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REGIS® TECHNOLOGIES, INC.

CHROMATOGRAPHY CATALOG



BGB GC LC MS CE



www.registech.com

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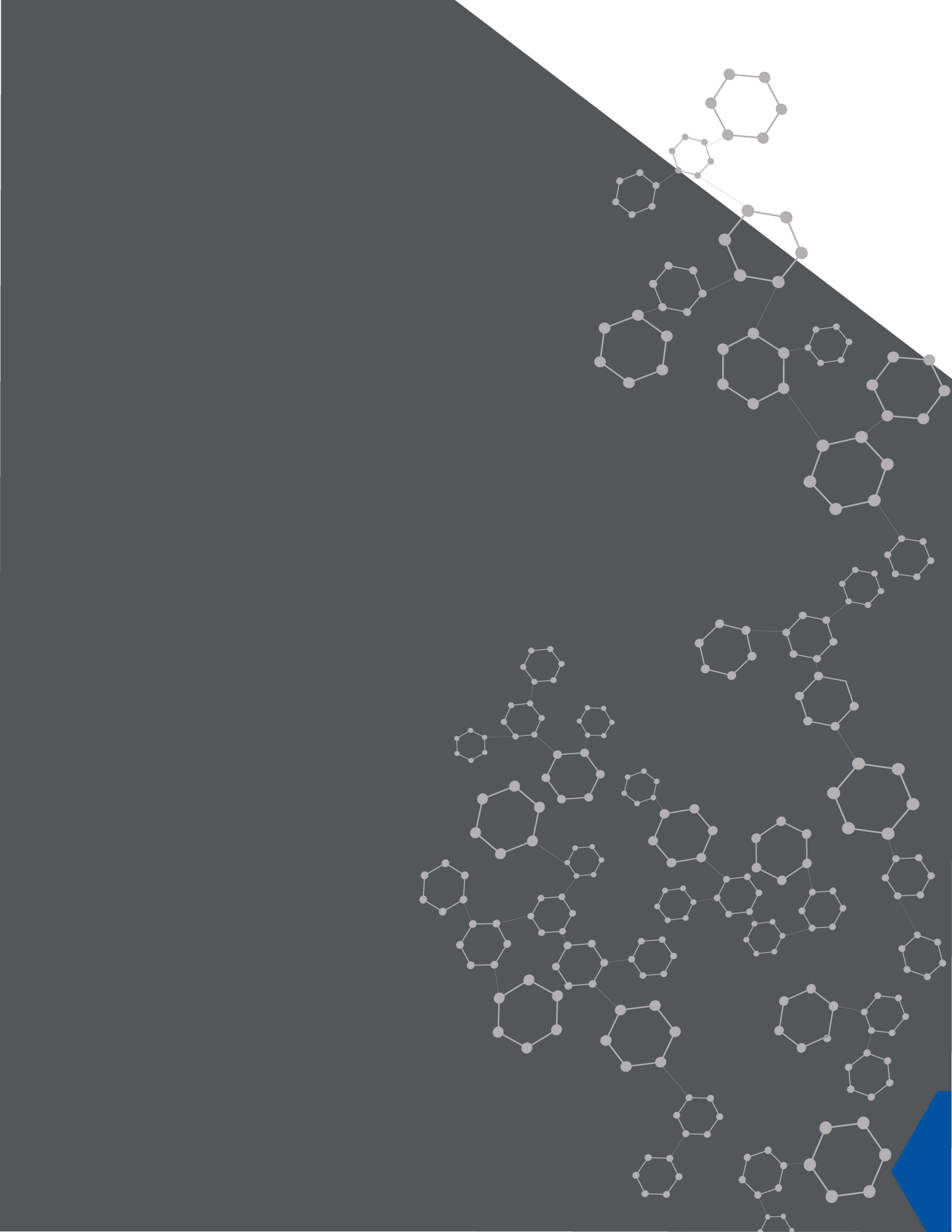
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REGIS®
TECHNOLOGIES, INC.



Regis Technologies, Inc. has been a recognized manufacturer of innovative consumables for the separation scientist since 1966. Our products include packed columns in sizes from analytical to preparative, bulk media for chiral and achiral separations, and specialty columns and reagents.

FIFTY YEARS OF INNOVATION

Specialty Reagents: Since 1966, Regis has been delivering high quality reagents starting with the first kit for analyzing natural protein amino acids by gas chromatography. Guaranteeing high purity and fast delivery, we offer a wide range of derivatizing, ion pairing, and bioluminescent reagents produced in our GMP manufacturing facility.

Chiral Columns: Since 1972, Regis has been a premier supplier of columns for chiral separations, starting with the introduction of Pirkle-type phases, including our flagship phase, Whelk-O® 1. Over the years we have continued to add new chiral phases to our product line, most recently introducing a line of coated and immobilized polysaccharide phases under the Reflect™ brand name.

Specialty Columns: In the 1980s, Regis brought Restricted Access Media (RAM) columns (for the direct injection of serum for drug analytes) and Immobilized Artificial Membrane (IAM) columns (to enable the prediction of drug membrane permeability) to the drug discovery community. Worldwide, researchers are still finding new ways to use these columns to save both time and money in the drug discovery process.

QUALITY PRODUCTS AND SERVICES

Our high purity reagents and HPLC columns are manufactured in a GMP manufacturing facility and meet strict quality control specifications. With decades of chromatography experience, our staff is dedicated to assisting customers with method development, troubleshooting issues, and providing product recommendations. Our global network of distributors bring Regis products along with outstanding customer support to virtually every corner of the globe.

CUSTOM DEVELOPMENT AND MANUFACTURING

Regis Custom Pharma has the necessary technical and operational capabilities to fully support its pharmaceutical and biotechnology clients' preclinical and clinical active pharmaceutical ingredient (API) needs. We offer a full range of services to support the development of our clients' lead molecules through commercialization, including process research and development, analytical and stability services, GMP API manufacturing, and preparative chromatographic separations. Regis operates an FDA inspected CGMP facility with ~36,000 square feet of production space for its Custom Pharma projects and the manufacturing of most chromatography products.

OUR PEOPLE

Committed to our Staff: We are proud of our highly technical staff comprised of educated, experienced, and engaging people in every department. Regis provides growth and cross-training opportunities for its team, including support for continuous education.

Committed to our Community: Each of us are proud to work for a caring, community-oriented organization. Recently, the Catholic Charities of the Archdiocese of Chicago recognized our owners, the Glunz family, with their highest honor, the Mandatum Award, for their generous support since 1975. In 2016, Loyola University Chicago's Quinlan School of Business awarded Regis the Illinois Family Business of the Year award. The Glunz family not only leads by example but provides Regis employees opportunities to volunteer and contribute to local causes.

Committed to You: Our team of experienced chemists, project managers, and support staff values each customer and is dedicated to moving their work forward. Our small size allows us to be accessible, responsive, and fast-acting. With over 60 years of proven customer service, you can rely on Regis to provide the highest quality products, services, and support as we continue to grow and meet the challenges of the future.

Contact us

By phone: (847)967-6000
By email: chromsales@registech.com
Visit our website: www.registech.com
To find a distributor in your country: www.registech.com/distributors



CHIRAL COLUMNS
For HPLC & SFC



CHIRAL CHROMATOGRAPHY

The ability to separate racemic compounds has become vitally important in the pharmaceutical, chemical, agricultural, and many other industries. Chiral chromatography has become a necessary tool–not only for the analytical determination of enantiomeric purity, but also for the isolation of pure enantiomers.

The separation of enantiomers relies on chiral stationary phases specifically designed to separate chiral molecules, since their enantiomers have the same physical and chemical properties but different spatial orientations. Regis offers three types of chiral stationary phases (CSPs) to enable separation of a broad range of compound types:

Whelk-O 1 (see page 13)

- Broad applicability for separation of enantiomers
- Alternative selectivity to polysaccharide CSPs
- High loading capacity for preparative applications
- Covalently bonded for long-term stability and broad mobile phase compatibility
- Choice of enantiomeric phases allows inversion of peak elution order

Polysaccharide (see page 19)

- Broad applicability for separation of enantiomers
- Available in both coated and immobilized phases
- Guaranteed performance to competitor equivalent selectors
- Compatible with normal phase HPLC, reversed-phase HPLC, and SFC conditions

Crown-Ether (see page 35)

- Best choice for separating amino acids and compounds containing primary amines
- Covalently bonded for excellent durability
- Available in both enantiomeric forms, allowing for inversion of peak elution order

All columns can be used with HPLC and/or SFC methods and are available in multiple particle sizes and dimensions to facilitate analytical through preparative scale separations. Bulk material is available for large-scale preparative separations. All columns meet rigorous manufacturing and quality control standards.

Did You Know?

Regis Technologies has been bringing innovative chiral stationary phases to market since 1972. We are proud to be a trusted supplier of high quality chromatography products and unique chiral stationary phases for more than 45 years.

COLUMN SELECTION

The biggest challenges in chiral separations are finding the best column for separating compounds of various types, as there is no universal chiral stationary phase, and predicting which chiral stationary phase will provide the best separation is difficult. Unlike many normal phase or reversed-phase separations, chiral separations do not simply depend on hydrophobicity. Chiral separations depend highly on the differences in orthoganality and planar shape between the two stereoisomers and their interaction with the stationary phase. Often, more than one column may provide some separation, but in many cases only one column or possibly two will provide adequate resolution of the enantiomers. Therefore, screening of multiple columns is often needed to find the right column for separation.

Ask the Expert

Our technical experts can recommend a selection of columns for a screening kit based on your needs. Contact us at techsupport@registech.com.

FREE CHIRAL SCREENING

Don't know where to start? Let us find the best column and method for your compound! A Regis chiral separations expert will develop a chiral separation method tailored to your analytical or preparative separation project, usually within three days.

3 Steps + 3 Days = Results

1. Execute a CDA, if desired. Regis has a premade template to assist with this step.
2. Complete a sample submission form, which includes health and safety information for your compound.
3. Submit a small amount of sample for screening. Regis will screen your sample across our full range of chiral stationary phases. Results are typically returned within 3 business days.

Start today. Contact your sales representative or email us at chromsales@registech.com.

