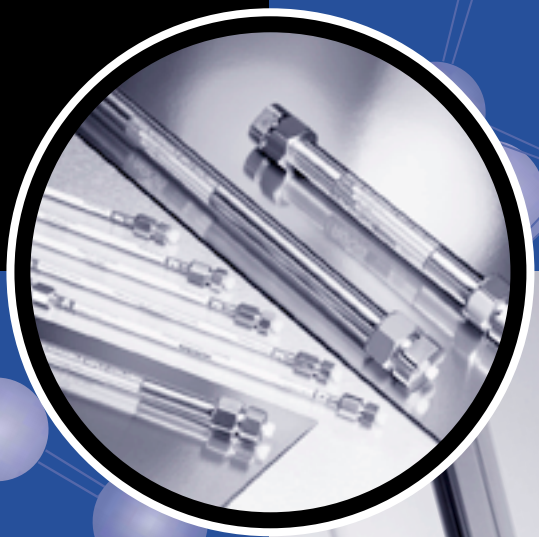
Chiral Stationary Phases



Chiral Stationary Phases

Chirality has become vitally important in the pharmaceutical, chemical and agricultural industries.

The differences which make compounds chiral can produce critically different pharmacological effects in biological systems. As a result, demand for stereoselective separation techniques and analytical assays to evaluate the enantiomeric purity of chiral compounds has increased.

Chiral chromatography has become a necessary tool—not only for the analytical determination of enantiomeric purity, but also for the isolation of pure enantiomers.

Chiral Chromatography

Regis Technologies is proud to be a leader in chiral separations and serve both the analytical and preparative needs of chromatographers and researchers worldwide. Regis offers three different classes of Chiral Stationary Phases (CSPs):

- Pirkle-Concept
- Davankov Ligand Exchange
- Protein-based

Regis manufactures a complete line of Pirkle Chiral Stationary Phases and Davankov Ligand Exchange columns at its pharmaceutical manufacturing facility. Columns range from analytical to preparative in size. A line of protein-based chiral stationary phases is also available. All products meet rigorous manufacturing and quality control specifications before release.

Pirkle Stationary Phases

In 1980, Regis Technologies, along with Professor William Pirkle, of the University of Illinois, introduced the Pirkle Chiral Stationary Phases. These Chiral Stationary Phases offer many advantages:

- Enantiomer separation on a wide variety of compound groups
- Column durability resulting from covalent phase bonding
- Ability to invert elution order
- Availability of analytical- to preparative-sized columns and bulk packing material
- Universal solvent compatibility

Enantiomer Separation

Regis manufactures ten Pirkle CSPs. These can separate a wide variety of enantiomers in numerous compound groups. Examples include:

- Aryl Propionic Acid Non-Sterodial Anti-Inflammatory Drugs (NSAIDs)
- Agricultural Compounds
- Natural Products
- β–Blockers
- Many Pharmaceuticals

Additional examples of enantiomer separations can be found in the Regis Chiral Application Guide IV or on our Web site at www.registech.com/chiral/. Our Web site is updated monthly with new applications and current chiral events.

Column Durability

The Pirkle Chiral Stationary Phases are covalently bonded to the silica, providing excellent column durability. Covalently bonded phases assure long-lasting columns and offer added benefits for preparative columns. Covalently bonded preparative columns are longer lasting than their coated, preparative column counterparts because with use, noncovalent coatings can leach off. Additional benefits include the columns' capacity to tolerate sample overload.

Ability to Invert Elution Order

An important advantage of the Pirkle Chiral Stationary Phases is the ability to invert elution order by using the same type of CSP, but with the opposite absolute configuration. As a result, it is possible to have the trace enantiomer elute before the major – a desirable feature for enantiomeric purity determinations. For preparative separations it is beneficial to elute the desired component first.

Analytical and Preparative-Sized Columns

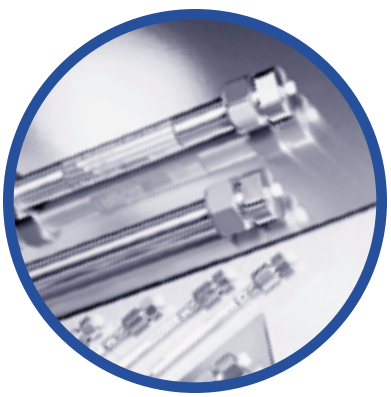
All of Regis' Pirkle HPLC columns are available in both analytical and preparative sizes. Since all chiral stationary phases are manufactured on-site, Regis can pack special or custom-sized columns quickly and easily.

Universal Solvent Compatibility

Choice of mobile phase is not a limitation with the Pirkle HPLC columns. They are compatible with most mobile phases. The pH of the mobile phase, however, must be between 2.5 and 7.5. **Both normal-phase and reversed-phase modes can be used**, although normal-phase is most common. For normal-phase separations, the classic mobile phase is a binary or ternary mixture of a hydrocarbon and a modifier, usually an aliphatic alcohol.

Typical uncharged organic modifers include ethanol, isopropanol and butanol. Under reversed-phase conditions, water-alcohol mixtures or aqueous phosphate buffers with charged organic modifiers are also employed.

Super and subcritical (SFC and SubFC) fluid chromatography, utilizing carbon dioxide, has also been introduced as a promising technique for the separation of enantiomers using Pirkle Chiral Stationary Phases.



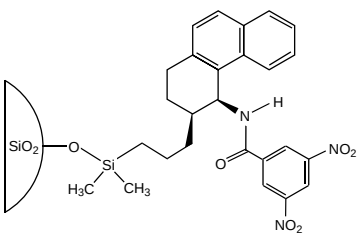
Whelk-O® 1

Analytical to Preparative Columns

The Whelk-O 1 is useful for the separation of underivatized enantiomers in a number of families including amides, epoxides, esters, ureas, carbamates, ethers, aziridines, phosphonates, aldehydes, ketones, carboxylic acids, alcohols and non-steroidal anti-inflammatory drugs (NSAIDs).

This π-electron acceptor/π-electron donor phase exhibits an extraordinary degree of generality. The broad versatility observed on the Whelk-O 1 column compares favorably with polysaccharide-derived chiral stationary phases.

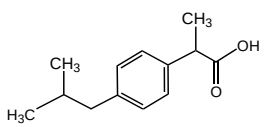
In addition, because Whelk-O 1 is covalently bonded to the support, the phase is compatible with all commonly used mobile phases, including aqueous systems – a distinct advantage over polysaccharide-derived chiral stationary phases. Other advantages include column durability, excellent efficiency, ability to invert elution order and excellent preparative capacity.

