamine in 10 mM Ammonium bicarbonate/
0.1 % Diethylamine in Methanol
(80:20)

Flow Rate: 1.5 mL/min

Detection: UV @ 286 nm

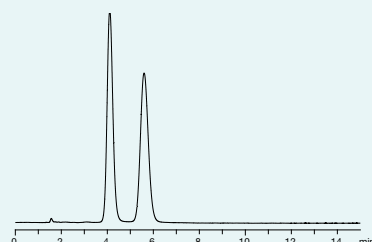
Temperature: Ambient



Optimal Resolution

Lux 5 μ m Cellulose-4

$\alpha = 1.53$



Based on a five phase screen under reversed phase conditions, the optimal chiral stationary phase for resolving Rabeprazole is Lux Cellulose-4.

Lux[®] Chiral Columns

guarantee



If Lux analytical columns (≤ 4.6 mm ID) do not provide at least an equivalent or better separation as compared to a competing column of the same particle size, similar phase and dimensions, send in your comparative data within 45 days and keep the Lux column for FREE.

Ordering Information

3 μ m Analytical Columns (mm)							SecurityGuard™ Cartridges (mm)	
Phases	50 x 2.0	150 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
Cellulose-1	00B-4458-B0	00F-4458-B0	00B-4458-E0	00D-4458-E0	00F-4458-E0	00G-4458-E0	AJO-8402	AJO-8403
Cellulose-2	00B-4456-B0	00F-4456-B0	00B-4456-E0	00D-4456-E0	00F-4456-E0	00G-4456-E0	AJO-8398	AJO-8366
Cellulose-3	00B-4492-B0	00F-4492-B0	00B-4492-E0	00D-4492-E0	00F-4492-E0	00G-4492-E0	AJO-8621	AJO-8622
Cellulose-4	00B-4490-B0	00F-4490-B0	00B-4490-E0	00D-4490-E0	00F-4490-E0	00G-4490-E0	AJO-8626	AJO-8627
Amylose-2	00B-4471-B0	00F-4471-B0	00B-4471-E0	00D-4471-E0	00F-4471-E0	00G-4471-E0	AJO-8471	AJO-8470
for ID:							2.0–3.0 mm	3.2–8.0 mm

5 μ m 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
Cellulose-1	00B-4459-B0	00B-4459-E0	00D-4459-E0	00F-4459-E0	00G-4459-E0	AJO-8402	AJO-8403
Cellulose-2	00B-4457-B0	00B-4457-E0	00D-4457-E0	00F-4457-E0	00G-4457-E0	AJO-8398	AJO-8366
Cellulose-3	00B-4493-B0	00B-4493-E0	00D-4493-E0	00F-4493-E0	00G-4493-E0	AJO-8621	AJO-8622
Cellulose-4	00B-4491-B0	00B-4491-E0	00D-4491-E0	00F-4491-E0	00G-4491-E0	AJO-8626	AJO-8627
Amylose-2	00B-4472-B0	00B-4472-E0	00D-4472-E0	00F-4472-E0	00G-4472-E0	AJO-8471	AJO-8470
for ID:						2.0–3.0 mm	3.2–8.0 mm

5 μ m Semi-Prep Columns (mm)			SecurityGuard™ Cartridges (mm)
Phases	150 x 10.0	250 x 10.0	10 x 10.0*
			/3pk
Cellulose-1†	00F-4459-N0	00G-4459-N0	AJO-8404
Cellulose-2†	00F-4457-N0	00G-4457-N0	AJO-8399
Cellulose-3	00F-4493-N0	00G-4493-N0	AJO-8623
Cellulose-4	00F-4491-N0	00G-4491-N0	AJO-8628
Amylose-2	00F-4472-N0	00G-4472-N0	AJO-8472
for ID:			9–16 mm

*Inquire for Lux 10 μ m Cellulose-1 and Cellulose-2 columns.

Bulk Media		
Phases	100 g	1 kg
10 μ m		
Cellulose-1	04G-4501	04K-4501
Cellulose-2	04G-4502	04K-4502
20 μ m		
Cellulose-1	04G-4473	04K-4473
Cellulose-2	04G-4464	04K-4464
Cellulose-3	04G-4504	04K-4504
Cellulose-4	04G-4503	04K-4503

Please inquire for 20 μ m Lux Amylose-2 media.