WHELK-O 1

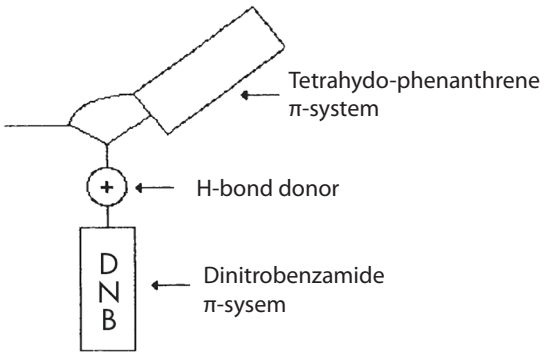
The Original Immobilized Phase

- Excellent method development column with applicability to a wide range of compound classes
- Alternate selectivity to polysaccharide chiral stationary phases
- Covalently bonded for long term performance and broad mobile phase compatibility
- Broad range of particle sizes and dimensions for analytical to preparative scale separations
- High loading capacity for excellent scalability in preparative applications
- Choice of enantiomeric phases allows inversion of peak elution order
- Recognized as USP L102

Chemistry

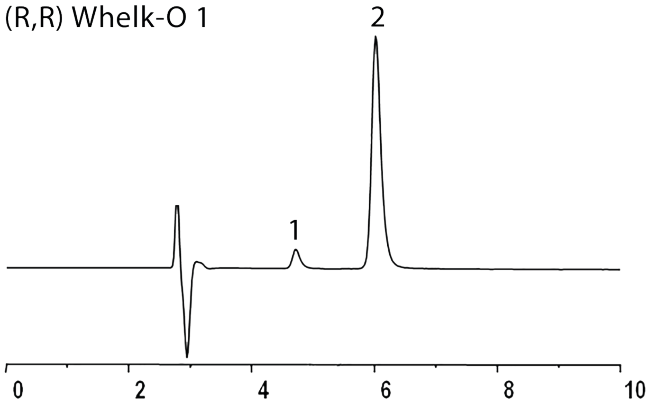
General purpose Pirkle-type chiral phase designed to achieve selectivity through pi-pi interactions, dipole moment, hydrogen bonding interactions, and additional selectivity based on structure. Fully endcapped and bonded to high purity silica. Covalent bonding makes it compatible with all commonly used mobile phases, including aqueous systems. This column can be used in both normal phase and reversed-phase with minimal equilibration time when switching between the two modes.

Key functional groups of the Whelk-O 1 selector involved in chiral recognition

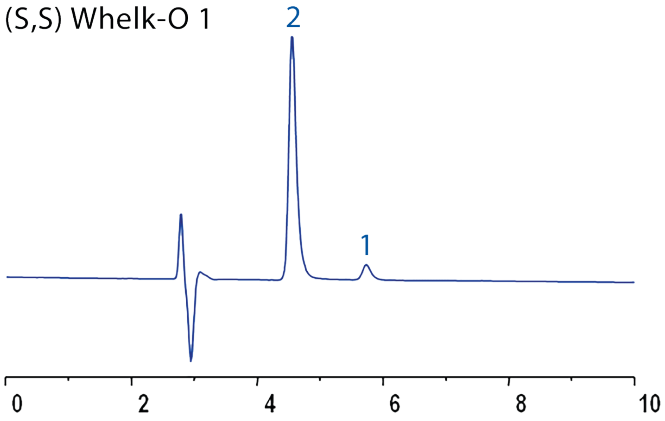




Inversion of elution order on (R,R) and (S,S) Whelk-O 1







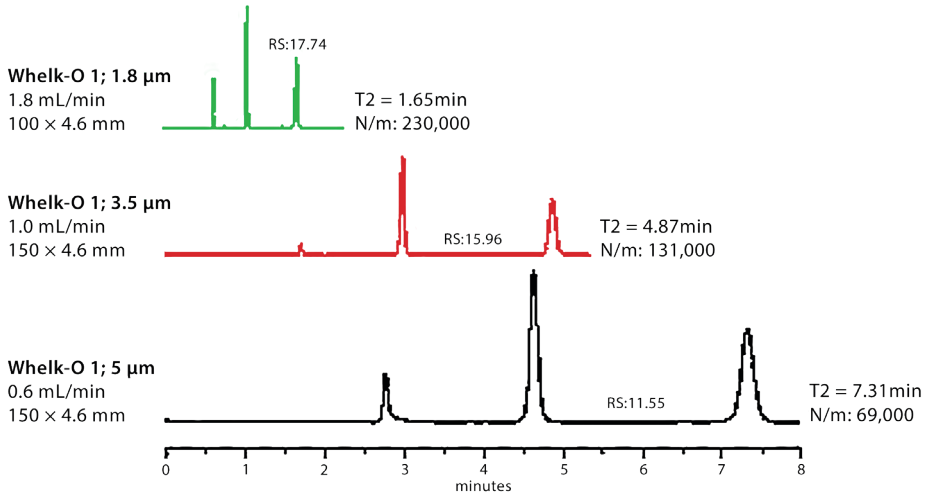


Whelk-O 1 columns are available in both R,R and S,S configurations. Choosing one or the other allows for peak elution order to be inverted. This can be beneficial in preparative and process scale applications when needing to elute one peak of interest quickly.

Available in 1.8 µm UHPLC columns

- Increase throughput and resolution—Great for rapid chiral screening
- 1.8µm fully porous particles for high efficiency separations in both UHPLC and UHPSFC
- Stable, long term performance for long column lifetimes at high flow rates and pressures

Rapid Chiral Separations—3X Faster with 1.8 µm particles



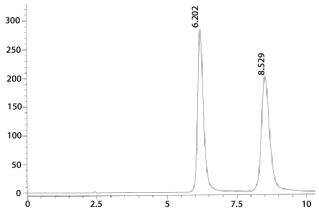
Eluent: Hex/EtOH 90:10 + 1% MeOH

Sample: trans-stilbene oxide

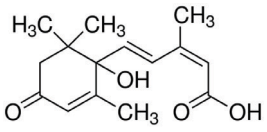


WHELK-O 1 APPLICATIONS

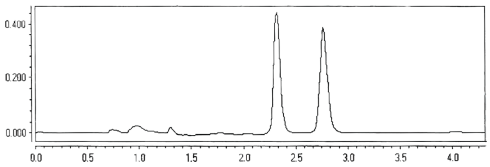
Abscisic Acid



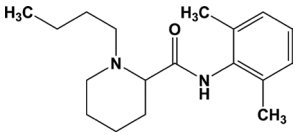
Column: Whelk-O 1, 5 µm, 25 cm x 4.6 mm
Mobile Phase: (75/25) Hexane/IPA + 0.1% Acetic Acid
Flow Rate: 1.5 mL/min
Detection: UV 254 nm
k'1: 2.21
α: 1.55
Catalog #: 1-780101-300, 1-780201-300



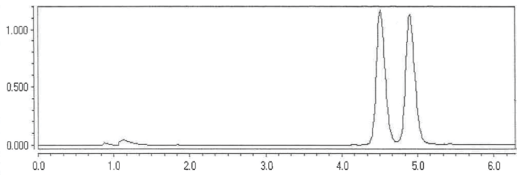
Bupivacaine



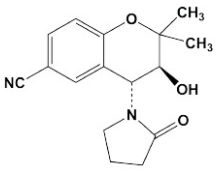
Column: (S,S) Whelk-O 1, 5 µm, 25 cm x 4.6 mm
Mobile Phase: (75/25) CO_2/Ethanol + 0.5% DEA
Flow Rate: 4.0 mL/min
Temperature: 40°C
Pressure: 125 bar
Detection: UV 254 nm
k'1: 2.09
α: 1.28
Catalog #: 1-780101-300



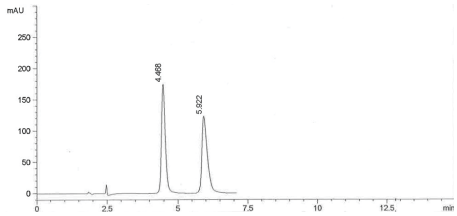
Cromakalim



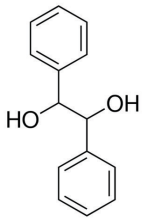
Column: (S,S) Whelk-O 1, 5 µm, 25 cm x 4.6 mm
Mobile Phase: (85/15) CO_2/Ethanol
Flow Rate: 4.0 mL/min
Temperature: 40°C
Pressure: 125 bar
Detection: UV 220 nm
k'1: 5.01
α: 1.10
Catalog #: 1-780101-300



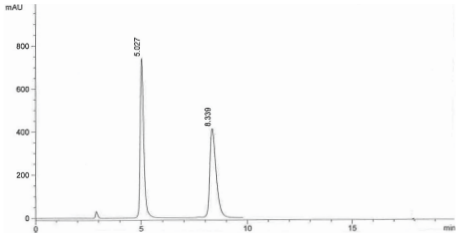
Hydrobenzoin



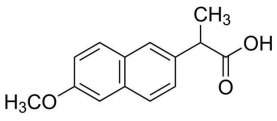
Column: (S,S) Whelk-O 1, 5 µm, 25 cm x 4.6 mm
Mobile Phase: (80/20) Hexane/IPA
Flow Rate: 1.5 mL/min
Detection: UV 254 nm
k'1: 1.32
α: 1.57
Catalog #: 1-780101-300



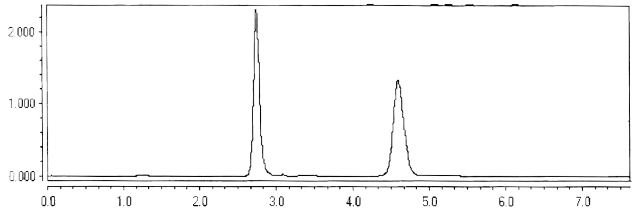
Naproxen



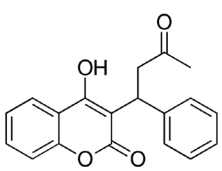
Column: (S,S) Whelk-O 1, 5 µm, 25 cm x 4.6 mm
Mobile Phase: (50/50) Hexane/Ethanol + 0.1% Acetic Acid
Flow Rate: 1.5 mL/min
Detection: UV 254 nm
k'1: 1.60
α: 2.07
Catalog #: 1-780101-300



Warfarin



Column: (S,S) Whelk-O 1, 5 µm, 25 cm x 4.6 mm
Mobile Phase: (65/35) CO_2/Ethanol + 0.5% Acetic Acid
Flow Rate: 4.0 mL/min
Temperature: 40°C
Pressure: 125 bar
Detection: UV 254 nm
k'1: 2.67
α: 1.92
Catalog #: 1-780101-300