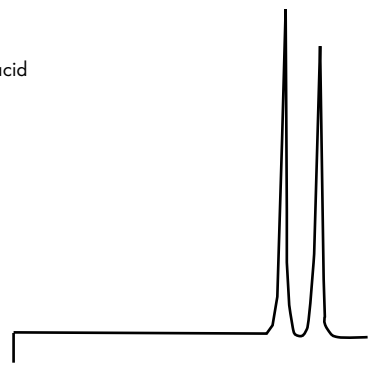


Product	Particle Size	Column Length and i.d.	Product #	U.S. Price
Spherical silica:				
(R,R)-Whelk-O 1	5 µm, 100Å	25 cm x 4.6 mm i.d.	786201	$1,500.00
(R,R)-Whelk-O 1	5 µm, 100Å	25 cm x 10.0 mm i.d.	786202	$5,000.00
(S,S)-Whelk-O 1	5 µm, 100Å	25 cm x 4.6 mm i.d.	786101	$1,500.00
(S,S)-Whelk-O 1	5 µm, 100Å	25 cm x 10.0 mm i.d.	786102	$5,000.00
Spherical Kromasil silica:				
(R,R)-Whelk-O 1	10 µm, 100Å	25 cm x 4.6 mm i.d.	786515	$1,500.00
(R,R)-Whelk-O 1	10 µm, 100Å	25 cm x 10.0 mm i.d.	786525	$5,000.00
(R,R)-Whelk-O 1	10 µm, 100Å	25 cm x 21.1 mm i.d.	786535	$11,000.00
(R,R)-Whelk-O 1	10 µm, 100Å	50 cm x 21.1 mm i.d.	786545	$18,000.00
(S,S)-Whelk-O 1	10 µm, 100Å	25 cm x 4.6 mm i.d.	786615	$1,500.00
(S,S)-Whelk-O 1	10 µm, 100Å	25 cm x 10.0 mm i.d.	786625	$5,000.00
(S,S)-Whelk-O 1	10 µm, 100Å	25 cm x 21.1 mm i.d.	786635	$11,000.00
(S,S)-Whelk-O 1	10 µm, 100Å	50 cm x 21.1 mm i.d.	786645	$18,000.00

Ibuprofen

Column: Whelk-O 1
25 cm x 4.6 mm i.d
Mobile Phase: (98/2/0.05)
hexane/isopropanol/acetic acid
Flow Rate: 0.9 mL/min
Load: 20 µL
Detection: UV 254 nm
Run Time: 8 min
Reference: 2





Whelk-O is a registered trademark of Regis Technologies, Inc.

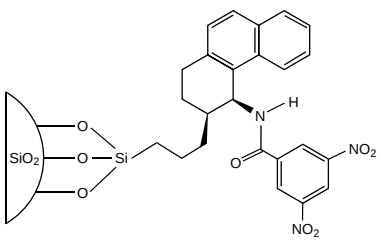
Product information and applications are available online at: www.registech.com/chiral/.

Whelk-O® 2

Analytical to Preparative Columns

Our newest addition to the Whelk-O line of chiral stationary phases is the Whelk-O 2. The Whelk-O 2 is the covalent trifunctional version of the Whelk-O 1. The Whelk-O 2 retains the same chiral selector but incorporates a trifunctional linkage to the silica support. In most cases, the enantioselectivity remains the same as that obtained with the Whelk-O 1.

Whelk-O 2 was designed to improve the resistance of the stationary phase to hydrolysis while using strong organic modifiers such as trifluoroacetic acid. The Whelk-O 2 is ideal for preparative separations since the material is bonded on 10 µm, 100Å spherical Kromasil silica. This allows the preparative chromatographer to perform method development on an analytical column and immediately scale up to larger diameter columns.

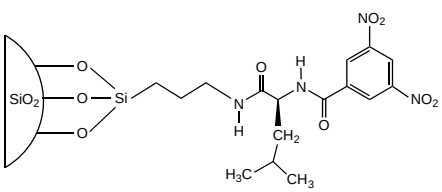


Product	Particle Size	Column Length and i.d.	Product #	U.S. Price
Spherical Kromasil silica:				
(R,R)-Whelk-O 2	10 µm, 100Å	25 cm x 4.6 mm i.d.	786315	$1,600.00
(R,R)-Whelk-O 2	10 µm, 100Å	25 cm x 10.0 mm i.d.	786325	$5,000.00
(R,R)-Whelk-O 2	10 µm, 100Å	25 cm x 21.1 mm i.d.	786335	$11,000.00
(R,R)-Whelk-O 2	10 µm, 100Å	50 cm x 21.1 mm i.d.	786345	$18,000.00
(S,S)-Whelk-O 2	10 µm, 100Å	25 cm x 4.6 mm i.d.	786415	$1,600.00
(S,S)-Whelk-O 2	10 µm, 100Å	25 cm x 10.0 mm i.d.	786425	$5,000.00
(S,S)-Whelk-O 2	10 µm, 100Å	25 cm x 21.1 mm i.d.	786435	$11,000.00
(S,S)-Whelk-O 2	10 µm, 100Å	50 cm x 21.1 mm i.d.	786445	$18,000.00

Leucine

Analytical and Semi-Preparative Columns

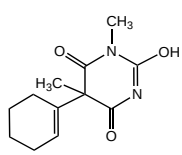
The π-acceptor leucine CSP is based on 3,5-dinitrobenzoyl leucine, covalently bonded to 5 µm aminopropyl silica. Columns derived from either L- or D-leucine are available. This phase demonstrates enhanced enantioselectivities for several classes of compounds, including benzodiazapines.



Product	Particle Size	Column Length and i.d.	Product #	U.S. Price
D-Leucine	5 µm, 100Å	25 cm x 4.6 mm i.d.	731054	$800.00
D-Leucine	5 µm, 100Å	25 cm x 10.0 mm i.d.	731254	$1,800.00
L-Leucine	5 µm, 100Å	25 cm x 4.6 mm i.d.	731041	$750.00
L-Leucine	5 µm, 100Å	25 cm x 10.0 mm i.d.	731241	$1,600.00

Hexobarbital

Column:	L-Leucine 25 cm x 4.6 mm i.d.
Mobile Phase:	(95/5) hexane/ethanol
Flow Rate:	0.7 mL/min
Load:	0.686 mg/mL
Detection:	UV 254 nm
Run Time:	16 min
k'_1:	2.89
α:	1.10



Whelk-O is a registered trademark of Regis Technologies, Inc.