5 μ m 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
Cellulose-1†	00F-4459-P0-AX	00G-4459-P0-AX	00G-4459-U0-AX	00G-4459-V0-AX	AJO-8405	AJO-8406
Cellulose-2†	00F-4457-P0-AX	00G-4457-P0-AX	00G-4457-U0-AX	00G-4457-V0-AX	AJO-8400	AJO-8401
Cellulose-3	00F-4493-P0-AX	00G-4493-P0-AX	00G-4493-U0-AX	00G-4493-V0-AX	AJO-8624	AJO-8625
Cellulose-4	00F-4491-P0-AX	00G-4491-P0-AX	00G-4491-U0-AX	00G-4491-V0-AX	AJO-8629	AJO-8630
Amylose-2	00F-4472-P0-AX	00G-4472-P0-AX	00G-4472-U0-AX	00G-4472-V0-AX	AJO-8473	AJO-8474
for ID:					18–29 mm	30–49 mm

*SecurityGuard Analytical Cartridges require holder, Part No.: KJO-4282
†SemiPrep SecurityGuard™ Cartridges require holder, Part No.: AJO-7220

**HPLC PREP SecurityGuard Cartridges require holder, Part No.: AJO-8223
SFC PREP SecurityGuard Cartridges require holder, Part No.: AJO-8617
♦HPLC PREP SecurityGuard Cartridges require holder, Part No.: AJO-8277
SFC PREP SecurityGuard Cartridges require holder, Part No.: AJO-8618



Column Performance Check Standard

Part No.	Description	Unit	Price
AL0-8412	Chiral Test Mix No. 5 (Lux)	ea	



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

CHIRALPAK, CHIRALCEL, AY, AY-H, OD, OD-H, OJ, OJ-H, and OZ-H are registered trademarks of DAICEL Corporation. All such trademarks are used by CHIRAL under license from DAICEL Corporation. Chiral Technologies, Inc. is a subsidiary of DAICEL Chemical Industries, LTD.

Columns used for comparison were manufactured by DAICEL Corporation. Phenomenex is in no way affiliated with DAICEL Corporation.

Sumichiral OA™

By Sumika Chemical Analysis Service, Ltd.

- High chromatographic efficiency
- Rapid recovery from overload
- Wide range of applications in both normal and reversed phase*
- Pirkle-Type, Cavity-Type, and Ligand-Exchange-Type phases available

Ordering Information

Sumichiral OA Chiral Columns (mm)				
Phases	Description	Type	—	250 x 4.6
OA-2000	(R)-phenylglycine and 3,5-dinitrobenzoic acid	Covalent	—	CH0-1752
OA-3100	(S)-valine and 3,5-dinitroaniline	Covalent	—	CH0-1770
OA-3200	(S)-tert-leucine and 3,5-dinitroaniline	Covalent	—	CH0-1776
OA-3300	(R)-phenylglycine and 3,5-dinitroaniline	Covalent	—	CH0-1782
OA-4100	(S)-valine and (R)-1-(α -naphthyl)-ethylamine	Covalent	—	CH0-1794
OA-4400	(S)-proline and (S)-1-(α -naphthyl)-ethylamine	Covalent	—	CH0-1800
OA-4500	(S)-proline and (R)-1-(α -naphthyl)-ethylamine	Covalent	—	CH0-1806
OA-4700	(S)-tert-leucine and (R)-1-(α -naphthyl)-ethylamine	Covalent	—	CH0-1818
OA-4900	(S)-indoline-2-carboxylic acid and (R)-1-(α -naphthyl)ethylamine	Covalent	—	CH0-1830
				250 x 4.6
OA-2500	(R)-1-naphthylglycine and 3,5-dinitrobenzoic acid	Covalent	—	CH0-1836
OA-2500-I	(R)-1-naphthylglycine and 3,5-dinitrobenzoic acid	Ionic	—	CH0-1848
				150 x 4.6
OA-5000	(D)-penicillamine	Ligand Exchange	CH0-1859	—
OA-6100	(L)-tartaric acid-mono-(L)-valine-(S)-1-(α -naphthyl)ethylamide	Ligand Exchange	CH0-1863	—
				150 x 4.6
OA-8000	Crown ether	Cavity	CH0-7050	—

*For a list of applications, please contact your Phenomenex representative

Ultron® ES

Manufactured by Shinwa Chemical Industries, Ltd.

- Two complementary protein-based chiral stationary phases
- Easy to use with reversed-phase mobile phases
- Racemic separation without derivatization
- pH range from 3.0 to 7.5

Ordering Information

Ultron ES Chiral Columns						
Column	μ m	Size (mm)	ES-OVM	Price	ES-Pepsin	Price
Analytical	5	150 x 4.6	702111651		822111651	
Analytical & Guard	5	150 x 4.6	702111651A		822111631A	



Protect your valuable column investment with the disposable KrudKatcher™ pre-column filter, see p. 19

For In-line Filters specifically designed to protect your chiral column investment, see p. 331



For Chiral Column Performance Check Standards, see p. 373



For HPLC Column Heater System (25-90 °C), see p. 366