WHELK-O 1 ORDERING INFORMATION

Product Type	Dimensions	Particle Size	(R,R) Catalog #	(S,S) Catalog #
Analytical	50 x 2.1 mm	1.8	1-780263-300	1-780163-300
Analytical	100 x 2.1 mm	1.8	1-780264-300	1-780164-300
Analytical	20 x 3 mm	1.8	1-780267-300	1-780167-300
Analytical	50 x 3 mm	1.8	1-780265-300	1-780165-300
Analytical	100 x 3 mm	1.8	1-780266-300	1-780166-300
Analytical	50 x 4.6 mm	1.8	1-780262-300	1-780162-300
Analytical	100 x 4.6 mm	1.8	1-780261-300	1-780161-300
Analytical	50 x 2.1 mm	3.5	1-780228-300	1-780128-300
Analytical	100 x 2.1 mm	3.5	1-780229-300	1-780129-300
Analytical	150 x 2.1 mm	3.5	1-780230-300	1-780130-300
Analytical	20 x 3 mm	3.5	1-780227-300	1-780127-300
Analytical	50 x 3 mm	3.5	1-780226-300	1-780126-300
Analytical	100 x 3 mm	3.5	1-780225-300	1-780125-300
Analytical	150 x 3 mm	3.5	1-780224-300	1-780124-300
Analytical	50 x 4.6 mm	3.5	1-780220-300	1-780120-300
Analytical	100 x 4.6 mm	3.5	1-780221-300	1-780121-300
Analytical	150 x 4.6 mm	3.5	1-780222-300	1-780122-300
Analytical	250 x 4.6 mm	3.5	1-780223-300	1-780123-300
Guard*	Quantity of 3	3.5	1-780231-300	1-780131-300
Analytical	30 x 2.1 mm	5	1-780256-300	1-780156-300
Analytical	50 x 2.1 mm	5	1-780255-300	1-780155-300
Analytical	100 x 2.1 mm	5	1-780254-300	1-780154-300
Analytical	150 x 2.1 mm	5	1-780206-300	1-780106-300
Analytical	50 x 3 mm	5	1-780259-300	1-780159-300
Analytical	100 x 3 mm	5	1-780260-300	1-780160-300
Analytical	30 x 4.6 mm	5	1-780253-300	1-780153-300
Analytical	50 x 4.6 mm	5	1-780252-300	1-780152-300
Analytical	100 x 4.6 mm	5	1-780251-300	1-780151-300
Analytical	150 x 4.6 mm	5	1-780205-300	1-780105-300
Analytical	250 x 4.6 mm	5	1-780201-300	1-780101-300
Semi-prep	250 x 10 mm	5	1-780202-300	1-780102-300
Semi-prep	150 x 21.1 mm	5	1-780209-300	1-780109-300

BEST SELLER

**Guard column holder and guard cartridge kits sold separately.*

WHELK-O 1 ORDERING INFORMATION (continued)

Product Type	Dimensions	Particle Size	(R,R) Catalog #	(S,S) Catalog #
Semi-prep	250 x 21.1 mm	5	1-780207-300	1-780107-300
Prep	150 x 30 mm	5	1-780208-300	1-780108-300
Prep	250 x 30 mm	5	1-780203-300	1-780103-300
Prep	150 x 50 mm	5	1-780214-300	1-780114-300
Prep	250 x 50 mm	5	1-780204-300	1-780104-300
Guard*	Quantity of 3	5	1-780200-300	1-780100-300
Analytical	50 x 2.1 mm	10	1-786903-300	1-786902-300
Analytical	50 x 4.6 mm	10	1-786907-300	1-786906-300
Analytical	100 x 4.6 mm	10	1-786909-300	1-786908-300
Analytical	150 x 4.6 mm	10	1-786252-300	1-786251-300
Analytical	250 x 4.6 mm	10	1-786515-300	1-786615-300
Semi-prep	250 x 10 mm	10	1-786525-300	1-786625-300
Semi-prep	150 x 21.1 mm	10	1-786518-300	1-786617-300
Semi-prep	250 x 21.1 mm	10	1-786535-300	1-786635-300
Semi-prep	500 x 21.1 mm	10	1-786545-300	1-786645-300
Prep	250 x 30 mm	10	1-786708-300	1-786702-300
Prep	500 x 30 mm	10	1-786713-300	1-786716-300
Prep	250 x 50 mm	10	1-786709-300	1-786703-300
Prep	250 x 4.6 mm	10	1-786710-300	1-786704-300
Analytical	250 x 4.6 mm	16	1-786361-300	1-786351-300
Analytical	250 x 4.6 mm	20	1-781401-300	1-781501-300
Guard*	Holder	N/A	1-801010-300	1-801010-300

BEST SELLER

Guard column holder and guard cartridge kits sold separately.



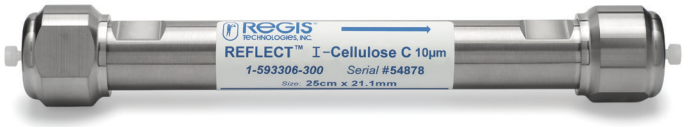
Tech Tip

Download the* Chiral Handbook *for over 300 pages of method development advice and SFC & HPLC applications at chiral.com.

REFLECT

High Performance Polysaccharide Phases

Polysaccharide chiral columns are the most widely used type of chiral stationary phases (CSPs) to separate enantiomers. Reflect chiral columns are rugged polysaccharide phases suitable for a wide range of chiral compounds. Unique, proprietary, phase coverage provides excellent peak shape and improved resolution versus leading chiral phases. High resolution greatly improves preparative loading, leading to greater productivity and higher purity separations. Combined with attractive pricing and rapid delivery, Reflect chiral columns deliver the performance and productivity you expect. Reflect columns are available packed with immobilized and coated CSPs.



REFLECT IMMOBILIZED

I-Amylose A
Amylose tris(3,5-dimethylphenylcarbamate)

I-Cellulose B
Cellulose tris(3,5-dimethylphenylcarbamate)

I-Cellulose C
Cellulose tris(3,5-dichlorophenylcarbamate)

I-Cellulose J
Cellulose tris(4-methylbenzoate)

REFLECT COATED

C-Amylose A
Amylose tris(3,5-dimethylphenylcarbamate)

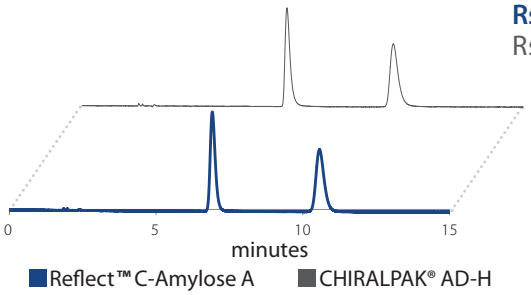
C-Cellulose B
Cellulose tris(3,5-dimethylphenylcarbamate)

Tech Tip

Create a screening set of columns to cover a broad range of selectivity. Contact your representative for details.

Achieve Equal or Better Separations compared to Leading Polysaccharide Phases

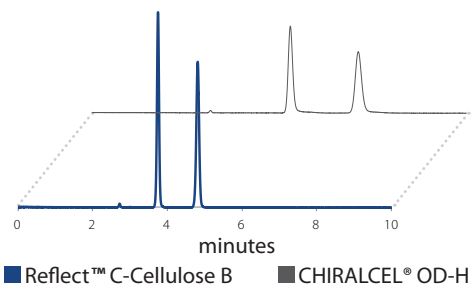
Reflect C-Amylose A provides equivalent separation of Bifonazole





Compound: Bifonazole
Column Size: 5 µm, 25 cm x 4.6 mm
Mobile Phase: (80/20) Hexane/Ethanol
Flow Rate: 1.5 mL/min
Detection: UV 228 nm
Catalog #: 1-580204-300

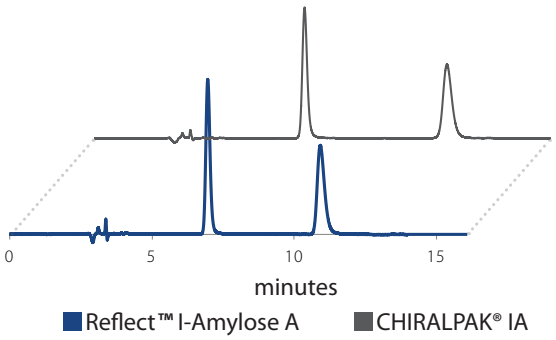
Reflect C-Cellulose B provides better separation of Benzoin





Compound: Benzoin
Column Size: 5 µm, 25 cm x 4.6 mm
Mobile Phase: (80/20) Hexane/IPA
Flow Rate: 1.5 mL/min
Detection: UV 254 nm
Catalog #: 1-590204-300

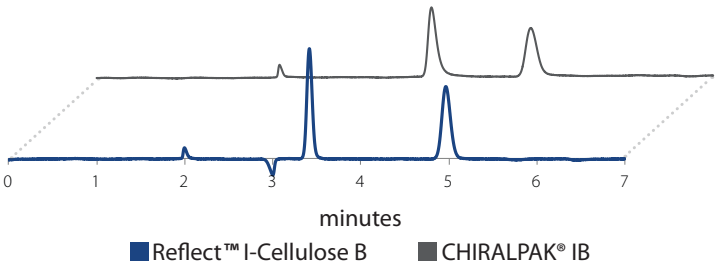
Reflect I-Amylose A provides equivalent separation of Chlormezanone





Compound: Chlormezanone
Column Size: 5 µm, 25 cm x 4.6 mm
Mobile Phase: (50/50) Hexane/IPA
Flow Rate: 1.0 mL/min
Detection: UV 220 nm
Catalog #: 1-591204-300

Reflect I-Cellulose B provides better separation of Alprenolol





Compound: Alprenolol
Column Size: : 5 µm, 25 cm x 4.6 mm
Mobile Phase: (90/10/0.1) Hexane/IPA/DEA
Flow Rate: 1.5 mL/min
Detection: UV 230 nm
Catalog #: 1-592204-300

The Reflect Guarantee

If our analytical columns (≤4.6mm ID) do not provide equivalent or better separations as compared to a competing column of the same particle size, phase type, and dimensions, return the column within 45 days for a full refund. Contact your representative for full details.

REFLECT IMMOBILIZED

- Rugged, immobilized phase for long column lifetimes
- High efficiency media with excellent peak shape and loading capacity
- Compatible with a broad range of solvents and separation modes (NP, RP, Polar Organic, SFC)
- Fully scalable from 3 to 20 µm
- Fast delivery—all sizes, anywhere in the world

Chemistry

Reflect polysaccharide immobilized chiral columns are made using a unique production process of immobilizing the chiral selector on high purity silica gel. Immobilizing the selector improves the stability of the chiral phase and broadens the range of mobile phase options. Selectors and characteristics are detailed in the following chart.