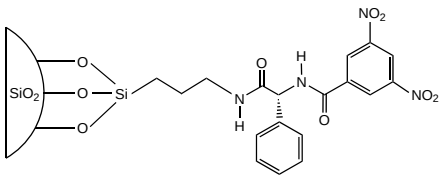
Product information and applications are available online at: www.registech.com/chiral/.

Phenylglycine

Analytical and Semi-Preparative Columns

Phenylglycine, a π-acceptor chiral phase, is based on 3,5-dinitrobenzoyl phenylglycine, covalently bonded to 5 µm aminopropyl silica. Phenylglycine columns are available in both L- and D- configurations.

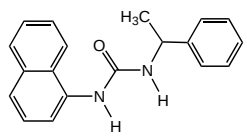
This CSP resolves a wide variety of compounds containing π-basic groups, including: aryl-substituted cyclic sulfoxides, bi-β-naphthol and its analogs, α-indanol and α-tetralol analogs, and aryl-substituted hydantoins.

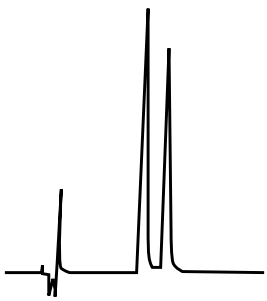


Product	Particle Size	Column Length and i.d.	Product #	U.S. Price
D-Phenylglycine	5 µm, 100Å	25 cm x 4.6 mm i.d.	731021	$700.00
D-Phenylglycine	5 µm, 100Å	25 cm x 10.0 mm i.d.	731221	$1,400.00
L-Phenylglycine	5 µm, 100Å	25 cm x 4.6 mm i.d.	731024	$700.00
L-Phenylglycine	5 µm, 100Å	25 cm x 10.0 mm i.d.	731224	$1,400.00

N-(1-Naphthyl)-N′-(1-methylbenzyl) urea

Column: D-Phenylglycine
25 cm x 4.6 mm i.d.
Mobile Phase: (70/30) hexane/ethanol
Flow Rate: 1.0 mL/min
Load: 20 µL
Detection: UV 254 nm
Run Time: 10 min
k'_1: 2.37
α: 1.22



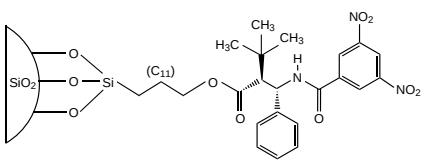


β-Gem 1

Analytical and Semi-Preparative Columns

β-Gem 1 is a π-acceptor chiral stationary phase and is prepared by covalently bonding N-3,5-dinitrobenzoyl-3-amino-3-phenyl-2-(1,1-dimethylethyl)-propanoate, to 5 µm silica through an ester linkage.

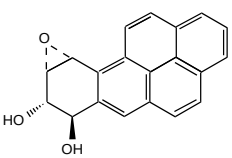
In many cases, this chiral phase considerably outperforms its widely used analog, phenylglycine. It can separate anilide derivatives of chiral carboxylic acids, including nonsteroidal anti-inflammatory agents.

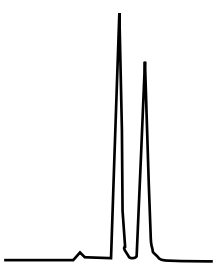


Product	Particle Size	Column Length and i.d.	Product #	U.S. Price
(R,R)-β-GEM 1	5 µm, 100Å	25 cm x 4.6 mm i.d.	731043	$1,400.00
(R,R)-β-GEM 1	5 µm, 100Å	25 cm x 10.0 mm i.d.	731243	$4,400.00
(S,S)-β-GEM 1	5 µm, 100Å	25 cm x 4.6 mm i.d.	731029	$1,400.00
(S,S)-β-GEM 1	5 µm, 100Å	25 cm x 10.0 mm i.d.	731229	$4,400.00

***trans*-(R)7,8-Dihydroxy-9,10-epoxy-7,8,9,10-tetrahydrobenzo[a]pyrene**

Column: *(R,R)*-β-Gem 1
25 cm x 4.6 mm i.d.
Mobile Phase: (60/40) hexane/ethanol
Flow Rate: 1.0 mL/min
Load: 20 µL
Detection: UV 254 nm
Run Time: 14 min
k'_1: 3.18
α: 1.25



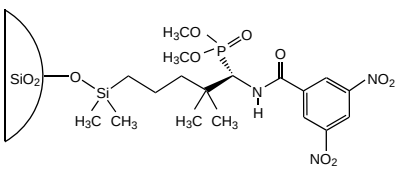


Product information and applications are available online at:
www.registech.com/chiral/.

Pirkle Chiral HPLC Columns

α-Burke 2
Analytical and Semi-Preparative Columns

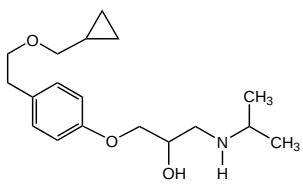
The α-Burke 2 phase is derived from dimethyl N-3,5-dinitro-benzoyl-α-amino-2,2-dimethyl-4-pentenyl phosphonate covalently bound to 5 µm silica. This π-acceptor chiral stationary phase is particularly valuable in the HPLC separation of β-blocker enantiomers, an important class of cardiovascular drugs whose enantiomers often exhibit differing pharmacological activities. The α-Burke 2 has been specifically designed to separate the enantiomers of β-blockers without chemical derivatization. In addition, it also resolves the enantiomers of many compounds separated on π-acceptor Pirkle type chiral stationary phases.

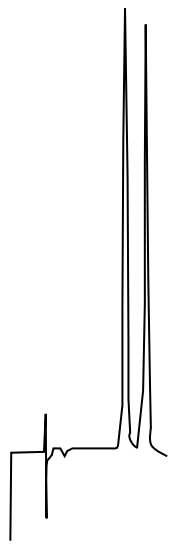


Product	Particle Size	Column Length and i.d.	Product #	U.S. Price
(R)-α-Burke 2	5 µm, 100Å	25 cm x 4.6 mm i.d.	735035	$1,400.00
(R)-α-Burke 2	5 µm, 100Å	25 cm x 10.0 mm i.d.	735235	$4,400.00
(S)-α-Burke 2	5 µm, 100Å	25 cm x 4.6 mm i.d.	735037	$1,400.00
(S)-α-Burke 2	5 µm, 100Å	25 cm x 10.0 mm i.d.	735237	$4,400.00

Betaxolol

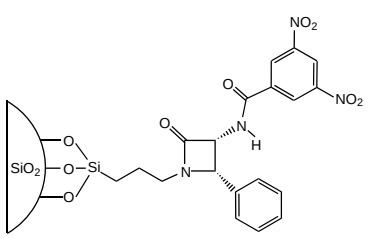
Column: α-Burke 2
25 cm x 4.6 mm i.d.
Mobile Phase: (85/10/5) CH_2C1_2/EtOH/MeOH
Flow Rate: 1 mL/min
Detection: UV 254 nm
Run Time: 11 min
k'_1: 2.36
α: 1.25
Reference: 4





Pirkle 1-J
Analytical and Semi-Preparative Columns

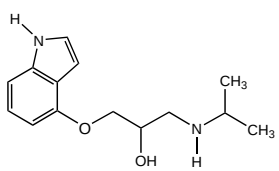
The Pirkle 1-J column is the latest in a series of CSPs from the research laboratories of Professor Pirkle. This new CSP contains an unusual β-lactam structure which significantly alters its molecular recognition properties. The Pirkle 1-J is useful for the direct separation of underivatized β-blocker enantiomers. It can also be used for the separation of the enantiomers of arylpropionic acid NSAIDs, as well as other drugs.

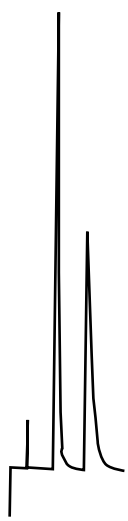


Product	Particle Size	Column Length and i.d.	Product #	U.S. Price
(3R, 4S)-Pirkle 1-J	5 µm, 100Å	25 cm x 4.6 mm i.d.	731044	$1,400.00
(3R, 4S)-Pirkle 1-J	5 µm, 100Å	25 cm x 10.0 mm i.d.	731244	$4,400.00
(3S, 4R)-Pirkle 1-J	5 µm, 100Å	25 cm x 4.6 mm i.d.	731045	$1,400.00
(3S, 4R)-Pirkle 1-J	5 µm, 100Å	25 cm x 10.0 mm i.d.	731245	$4,400.00

Pindolol

Column: Pirkle 1-J
25 cm x 4.6 mm i.d.
Mobile Phase: (80/20) methylene chloride/ethanol, +0.04M ammonium acetate
Flow Rate: 1.0 mL/min
Load: 10 µL
Detection: UV 254 nm





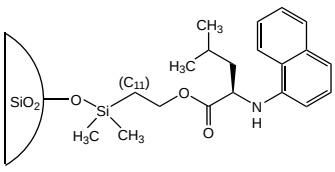
Product information and applications are available online at: www.registech.com/chiral/.

Naphthylleucine

Analytical and Semi-Preparative Columns

The naphthylleucine phase, a π-electron-donor, is based on N-(1-naphthyl) leucine, covalently bonded to 5 µm silica through an ester linkage.

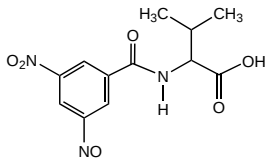
This phase resolves DNB derivatives of amino acids as the free acid when used in reversed-phase mode. In the classic normal-phase, this CSP can resolve the amides and esters of DNB amines, alcohols and amino acids.

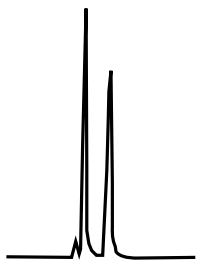


Product	Particle Size	Column Length and i.d.	Product #	U.S. Price
L-Naphthylleucine	5 µm, 100Å	25 cm x 4.6 mm i.d.	731034	$800.00
L-Naphthylleucine	5 µm, 100Å	25 cm x 10.0 mm i.d.	731234	$1,900.00

N-(3,5-Dinitrobenzoyl) valine

Column: Naphthylleucine
25 cm x 4.6 mm i.d.
Mobile Phase: (80/20) methanol/10mM KH_2PO_4, pH 6.86 + 0.5 mM Q6
Flow Rate: 1.0 mL/min
Load: 5 µL
Detection: UV 254 nm
Run Time: 4 min

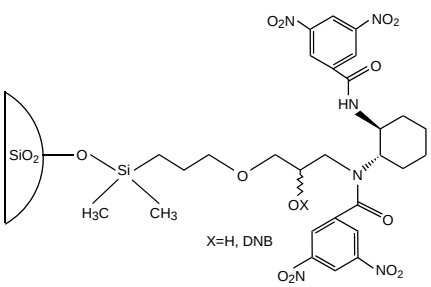




DACH-DNB

Analytical to Preparative Columns

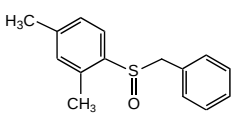
The innovative DACH-DNB CSP was designed by Italian chemists Drs. Francesco Gasparrini, Misiti and Villani at Rome University "La Sapienza." The DACH-DNB CSP, which contains the 3,5-dinitrobenzoyl derivative of 1,2-diaminocyclohexane, has been found to resolve a broad range of racemate classes including amides, alcohols, esters, ketones, acids, sulfoxides, phosphine oxides, selenoxides, phosphonates, thiophosphineoxide, phosphineselenide, phosphine-borane, beta-lactams, organometallics, atropisomers and heterocycles.

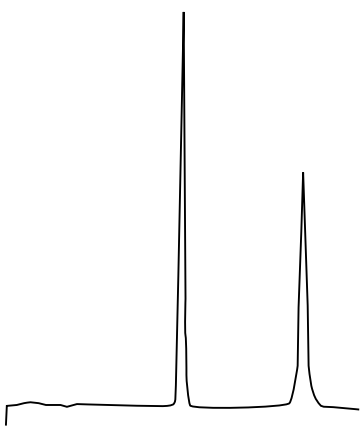


Product	Particle Size	Column Length and i.d.	Product #	U.S. Price
(R,R)-DACH-DNB	5 µm, 100Å	25 cm x 4.6 mm i.d.	788101	$1,400.00
(R,R)-DACH-DNB	5 µm, 100Å	25 cm x 10.0 mm i.d.	788102	$4,400.00
(R,R)-DACH-DNB	10 µm, 100Å	25 cm x 21.1 mm i.d.	788103	$11,000.00
(S,S)-DACH-DNB	5 µm, 100Å	25 cm x 4.6 mm i.d.	788201	$1,400.00
(S,S)-DACH-DNB	5 µm, 100Å	25 cm x 10.0 mm i.d.	788202	$4,400.00
(S,S)-DACH-DNB	10 µm, 100Å	25 cm x 21.1 mm i.d.	788203	$11,000.00

Sulfoxide

Column: (R,R)-DACH-DNB
25 cm x 4.6 mm
Mobile Phase: (95/5) CH_2Cl_2/IPA
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 15.0 min
k'_1: 2.15
α: 2.05



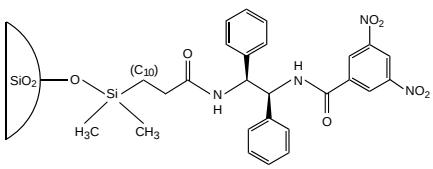


Product information and applications are available online at: www.registech.com/chiral/.