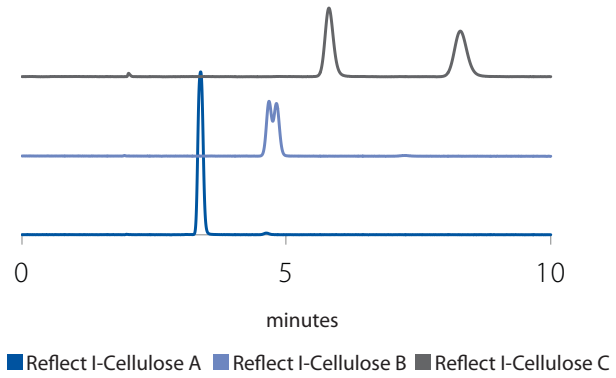
Reflect Immobilized Phase Characteristics

PRODUCT NAME	CHIRAL STATIONARY PHASE IMMOBILIZED	LEADING COMPETITIVE PRODUCTS*	USP	PARTICLE SIZES	pH RANGE	MAXIMUM PRESSURE
Reflect I-Amylose A	Amylose tris(3,5-dimethylphenylcarbamate)	Chiralpak® IA, IA-3; Lux® i-Amylose 1	L99	3, 5, 10, 20 µm	2 - 9	6,000 psi
Reflect I-Cellulose B	Cellulose tris(3,5-dimethylphenylcarbamate)	Chiralpak® IB, IB-3	N/A			
Reflect I-Cellulose C	Cellulose tris(3,5-dichlorophenylcarbamate)	Chiralpak® IC, IC-3; Lux® i-Cellulose 5	N/A			
Reflect I-Cellulose J	Cellulose tris(4-methylbenzoate)	No Equivalent Similar to Coated Chiralpak® OJ	N/A	3 & 5 µm		

* DAICEL, CHIRALCEL, CHIRALPAK, AD, AD-H, AD, OD, OD-H, OJ, are registered trademarks of DAICEL Corporation. All such trademarks are used by Chiral Technologies under license from DAICEL Corporation. Chiral Technologies, Inc. is a subsidiary of DAICEL Corporation. Lux is a registered trademark of Phenomenex Inc.

Broad Selectivity

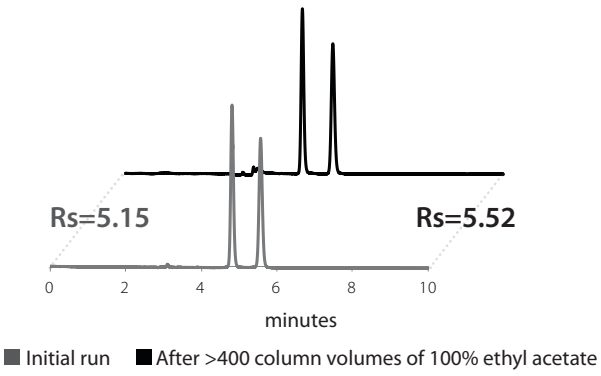
Optimize separation with a range of phases



Compound: Nimodipine
Column Size: 5 µm, 25 cm x 4.6 mm
Mobile Phase: (85/15/0.1) Hexane/IPA/DEA
Flow Rate: 1.5 mL/min
Rs: 6.69 on I-Cellulose C

Excellent Stability

No loss of resolution after over 400 column volumes of ethyl acetate



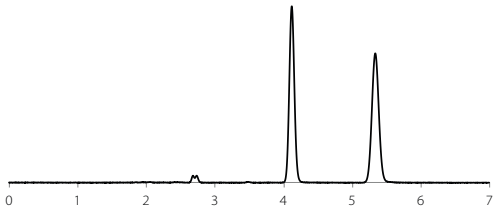
Compound: Hydrobenzoin
Column: Reflect I-Amylose A, 5 µm, 25 cm x 4.6 mm
Mobile Phase: (70/30) Hexane/Ethanol
Flow Rate: 1.0 mL/min

Tech Tip

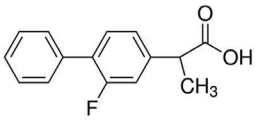
Immobilized CSPs offer the advantage of stability with strong solvents like THF, ethyl acetate, and chlorinated solvents. This allows greater flexibility in developing separations that exhibit different selectivity in comparison with coated columns, which have a more limited range of solvent options. The extended range of solvent choices can also enhance sample solubility, which can have a positive effect on production rate in preparative applications.

REFLECT APPLICATIONS

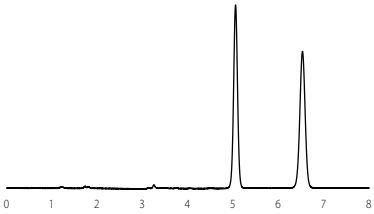
Flurbiprofen



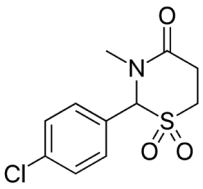
Column: Reflect C-Amylose A, 5 µm, 25 cm x 4.6 mm
Mobile Phase: (90/10/0.1) Hexane/Ethanol/Acetic Acid
Flow Rate: 1.5 mL/min
Detection: UV 254 nm
k'1: 1.06
α: 1.58
Catalog #: 1-580204-300



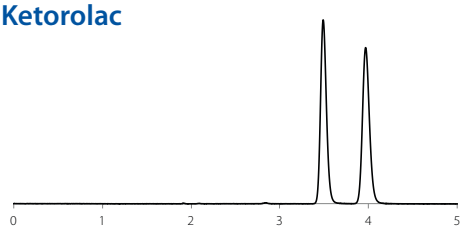
Chlormezanone



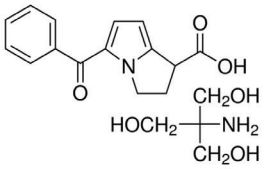
Column: Reflect C-Cellulose B, 5 µm, 25 cm x 4.6 mm
Mobile Phase: 100% Ethanol
Flow Rate: 1.0 mL/min
Detection: UV 220 nm
k'1: 0.64
α: 1.75
Catalog #: 1 -590204-300



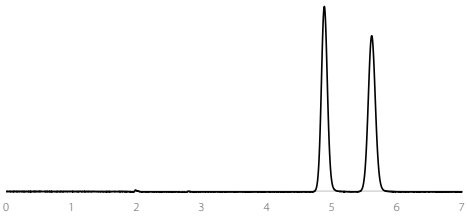
Ketorolac



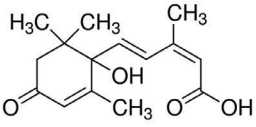
Column: Reflect I-Amylose A, 5 µm, 25 cm x 4.6 mm
Mobile Phase: (70/30/0.1) Hexane/Ethanol/Acetic Acid
Flow Rate: 1.5 mL/min
Detection: UV 254 nm
k'1: 0.74
α: 1.32
Catalog #: 1-591204-300



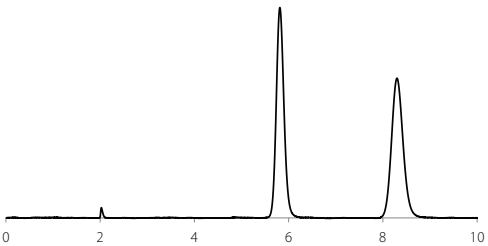
Abscisic Acid



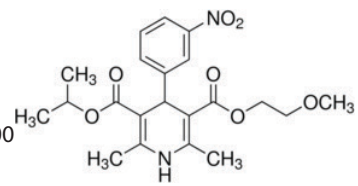
Column: Reflect I-Cellulose B, 5 µm, 25 cm x 4.6 mm
Mobile Phase: (85/15/0.1) Hexane/Ethanol/Acetic Acid
Flow Rate: 1.5 mL/min
Detection: UV 254 nm
k'1: 1.44
α: 1.25
Catalog #: 1-592204-300



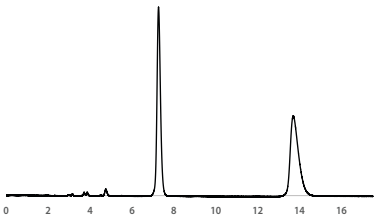
Nimodipine



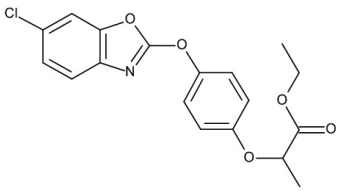
Column: Reflect I-Cellulose C, 5 µm, 25 cm x 4.6 mm
Mobile Phase: (85/15/0.1) Hexane/2-propanol/ Diethylamine
Flow Rate: 1.5 mL/min
Detection: UV 254 nm
k'1: 1.97
α: 1.65
Catalog #: 1-593204-300



Fenoxaprop-ethyl



Column: Reflect I-Cellulose J, 5 µm, 25 cm x 4.6 mm
Mobile Phase: (80/20) Hexane/Ethanol
Flow Rate: 1.5 mL/min
Detection: UV 254 nm
k'1: 2.63
α: 2.22
Catalog #: 1-594204-300



REFLECT I-AMYLOSE A ORDERING INFORMATION

Product Type	Dimensions	Particle Size	Catalog #
Analytical	50 x 2.1 mm	3	1-591109-300
Analytical	100 x 2.1 mm	3	1-591110-300
Analytical	150 x 2.1 mm	3	1-591111-300
Analytical	50 x 3 mm	3	1-591101-300
Analytical	100 x 3 mm	3	1-591106-300
Analytical	150 x 3 mm	3	1-591105-300
Analytical	50 x 4.6 mm	3	1-591107-300
Analytical	100 x 4.6 mm	3	1-591102-300
Analytical	150 x 4.6 mm	3	1-591103-300
Analytical	250 x 4.6 mm	3	1-591104-300
Guard*	Quantity of 3	3	1-591112-300
Analytical	50 x 2.1 mm	5	1-591212-300
Analytical	100 x 2.1 mm	5	1-591213-300
Analytical	150 x 2.1 mm	5	1-591215-300
Analytical	50 x 3 mm	5	1-591211-300
Analytical	100 x 3 mm	5	1-591214-300
Analytical	150 x 3 mm	5	1-591216-300
Analytical	50 x 4.6 mm	5	1-591201-300
Analytical	100 x 4.6 mm	5	1-591202-300
Analytical	150 x 4.6 mm	5	1-591203-300
Analytical	250 x 4.6 mm	5	1-591204-300
Semi-Prep	250 x 10 mm	5	1-591205-300
Semi-Prep	150 x 21.1 mm	5	1-591210-300
Semi-Prep	250 x 21.1 mm	5	1-591206-300
Prep	150 x 30 mm	5	1-591209-300
Prep	250 x 30 mm	5	1-591207-300
Prep	250 x 50 mm	5	1-591208-300
Guard*	Quantity of 3	5	1-591217-300
Analytical	50 x 4.6 mm	10	1-591301-300
Analytical	100 x 4.6 mm	10	1-591302-300
Analytical	150 x 4.6 mm	10	1-591303-300
Analytical	250 x 4.6 mm	10	1-591304-300
Semi-Prep	250 x 10 mm	10	1-591305-300
Semi-Prep	150 x 21.1 mm	10	1-591310-300
Semi-Prep	250 x 21.1 mm	10	1-591306-300