ULMO

Analytical to Preparative Columns

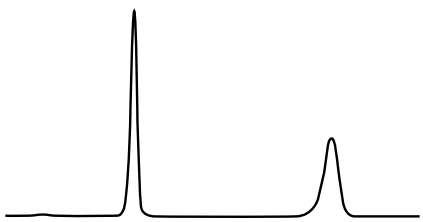
The ULMO chiral stationary phase was developed by Austrian researchers Uray, Lindner and Maier. The ULMO CSP is based on a 3,5-dintrobenzoyl derivative of diphenylethylenediamine. This CSP has a general ability to separate the enantiomers of many racemate classes and is particularly good at separating the enantiomers of aryl carbinols.

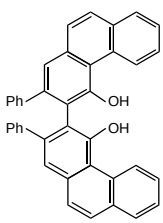


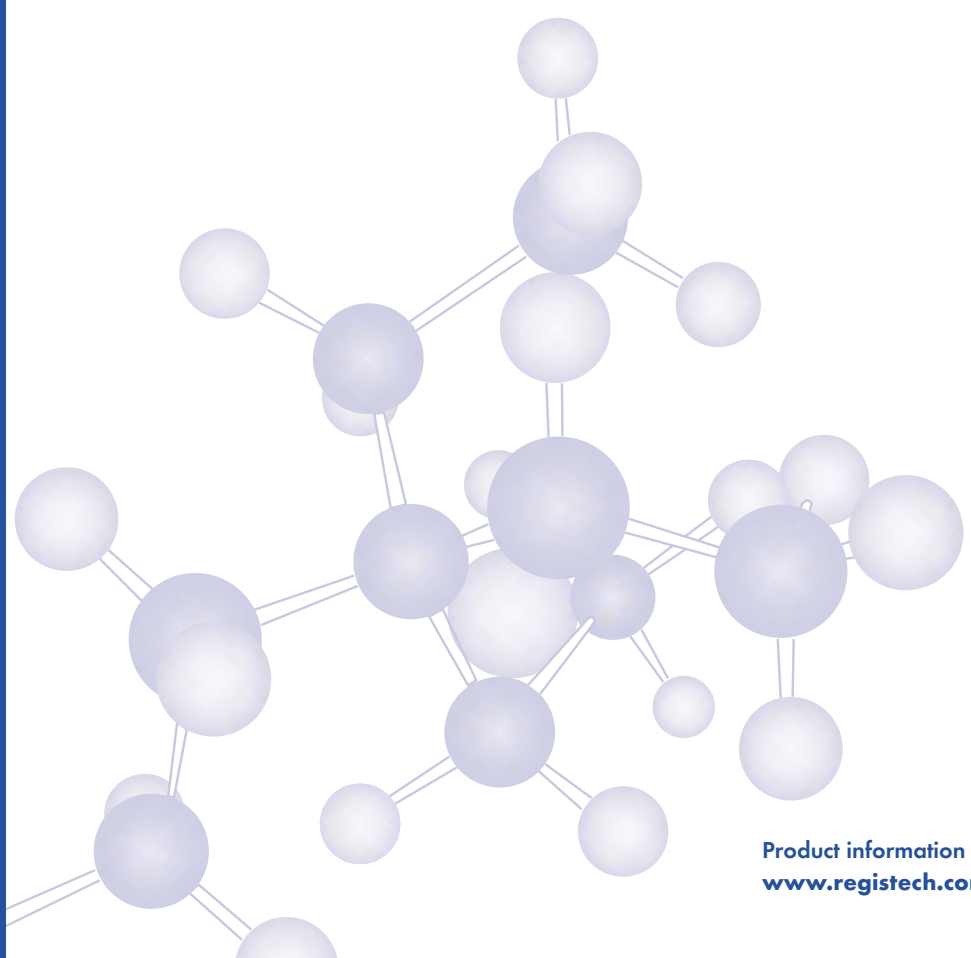
Product	Particle Size	Column Length and i.d.	Product #	U.S. Price
(S,S)-ULMO	5 µm, 100Å	25 cm x 4.6 mm i.d.	787100	$1,400.00
(S,S)-ULMO	5 µm, 100Å	25 cm x 10.0 mm i.d.	787101	$4,400.00
(S,S)-ULMO	10 µm, 100Å	25 cm x 21.1 mm i.d.	787102	$11,000.00
(R,R)-ULMO	5 µm, 100Å	25 cm x 4.6 mm i.d.	787200	$1,400.00
(R,R)-ULMO	5 µm, 100Å	25 cm x 10.0 mm i.d.	787201	$4,400.00
(R,R)-ULMO	10 µm, 100Å	25 cm x 21.1 mm i.d.	787202	$11,000.00

Vapol

Column: (R,R)-ULMO
25 cm x 4.6 mm
Mobile Phase: 100% methanol
Flow Rate: 1.5 mL/min
Detection: UV 254 nm
Run Time: 13 min
k'_1: 1.74
α: 3.37







Product information and applications are available online at:
www.registech.com/chiral/.

Davankov Ligand Exchange Chiral Stationary Phase

Davankov Ligand Exchange Chiral Stationary Phase

The Davankov chiral stationary phase is useful for the separation of underivatized amino acid enantiomers. This phase operates according to the principles of ligand-exchange chromatography (LEC), a technique pioneered by Professor V. Davankov.

The Davankov column requires a mobile phase of aqueous methanol containing copper(II) acetate. Enantioselectivity is extremely high with alphas up to 16 being reported. Regis provides either a Davankov HPLC column, or a kit which allows the user to convert a standard ODS column into a Davankov Chiral Stationary phase.

Both of these Davankov products maintain a stable coating compatible with those mobile phases generally used in amino acid separations.

Davankov Column

A pre-converted Davankov column complete with care and use guide, column test conditions and performance results is available.