BEST SELLER

BEST SELLER

**Guard column holder and guard cartridge kits sold separately.*

REFLECT I-AMYLOSE A ORDERING INFORMATION (continued)

Product Type	Dimensions	Particle Size	Catalog #
Prep	250 x 30 mm	10	1-591307-300
Prep	250 x 50 mm	10	1-591308-300
Analytical	250 x 4.6 mm	20	1-591404-300
Guard*	Holder	N/A	1-801010-300

REFLECT I-CELLULOSE B ORDERING INFORMATION

Product Type	Dimensions	Particle Size	Catalog #
Analytical	50 x 2.1 mm	3	1-592109-300
Analytical	100 x 2.1 mm	3	1-592110-300
Analytical	150 x 2.1 mm	3	1-592111-300
Analytical	50 x 3 mm	3	1-592101-300
Analytical	100 x 3 mm	3	1-592106-300
Analytical	150 x 3 mm	3	1-592105-300
Analytical	50 x 4.6 mm	3	1-592107-300
Analytical	100 x 4.6 mm	3	1-592102-300
Analytical	150 x 4.6 mm	3	1-592103-300
Analytical	250 x 4.6 mm	3	1-592104-300
Guard*	Quantity of 3	3	1-592112-300
Analytical	50 x 2.1 mm	5	1-592212-300
Analytical	100 x 2.1 mm	5	1-592213-300
Analytical	150 x 2.1 mm	5	1-592215-300
Analytical	50 x 3 mm	5	1-592211-300
Analytical	100 x 3 mm	5	1-592214-300
Analytical	150 x 3 mm	5	1-592216-300
Analytical	50 x 4.6 mm	5	1-592201-300
Analytical	100 x 4.6 mm	5	1-592202-300
Analytical	150 x 4.6 mm	5	1-592203-300
Analytical	250 x 4.6 mm	5	1-592204-300
Semi-Prep	250 x 10 mm	5	1-592205-300

BEST SELLER

**Guard column holder and guard cartridge kits sold separately.*

REFLECT I-CELLULOSE B ORDERING INFORMATION (continued)

Product Type	Dimensions	Particle Size	Catalog #
Semi-Prep	150 x 21.1 mm	5	1-592210-300
Semi-Prep	250 x 21.1 mm	5	1-592206-300
Prep	150 x 30 mm	5	1-592209-300
Prep	250 x 30 mm	5	1-592207-300
Prep	250 x 50 mm	5	1-592208-300
Guard*	Quantity of 3	5	1-592217-300
Analytical	50 x 4.6 mm	10	1-592301-300
Analytical	100 x 4.6 mm	10	1-592302-300
Analytical	150 x 4.6 mm	10	1-592303-300
Analytical	250 x 4.6 mm	10	1-592304-300
Semi-Prep	250 x 10 mm	10	1-592305-300
Semi-Prep	150 x 21.1 mm	10	1-592310-300
Semi-Prep	250 x 21.1 mm	10	1-592306-300
Prep	250 x 30 mm	10	1-592307-300
Prep	250 x 50 mm	10	1-592308-300
Analytical	250 x 4.6 mm	20	1-592404-300
Guard*	Holder	N/A	1-801010-300

BEST SELLER

REFLECT I-CELLULOSE C ORDERING INFORMATION

Product Type	Dimensions	Particle Size	Catalog #
Analytical	50 x 2.1 mm	3	1-593109-300
Analytical	100 x 2.1 mm	3	1-593110-300
Analytical	150 x 2.1 mm	3	1-593111-300
Analytical	50 x 3 mm	3	1-593101-300
Analytical	100 x 3 mm	3	1-593106-300
Analytical	150 x 3 mm	3	1-593105-300
Analytical	50 x 4.6 mm	3	1-593107-300

**Guard column holder and guard cartridge kits sold separately.*

REFLECT I-CELLULOSE C ORDERING INFORMATION (continued)

Product Type	Dimensions	Particle Size	Catalog #
Analytical	100 x 4.6 mm	3	1-593102-300
Analytical	150 x 4.6 mm	3	1-593103-300
Analytical	250 x 4.6 mm	3	1-593104-300
Guard*	Quantity of 3	3	1-593112-300
Analytical	50 x 2.1 mm	5	1-593212-300
Analytical	100 x 2.1 mm	5	1-593213-300
Analytical	150 x 2.1 mm	5	1-593215-300
Analytical	50 x 3 mm	5	1-593211-300
Analytical	100 x 3 mm	5	1-593214-300
Analytical	150 x 3 mm	5	1-593216-300
Analytical	50 x 4.6 mm	5	1-593201-300
Analytical	100 x 4.6 mm	5	1-593202-300
Analytical	150 x 4.6 mm	5	1-593203-300
BEST SELLER Analytical	250 x 4.6 mm	5	1-593204-300
Semi-Prep	250 x 10 mm	5	1-593205-300
Semi-Prep	150 x 21.1 mm	5	1-593210-300
BEST SELLER Semi-Prep	250 x 21.1 mm	5	1-593206-300
Prep	150 x 30 mm	5	1-593209-300
Prep	250 x 30 mm	5	1-593207-300
Prep	250 x 50 mm	5	1-593208-300
Guard*	Quantity of 3	5	1-593217-300
Analytical	50 x 4.6 mm	10	1-593301-300
Analytical	100 x 4.6 mm	10	1-593302-300
Analytical	150 x 4.6 mm	10	1-593303-300
Analytical	250 x 4.6 mm	10	1-593304-300
Semi-Prep	250 x 10 mm	10	1-593305-300
Semi-Prep	150 x 21.1 mm	10	1-593310-300
Semi-Prep	250 x 21.1 mm	10	1-593306-300
Prep	250 x 30 mm	10	1-593307-300
Prep	250 x 50 mm	10	1-593308-300
Analytical	250 x 4.6 mm	20	1-593403-300
Guard*	Holder	N/A	1-801010-300

**Guard column holder and guard cartridge kits sold separately.*

REFLECT I-CELLULOSE J ORDERING INFORMATION

Product Type	Dimensions	Particle Size	Catalog #
Analytical	50 x 2.1 mm	3	1-594109-300
Analytical	100 x 2.1 mm	3	1-594110-300
Analytical	150 x 2.1 mm	3	1-594111-300
Analytical	50 x 3 mm	3	1-594101-300
Analytical	100 x 3 mm	3	1-594106-300
Analytical	150 x 3 mm	3	1-594105-300
Analytical	50 x 4.6 mm	3	1-594107-300
Analytical	100 x 4.6 mm	3	1-594102-300
Analytical	150 x 4.6 mm	3	1-594103-300
Analytical	250 x 4.6 mm	3	1-594104-300
Guard*	Quantity of 3	3	1-594112-300
Analytical	50 x 2.1 mm	5	1-594212-300
Analytical	100 x 2.1 mm	5	1-594213-300
Analytical	150 x 2.1 mm	5	1-594215-300
Analytical	50 x 3 mm	5	1-594211-300
Analytical	100 x 3 mm	5	1-594214-300
Analytical	150 x 3 mm	5	1-594216-300
Analytical	50 x 4.6 mm	5	1-594201-300
Analytical	100 x 4.6 mm	5	1-594202-300
Analytical	150 x 4.6 mm	5	1-594203-300
Analytical	250 x 4.6 mm	5	1-594204-300
Semi-Prep	250 x 10 mm	5	1-594205-300
Semi-Prep	150 x 21.1 mm	5	1-594210-300
Semi-Prep	250 x 21.1 mm	5	1-594206-300
Prep	150 x 30 mm	5	1-594209-300
Prep	250 x 30 mm	5	1-594207-300
Prep	250 x 50 mm	5	1-594208-300
Guard*	Quantity of 3	5	1-594217-300
Guard*	Holder	N/A	1-801010-300

BEST SELLER

BEST SELLER

**Guard column holder and guard cartridge kits sold separately.*

REFLECT COATED POLYSACCHARIDE PHASES

- High efficiency media with excellent peak shape and loading capacity
- Compatible with a wide range of solvents and separation modes (normal phase HPLC and SFC)
- Fully scalable from 3-20 µm
- Fast delivery—all sizes, anywhere in the world

Chemistry

Reflect polysaccharide coated chiral columns are made using a unique production process of coating the chiral selector on high purity silica gel. Reflect chiral phases have been developed to match or exceed performance of legacy polysaccharide chiral columns. Selectors and characteristics are detailed in the following chart.

Reflect Coated Phase Characteristics

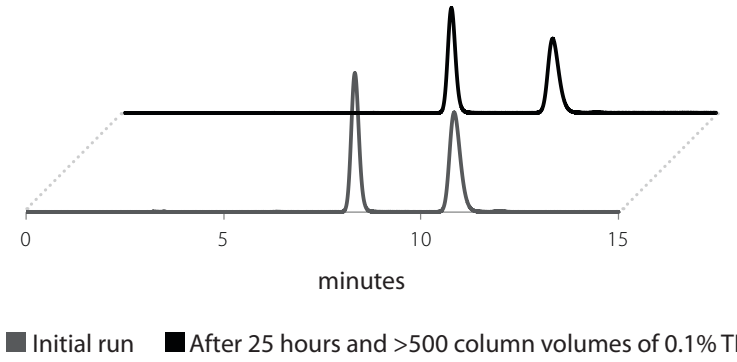
PRODUCT NAME	SELECTOR	EQUIVALENT COMPETITIVE PRODUCTS*	USP	PARTICLE SIZES	pH RANGE	MAXIMUM PRESSURE
Reflect C-Amylose A	Amylose tris(3,5-dimethylphenylcarbamate)	CHIRALPAK® AD®, AD-H®, AD-3; Lux® Amylose-1	L51	3, 5, 10, 20 µm	2 - 9	6,000 psi
Reflect C-Cellulose B	Cellulose tris(3,5-dimethylphenylcarbamate)	CHIRALCEL® OD®, OD-H®, OD-3; Lux® Cellulose-1	L40			

* DAICEL, CHIRALCEL, CHIRALPAK, AD, AD-H, AD-3, OD, OD-H, OD-3, are registered trademarks of DAICEL Corporation. All such trademarks are used by Chiral Technologies under license from DAICEL Corporation. Chiral Technologies, Inc. is a subsidiary of DAICEL Corporation. Lux is a registered trademark of Phenomenex Inc.

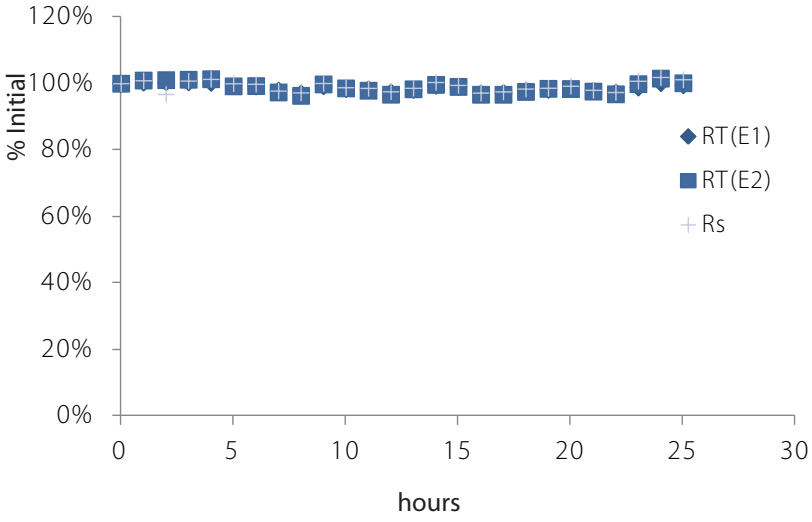


Excellent Stability

No loss of resolution after 25 hours and over 500 column volumes (CVs) of 0.1% trifluoroacetic acid



No loss of retention or resolution after 25 hours of analysis time in 0.1% TFA



Compound: Ketolorac
Column: Reflect C-Amylose A, 5 µm, 25 cm x 4.6 mm
Mobile Phase: (70/30/0.1) Hexane/Ethanol/TFA
Flow Rate: 1.5 mL/min for 25 hours = >500 CVs
Detection: UV 314 nm
Catalog #: 1-580204-300

REFLECT C-AMYLOSE A ORDERING INFORMATION

Product Type	Dimensions	Particle Size	Catalog #
Analytical	50 x 2.1 mm	3	1-580109-300
Analytical	100 x 2.1 mm	3	1-580110-300
Analytical	150 x 2.1 mm	3	1-580111-300
Analytical	50 x 3 mm	3	1-580101-300
Analytical	100 x 3 mm	3	1-580106-300
Analytical	150 x 3 mm	3	1-580105-300
Analytical	50 x 4.6 mm	3	1-580107-300
Analytical	100 x 4.6 mm	3	1-580102-300
Analytical	150 x 4.6 mm	3	1-580103-300
Analytical	250 x 4.6 mm	3	1-580104-300
Guard*	Quantity of 3	3	1-580112-300
Analytical	50 x 2.1 mm	5	1-580212-300
Analytical	100 x 2.1 mm	5	1-580213-300
Analytical	150 x 2.1 mm	5	1-580215-300
Analytical	50 x 3 mm	5	1-580211-300
Analytical	100 x 3 mm	5	1-580214-300
Analytical	150 x 3 mm	5	1-580216-300
Analytical	50 x 4.6 mm	5	1-580201-300
Analytical	100 x 4.6 mm	5	1-580202-300
Analytical	150 x 4.6 mm	5	1-580203-300
BEST SELLER Analytical	250 x 4.6 mm	5	1-580204-300
Semi-Prep	250 x 10 mm	5	1-580205-300
Semi-Prep	150 x 21.1 mm	5	1-580210-300
BEST SELLER Semi-Prep	250 x 21.1 mm	5	1-580206-300
Prep	150 x 30 mm	5	1-580209-300
Prep	250 x 30 mm	5	1-580207-300
Prep	250 x 50 mm	5	1-580208-300
Guard*	Quantity of 3	5	1-580217-300
Analytical	150 x 2.1 mm	10	1-580309-300
Analytical	50 x 4.6 mm	10	1-580301-300
Analytical	100 x 4.6 mm	10	1-580302-300
Analytical	150 x 4.6 mm	10	1-580303-300

**Guard column holder and guard cartridge kits sold separately.*

REFLECT C-AMYLOSE A ORDERING INFORMATION (continued)

Product Type	Dimensions	Particle Size	Catalog #
Analytical	250 x 4.6 mm	10	1-580304-300
Semi-Prep	250 x 10 mm	10	1-580305-300
Semi-Prep	150 x 21.1 mm	10	1-580310-300
Semi-Prep	250 x 21.1 mm	10	1-580306-300
Prep	250 x 30 mm	10	1-580307-300
Prep	250 x 50 mm	10	1-580308-300
Analytical	250 x 4.6 mm	20	1-580405-300
Guard*	Holder	N/A	1-801010-300

REFLECT C-CELLULOSE B ORDERING INFORMATION

Product Type	Dimensions	Particle Size	Catalog #
Analytical	50 x 2.1 mm	3	1-590109-300
Analytical	100 x 2.1 mm	3	1-590110-300
Analytical	150 x 2.1 mm	3	1-590111-300
Analytical	50 x 3 mm	3	1-590101-300
Analytical	100 x 3 mm	3	1-590106-300
Analytical	150 x 3 mm	3	1-590105-300
Analytical	50 x 4.6 mm	3	1-590107-300
Analytical	100 x 4.6 mm	3	1-590102-300
Analytical	150 x 4.6 mm	3	1-590103-300
Analytical	250 x 4.6 mm	3	1-590104-300
Guard*	Quantity of 3	3	1-590112-300
Analytical	50 x 2.1 mm	5	1-590212-300
Analytical	100 x 2.1 mm	5	1-590213-300
Analytical	150 x 2.1 mm	5	1-590215-300
Analytical	50 x 3 mm	5	1-590211-300
Analytical	100 x 3 mm	5	1-590214-300
Analytical	150 x 3 mm	5	1-590216-300
Analytical	50 x 4.6 mm	5	1-590201-300
Analytical	100 x 4.6 mm	5	1-590202-300

**Guard column holder and guard cartridge kits sold separately.*

REFLECT C-CELLULOSE B ORDERING INFORMATION

Product Type	Dimensions	Particle Size	Catalog #
Analytical	150 x 4.6 mm	5	1-590203-300
BEST SELLER Analytical	250 x 4.6 mm	5	1-590204-300
Semi-Prep	250 x 10 mm	5	1-590205-300
Semi-Prep	150 x 21.1 mm	5	1-590210-300
BEST SELLER Semi-Prep	250 x 21.1 mm	5	1-590206-300
Prep	150 x 30 mm	5	1-590209-300
Prep	250 x 30 mm	5	1-590207-300
Prep	250 x 50 mm	5	1-590208-300
Guard*	Quantity of 3	5	1-590217-300
Analytical	150 x 2.1 mm	10	1-590309-300
Analytical	50 x 4.6 mm	10	1-590301-300
Analytical	100 x 4.6 mm	10	1-590302-300
Analytical	150 x 4.6 mm	10	1-590303-300
Analytical	250 x 4.6 mm	10	1-590304-300
Semi-Prep	250 x 10 mm	10	1-590305-300
Semi-Prep	150 x 21.1 mm	10	1-590310-300
Semi-Prep	250 x 21.1 mm	10	1-590306-300
Prep	250 x 30 mm	10	1-590307-300
Prep	250 x 50 mm	10	1-590308-300
Analytical	250 x 4.6 mm	20	1-580505-300
Guard*	Holder	N/A	1-801010-300

**Guard column holder and guard cartridge kits sold separately.*



CHIROSIL

Crown-Ether Chiral Stationary Phases

ChiroSil® RCA(+) and SCA(-) are proven chiral stationary phases for the separation of amino acids and compounds containing primary amines.

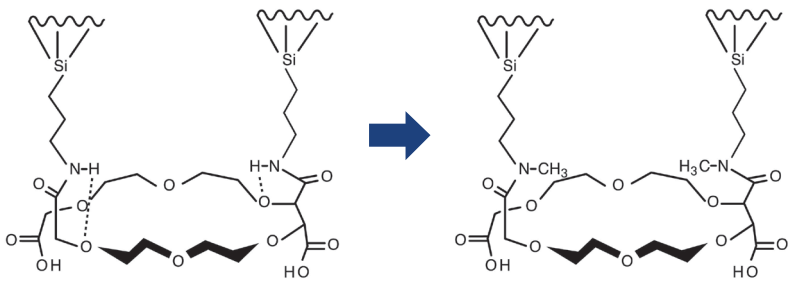
- Excellent durability due to covalent bonding
- Available in both enantiomeric forms [RCA(+) and SCA(-)], which allows for the inversion of peak elution order
- Columns are stable to 5,000 psi (~345 bar)
- Fast delivery—all sizes, anywhere in the world
- Columns are available in 5 and 10 µm particle sizes and analytical and preparative dimensions

Chemistry

Chirosil RCA(+) and SCA(-) have (+) or (-)-(18-Crown-6)-tetracarboxylic acid as a chiral selector, which is bonded to the silica support. The ChiroSil® CSP is manufactured for use in high-performance liquid chromatography (HPLC).

CHIROSIL ME

ChiroSil ME columns are for amino acid chiral analysis and have increased capacity factors. Chirosil ME RCA(+) and SCA(-) have (+) or (-)-(18-Crown-6)-tetracarboxylic acid as a chiral selector, which is bonded to the silica support. In general, capacity factors on Chirosil ME are greater than on standard Chirosil, while the separation factors and resolution are greater on standard Chirosil than on Chirosil ME. Select Chirosil ME for applications where greater retention and capacity are needed.

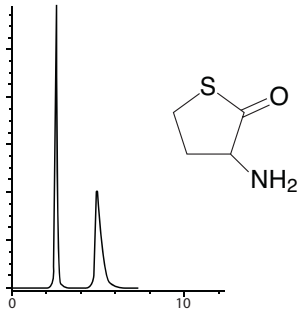


CHIROSIL **CHIROSIL ME**

ChiroSil® is a trademark of RStech Corporation of Daejeon, South Korea.