Davankov Reagent A Kit

Regis provides the Davankov Reagent A kit, which contains Davankov Reagent A, a hydroxyproline derivative and copper(II) acetate (sufficient quantities to coat one 15 cm column and prepare mobile phase). The column coating procedure involves dissolving the Davankov Reagent A into methanol/water (80/20) and pumping this mixture through the column. This is followed by a wash with a concentrated solution of $Cu(OAc)_2$ in methanol/water (15/85). Detailed coating procedures are included with the kit.

Product	Particle Size	Column Length and i.d.	Product #	U.S. Price
Davankov Column	5 µm, 100Å	15 cm x 4.6 mm i.d.	731653	$700.00
Davankov Reagent A Kit			731650	$300.00
REXCHROM ODS Column	5 µm, 100Å	15 cm x 4.6 mm i.d.	728118	$300.00

DL-Leucine and DL-Norvaline

Column: REXCHROM Davankov A
15 cm x 4.6 mm i.d.

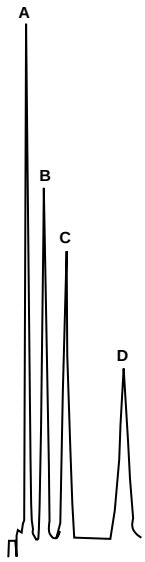
Mobile Phase: (65/35) 10^{-4} M $CuAc_2$, pH 5.0/methanol

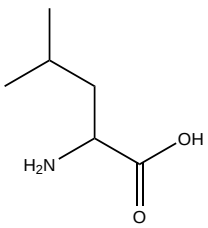
Flow rate: 2.0 mL/min

Detection: UV 254 nm

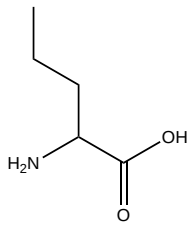
Run Time: 16 min

Peak Identities:
A. L-Norvaline
B. L-Leucine
C. D-Norvaline
D. D-Leucine

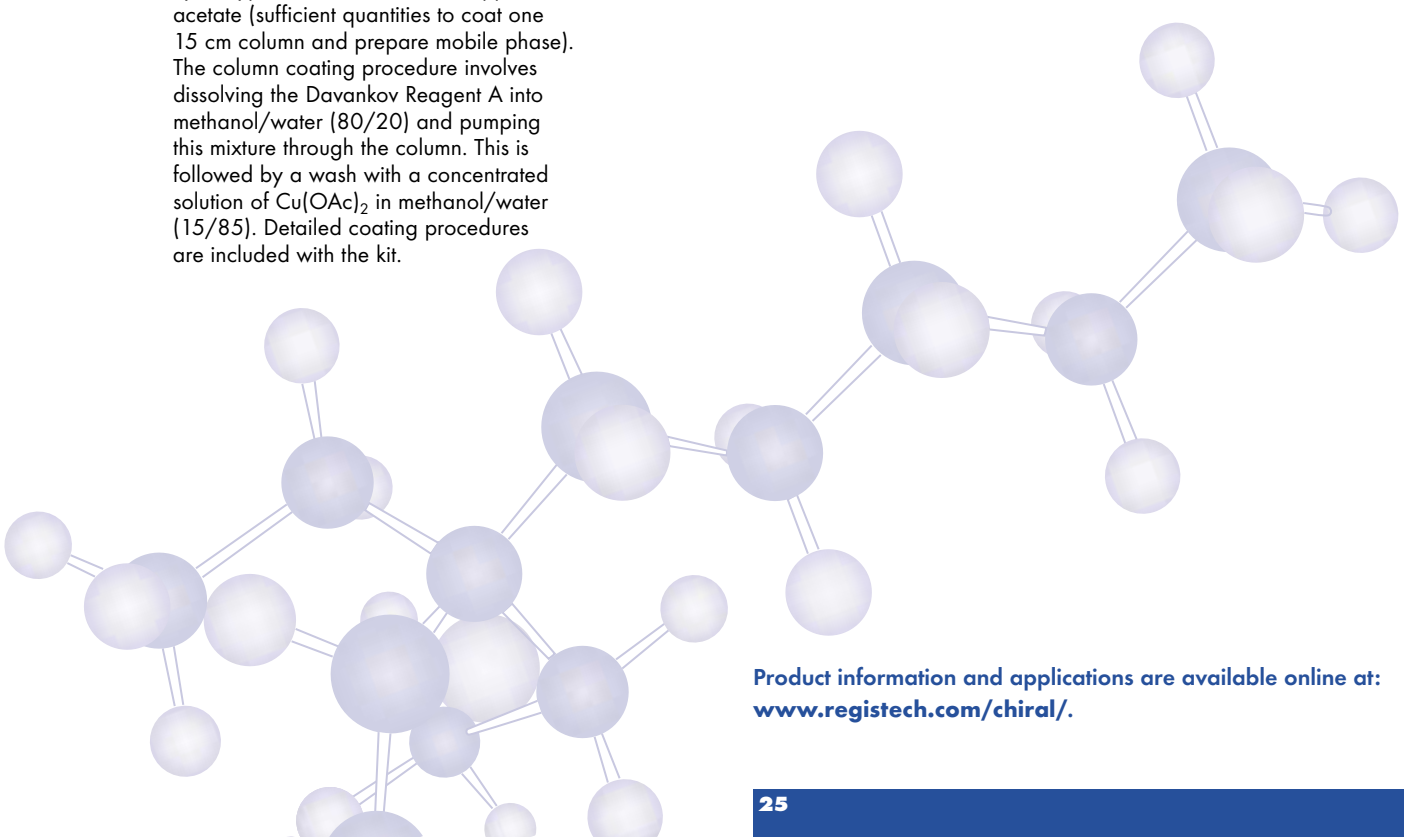




DL-Leucine



DL-Norvaline



Product information and applications are available online at: www.registech.com/chiral/.

Protein-Based Chiral Stationary Phases

Regis carries a line of protein-based chiral columns manufactured by ChromTech AB. These include:

- Chiral AGP-(α–glycoprotein)
- Chiral CBH-(cellobiohydrolase)
- Chiral HSA-(human serum albumin)

For additional product information and a Protein-Based Stationary Phase Application Guide, please contact Regis at sales@registech.com.

Chiral AGP

Micro, Analytical and Semi-Preparative Columns

Chiral AGP is the second generation chiral selector based on the α_1-acid glycoprotein (α_1-AGP) as the chiral stationary phase. The AGP has been immobilized on spherical, 5 µm particles. The Chiral AGP column is typically used in the reversed-phase mode, where it can be used for the resolution of an extremely broad range of chiral compounds, such as amines, (primary, secondary, tertiary and quaternary ammonium), acids, esters, sulphoxides, amides, and alcohols. The enantioselectivity and the retention can easily be regulated by the pH of the mobile phase, the buffer concentration and the nature and concentration of the organic modifier.

Product	Particle Size	Column Length and i.d.	Product #	U.S. Price
Chiral AGP	5 µm	15 cm x 0.18 mm i.d.	732195	$1,600.00
Chiral AGP	5 µm	10 cm x 1 mm i.d.	732194	$1,950.00
Chiral AGP	5 µm	10 cm x 2.0 mm i.d.	732196	$1,250.00
Chiral AGP	5 µm	15 cm x 2.0 mm i.d.	732197	$1,400.00
Chiral AGP	5 µm	5 cm x 4.0 mm i.d.	732198	$995.00
Chiral AGP	5 µm	10 cm x 4.0 mm i.d.	732200	$1,230.00
Chiral AGP	5 µm	15 cm x 4.0 mm i.d.	732199	$1,490.00
Chiral AGP	5 µm	10 cm x 10.0 mm i.d.	732301	$4,750.00
Chiral AGP	5 µm	15 cm x 10.0 mm i.d.	732302	$7,100.00
Chiral AGP Guard Column	5 µm	1 cm x 3.0 mm i.d.	732300	$135.00
Guard cartridge holder			731441	$125.00

Omeprazole

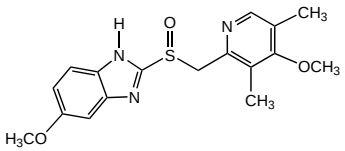
Column: Chiral-AGP
10 cm x 4.0 mm i.d.

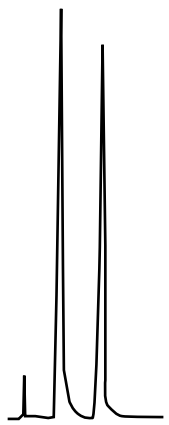
Mobile phase: 10% acetonitrile in 10 mM sodium phosphate buffer, pH 6.5

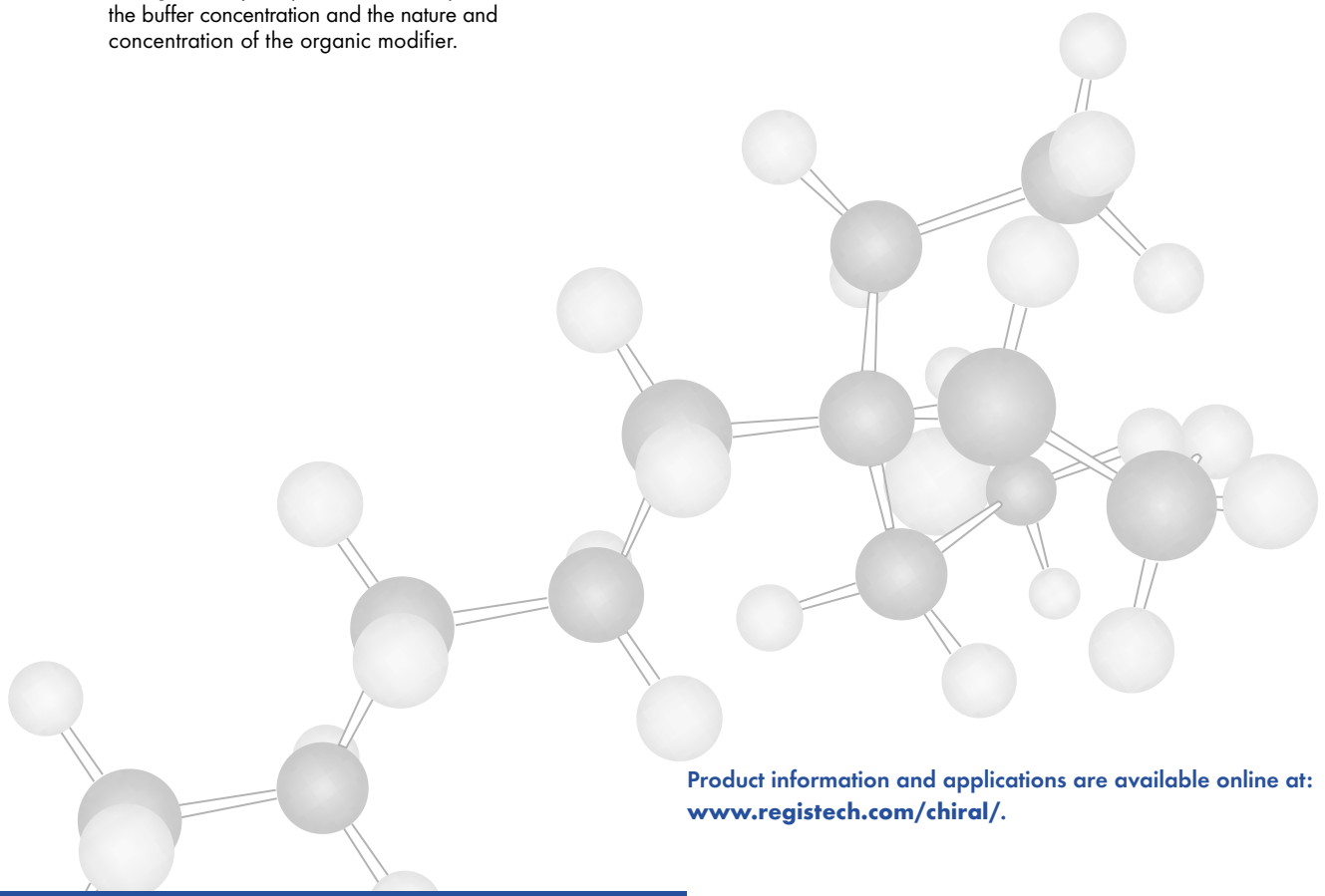
Detection: UV 210 nm

Sample Conc: 0.02 mg/mL

Run Time: 8 min







Product information and applications are available online at: **www.registech.com/chiral/.**

Chiral CBH

Micro, Analytical and Semi-Preparative Columns

Cellobiohydrolase (CBH) is a stable enzyme which has been immobilized onto 5 µm spherical silica particles. The column is used in reversed-phase mode and is effective for the separation of enantiomers of basic drugs from many compound classes. The retention and the enantioselectivity can be regulated by changes in pH, buffer concentration and the nature and concentration of organic modifer.