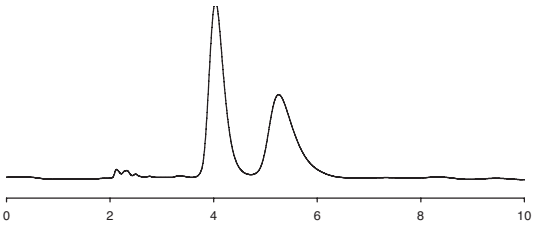
CHIROSIL APPLICATIONS

Homocysteine-Thiolactone HCl



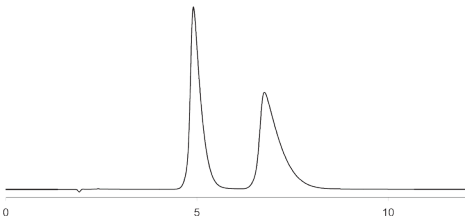
Column: ChiroSil RCA(+), 5 µm, 15 cm x 4.6 mm
Mobile Phase: (60/40) CH_3OH/H O + 0.05% TFA
Flow Rate: 1.0 mL/min
Detection: UV 240 nm
k'1: 0.58
α: 3.56
Catalog #: 1-799001-300

DL-Arginine



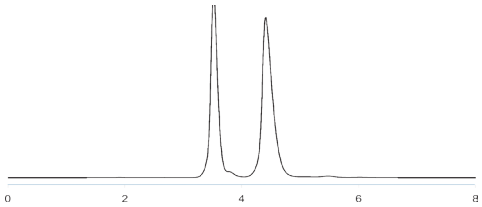
Column: ChiroSil ME RCA(+), 5 µm, 15 cm x 4.6 mm
Mobile Phase: (50/50) 5 mM $HClO_4$ Acid/MeOH
Flow Rate: 0.5 mL/min
Detection: UV 210 nm
Temperature: 10°C
k'1: 0.66
α: 1.40
Catalog #: 1-788001-300

DL-4-Chloro-phenylalanine



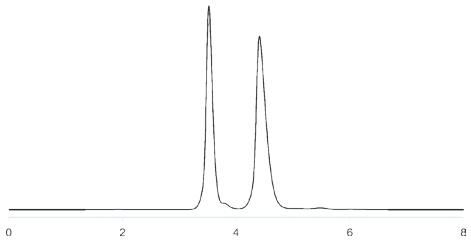
Column: ChiroSil ME RCA(+), 5µm, 15 cm x 4.6 mm
Mobile Phase: (40/60) 0.01% Phosphoric Acid/MeOH
Flow Rate: 1.0 mL/min
Detection: UV 210 nm
Temperature: 10°C
k'1: 0.78
α: 1.58
Catalog #: 1-788001-300

DL-DOPA



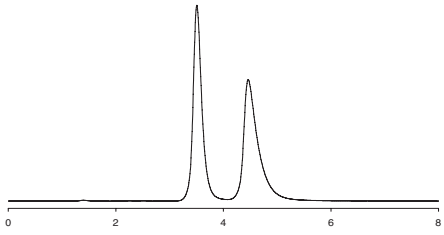
Column: ChiroSil ME RCA(+), 5µm, 15 cm x 4.6 mm
Mobile Phase: (30/70) 0.01% Phosphoric Acid/MeOH
Flow Rate: 1.0 mL/min
Detection: UV 210 nm
Temperature: 20°C
k'1: 1.20
α: 1.57
Catalog #: 1-788001-300

DL-4-Nitro-Phenylalanine



Column: ChiroSil ME RCA(+), 5 µm, 15 cm x 4.6 mm
Mobile Phase: (40/60) 0.01% Phosphoric Acid/MeOH
Flow Rate: 1.0 mL/min
Detection: UV 210 nm
Temperature: 40°C
k'1: 1.91
α: 1.51
Catalog #: 1-788001-300

DL-Tryptophane



Column: ChiroSil ME RCA(+), 5 µm, 15 cm x 4.6 mm
Mobile Phase: (30/70) 0.01% Phosphoric Acid/MeOH
Flow Rate: 1.0 mL/min
Detection: UV 210 nm
Temperature: 20°C
k'1: 0.86
α: 1.59
Catalog #: 1-788001-300

CHIROSIL ORDERING INFORMATION

Product Type	Dimensions	Particle Size	RCA(+) Catalog #	SCA(-) Catalog #
Analytical	100 x 3 mm	5	1-799010-300	1-799107-300
Analytical	100 x 4.6 mm	5	1-799008-300	1-799108-300
BEST SELLER Analytical	150 x 4.6 mm	5	1-799001-300	1-799101-300
Analytical	250 x 4.6 mm	5	1-799002-300	1-799102-300
Semi-prep	250 x 10 mm	5	1-799006-300	1-799109-300
Semi-prep	150 x 21.1 mm	5	1-799003-300	1-799103-300
BEST SELLER Semi-prep	250 x 21.1 mm	5	1-799005-300	1-799105-300
Prep	150 x 30 mm	5	1-799033-300	1-799133-300
Prep	250 x 30 mm	5	1-799055-300	1-799155-300
Analytical	250 x 4.6 mm	10	1-799014-300	1-799114-300
Semi-prep	250 x 10 mm	10	1-799020-300	1-799120-300
Semi-prep	150 x 21.1 mm	10	1-799119-300	1-799116-300
Semi-prep	250 x 21.1 mm	10	1-799004-300	1-799104-300
Prep	150 x 30 mm	10	1-799018-300	1-799118-300
Prep	250 x 30 mm	10	1-799044-300	1-799117-300
Guard Column	10 x 3 mm	5	1-799200-300	1-799100-300
Guard Cartridge Holder	N/A	N/A	1-731441-200	1-731441-200



CHIROSIL ME ORDERING INFORMATION

Product Type	Dimensions	Particle Size	RCA(+) Catalog #	SCA(-) Catalog #
Analytical	150 x 4.6 mm	5	1-788001-300	1-788009-300
Analytical	250 x 4.6 mm	5	1-788002-300	1-788010-300
Semi-prep	250 x 10 mm	5	1-788003-300	1-788011-300
Semi-prep	150 x 21.1 mm	5	1-788018-300	1-788024-300
Semi-prep	250 x 21.1 mm	5	1-788004-300	1-788012-300
Prep	150 x 30 mm	5	1-788020-300	1-788026-300
Prep	250 x 30 mm	5	1-788019-300	1-788025-300
Analytical	150 x 4.6 mm	10	1-788005-300	1-788013-300
Analytical	250 x 4.6 mm	10	1-788006-300	1-788014-300
Semi-prep	250 x 10 mm	10	1-788007-300	1-788015-300
Semi-prep	150 x 21.1 mm	10	1-788021-300	1-788027-300
Semi-prep	250 x 21.1 mm	10	1-788008-300	1-788016-300
Prep	150 x 30 mm	10	1-788023-300	1-788029-300
Prep	250 x 30 mm	10	1-788022-300	1-788028-300

BEST SELLER

BEST SELLER

Tech Tip

Regis recommends building a small library of chiral columns that have complementary selectivities to guarantee the most hits and durability for high volume screening.

PIRKLE-TYPE COLUMNS

Exclusive to Regis, we offer additional chiral phases with Pirkle-Type (or commonly referred to as brush-type) chemistries. Pirkle chiral stationary phases generally fall into three classes: π-electron acceptor/π-electron donors, the π-electron acceptors and the π-electron donors. With Pirkle phases, chiral recognition occurs at binding sites. Major binding sites are classified as π -basic or π -acidic aromatic rings, acidic sites, basic sites, and steric interaction sites. Aromatic rings are potential sites for π - π interactions. Acidic sites supply hydrogens for potential intermolecular hydrogen bonds; the hydrogen is often an amido proton (N-H) from an amide, carbamate, urea, or amine. Basic sites, such as π-electrons, sulfinyl or phosphinyl oxygens, and hydroxy or ether oxygens, may also be involved in hydrogen bond formation. Steric interactions may also occur between large groups.

Advantages of the Pirkle-Type Chiral Stationary Phases

- Long lasting, robust columns
- Covalently bonded selector
- Compatible with strong solvents for cleaning
- Compatible with SFC and SMB applications
- High Capacity

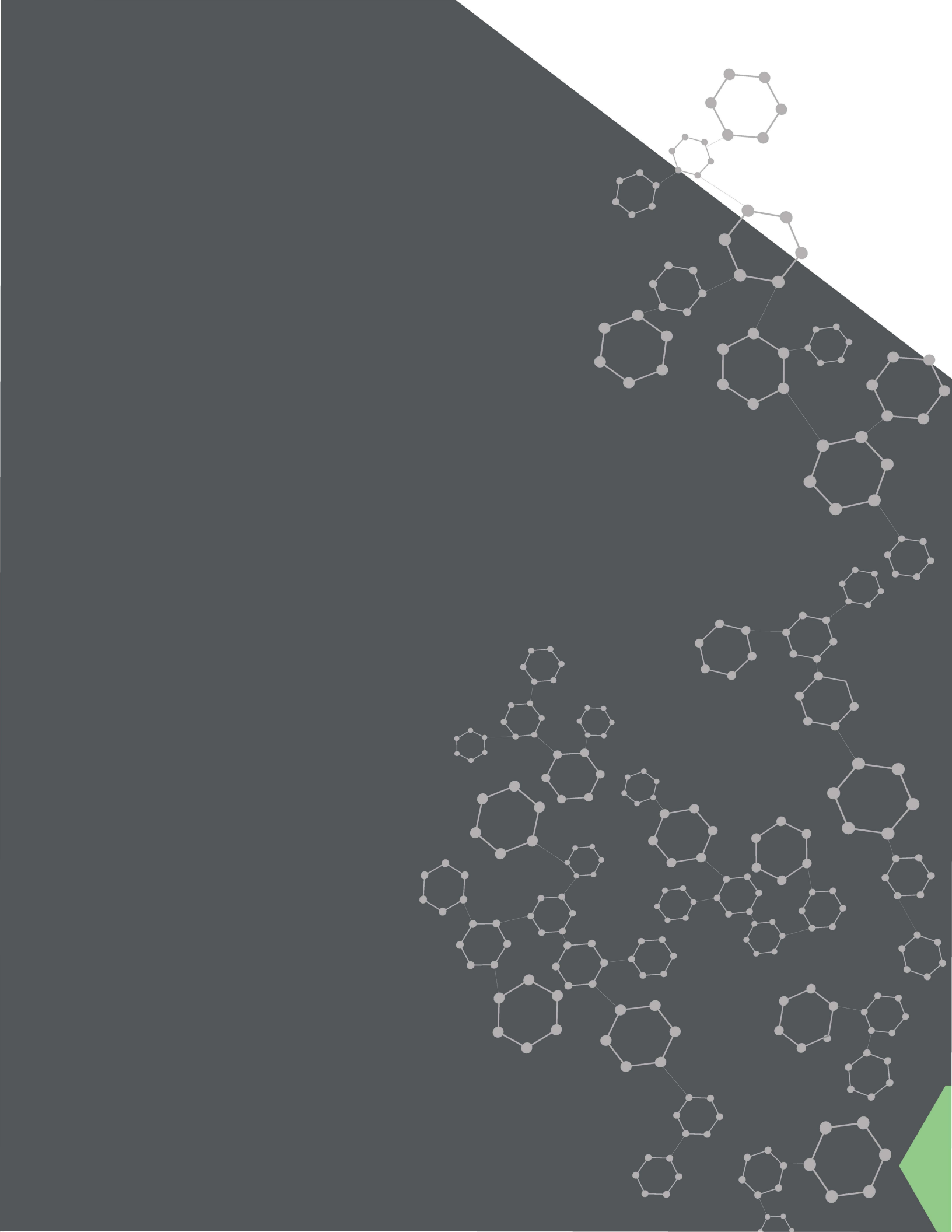


Available Pirkle-Type Phases

π-Electron Acceptor/ π-Electron Donor Phases	π-Electron Acceptor Phases
Whelk-O 2	DACH-DNB
ULMO	Pirkle 1-J
	α-Burke 2
	β-Gem 1
	Leucine
	Phenylglycine

Ask the Expert

Find applications and more information on chiral.com or through your local representative at techsupport@registech.com.