Product	Particle Size	Column Length and i.d.	Product #	U.S. Price
Chiral CBH	5 µm	10 cm x 0.18 mm i.d.	732357	$1,550.00
Chiral CBH	5 µm	10 cm x 2.0 mm i.d.	732353	$1,250.00
Chiral CBH	5 µm	15 cm x 2.0 mm i.d.	732354	$1,400.00
Chiral CBH	5 µm	5 cm x 4.0 mm i.d.	732352	$995.00
Chiral CBH	5 µm	10 cm x 4.0 mm i.d.	732350	$1,230.00
Chiral CBH	5 µm	15 cm x 4.0 mm i.d.	732351	$1,490.00
Chiral CBH	5 µm	10 cm x 10.0 mm i.d.	732355	$4,750.00
Chiral CBH	5 µm	15 cm x 10.0 mm i.d.	732356	$7,100.00
Chiral CBH Guard Column	5 µm	1 cm x 3.0 mm i.d.	732358	$135.00
Guard cartridge holder			731441	$125.00

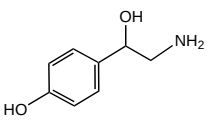
Octopamine

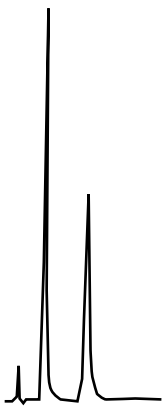
Column: Chiral-CBH
10 cm x 4.0 mm i.d.

Mobile phase: 5% 2-propanol in 10 mM sodium phosphate buffer, pH 6.0 + 50 µM disodium EDTA

Sample Conc: 0.03 mg/mL

Run Time: 9 min





Product information and applications are available online at: **www.registech.com/chiral/.**

Chiral HSA

Analytical and Semi-Preparative Columns

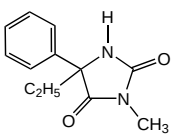
With the Chiral human serum albumin (HSA) column, the enantiomers of many carboxylic acids and amino acids can be resolved directly, without derivatization. Enantioselectivity and retention can be regulated by changing the mobile phase composition, pH, buffer concentration and/or nature of the organic modifier.

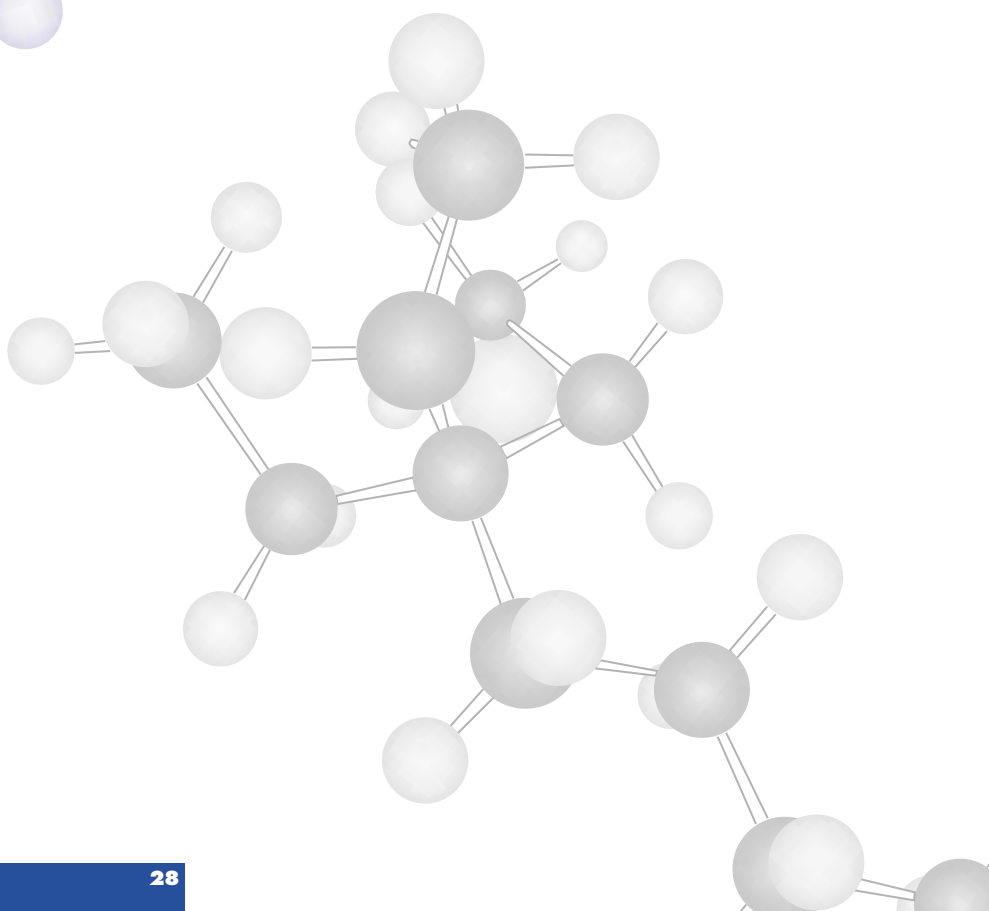
HSA has been immobilized onto 5 µm spherical silica particles. The surface chemistry of the silica and the method of immobilization provide a stable chiral separation material.

Product	Particle Size	Column Length and i.d.	Product #	U.S. Price
Chiral HSA	5 µm	10 cm x 4.0 mm i.d.	732240	$1,230.00
Chiral HSA	5 µm	15 cm x 4.0 mm i.d.	732239	$1,490.00
Chiral HSA	5 µm	10 cm x 10.0 mm i.d.	732341	$3,775.00
Chiral HSA	5 µm	15 cm x 10.0 mm i.d.	732342	$5,050.00
Chiral HSA Guard Column	5 µm	1 cm x 3.0 mm i.d.	732340	$135.00
Guard cartridge holder			731441	$125.00

Mephenytoin

Column: Chiral-HSA
10 cm x 4.0 mm i.d.
Mobile phase: 10 mM sodium phosphate buffer, pH 7.0
Detection: UV 225 nm
Sample Conc: 0.02 mg/mL
Run Time: 8 min





For additional information on Chiral Stationary Phases, check our Web site at www.registech.com/chiral/. You may also request a copy of the Chiral HPLC Application Guide containing additional Chiral Applications, by contacting Regis at:

(800) 323-8144 ext. 649
(847) 967-6000 ext. 649
e-mail us at: **sales@registech.com.**