ACHIRAL SFC
Columns

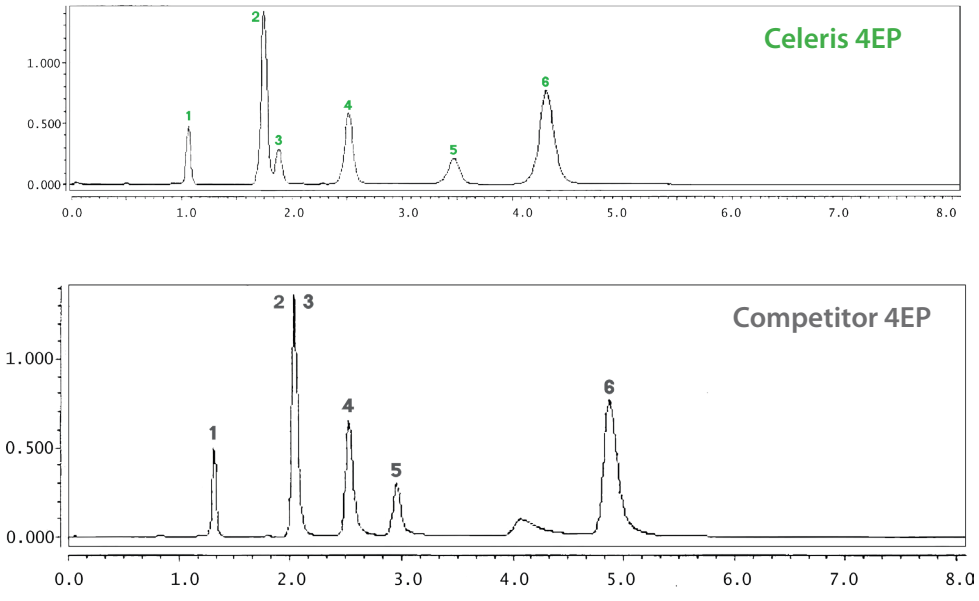


CELERIS ACHIRAL SUPERCRITICAL FLUID CHROMATOGRAPHY COLUMNS

More chemists are discovering the benefits of supercritical fluid chromatography (SFC) as a greener alternative to HPLC separation of complex samples containing a range of different functional groups and polarities. The use of compressed carbon dioxide (CO_2) as the primary mobile phase provides many benefits: it is readily available, relatively inexpensive, and safe. It can also be recycled, leading to SFC's designation as a "green" technology. Additionally, the viscosities of compressed CO_2 and mixtures with polar modifiers are much lower than those of aqueous mixtures. This allows chromatographic run times to be approximately one-third to one-fifth as long as typical HPLC runs. Ultimately, SFC provides faster separation and higher sample throughput compared to HPLC.

The Celeris™ family of achiral stationary phases has been specifically designed for SFC separations, delivering high capacity, broad selectivity, excellent peak shapes, and reproducible performance over long column lifetimes. Celeris high performance phases provide rapid separation and recovery of purified components at a lower price than competitor offerings, enabling use of larger column sizes to reduce the number of purification cycles required to achieve purity of the batch.

Celeris ethyl pyridine phases provide similar or better separation than competing EP phases.



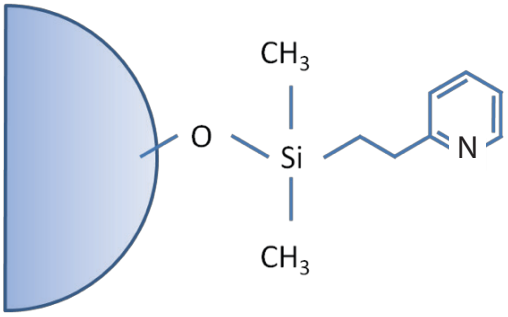
1: Ibuprofen **2:** Aspirin **3:** Ketoprofen **4:** Indomethacin **5:** Diclofenac **6:** Sulindac
Column Dimensions: 15 cm x 4.6 mm, 5 µm; **Mobile Phase:** CO_2/CH_3OH (80/20);
Flow Rate: 3.20 mL/min; **Temperature:** 40° C; **Pressure:** 125 bar; **Detection:** UV 230 nm

PHASE TYPES

ETHYL PYRIDINE PHASES

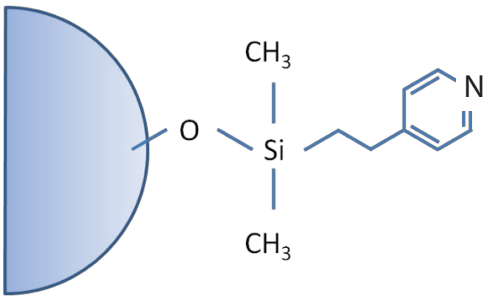
Ethyl pyridine phases are the workhorse phases for preparative and process scale SFC purifications. Celeris 2EP (2-ethyl pyridine) and 4EP (4-ethyl pyridine) media is designed to be highly reproducible based on tight product specifications and low metal content. Celeris 2EP is especially well suited for separation of acidic compounds and exhibits broad selectivity towards a variety of other compound types. The Celeris 4EP phase offers alternate selectivity to the 2EP phase. Celeris 2EP and 4EP SFC columns deliver high performance separations comparable to other ethyl pyridine phases at a much lower price.

2-ethyl pyridine chemical structure





4-ethyl pyridine chemical structure





CELERIS 2EP ORDERING INFORMATION

Product Type	Dimensions	Particle Size	Catalog #
Analytical	50 x 2.1 mm	5 µm	1-790317-300
Analytical	100 x 2.1 mm	5 µm	1-790316-300
Analytical	150 x 2.1 mm	5 µm	1-790306-300
Analytical	50 x 3 mm	5 µm	1-790315-300
Analytical	100 x 3 mm	5 µm	1-790313-300
Analytical	150 x 3 mm	5 µm	1-790318-300
Analytical	50 x 4.6 mm	5 µm	1-790314-300
Analytical	100 x 4.6 mm	5 µm	1-790312-300
Analytical	150 x 4.6 mm	5 µm	1-790305-300
Analytical	250 x 4.6 mm	5 µm	1-790301-300
Semi-Prep	250 x 10 mm	5 µm	1-790302-300
Semi-Prep	100 x 21.1 mm	5 µm	1-790310-300
Semi-Prep	150 x 21.1 mm	5 µm	1-790309-300
Semi-Prep	250 x 21.1 mm	5 µm	1-790307-300
Prep	150 x 30 mm	5 µm	1-790308-300
Prep	250 x 30 mm	5 µm	1-790303-300
Prep	150 x 30 mm	5 µm	1-790311-300
Prep	250 x 50 mm	5 µm	1-790304-300
Analytical	50 x 2.1 mm	10 µm	1-790411-300
Analytical	50 x 4.6 mm	10 µm	1-790412-300
Analytical	100 x 4.6 mm	10 µm	1-790413-300
Analytical	150 x 4.6 mm	10 µm	1-790401-300
Analytical	250 x 4.6 mm	10 µm	1-790402-300
Semi-Prep	150 x 10 mm	10 µm	1-790414-300
Semi-Prep	250 x 10 mm	10 µm	1-790404-300
Semi-Prep	150 x 21.1 mm	10 µm	1-790403-300
Semi-Prep	250 x 21.1 mm	10 µm	1-790405-300
Semi-Prep	500 x 21.1 mm	10 µm	1-790406-300
Prep	250 x 30 mm	10 µm	1-790407-300
Prep	500 x 30 mm	10 µm	1-790410-300
Prep	250 x 50 mm	10 µm	1-790408-300
Prep	500 x 50 mm	10 µm	1-790409-300

BEST SELLER

CELERIS 4EP ORDERING INFORMATION

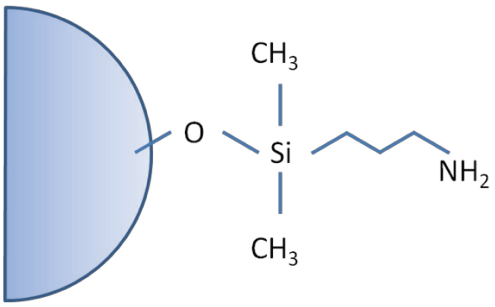
Product Type	Dimensions	Particle Size	Catalog #
Analytical	50 x 2.1 mm	5 µm	1-790515-300
Analytical	100 x 2.1 mm	5 µm	1-790514-300
Analytical	150 x 2.1 mm	5 µm	1-790506-300
Analytical	50 x 3 mm	5 µm	1-790513-300
Analytical	100 x 3 mm	5 µm	1-790511-300
Analytical	150 x 3 mm	5 µm	1-790516-300
Analytical	50 x 4.6 mm	5 µm	1-790512-300
Analytical	100 x 4.6 mm	5 µm	1-790510-300
Analytical	150 x 4.6 mm	5 µm	1-790505-300
Analytical	250 x 4.6 mm	5 µm	1-790501-300
Semi-Prep	250 x 10 mm	5 µm	1-790502-300
Semi-Prep	100 x 21.1 mm	5 µm	1-790517-300
Semi-Prep	150 x 21.1 mm	5 µm	1-790509-300
Semi-Prep	250 x 21.1 mm	5 µm	1-790507-300
Prep	150 x 30 mm	5 µm	1-790508-300
Prep	250 x 30 mm	5 µm	1-790503-300
Prep	150 x 50 mm	5 µm	1-790518-300
Prep	250 x 50 mm	5 µm	1-790504-300
Analytical	50 x 2.1 mm	10 µm	1-790613-300
Analytical	50 x 4.6 mm	10 µm	1-790614-300
Analytical	100 x 4.6 mm	10 µm	1-790615-300
Analytical	150 x 4.6 mm	10 µm	1-790601-300
Analytical	250 x 4.6 mm	10 µm	1-790602-300
Semi-Prep	150 x 10 mm	10 µm	1-790604-300
Semi-Prep	250 x 10 mm	10 µm	1-790606-300
Semi-Prep	150 x 21.1 mm	10 µm	1-790605-300
Semi-Prep	250 x 21.1 mm	10 µm	1-790607-300
Semi-Prep	500 x 21.1 mm	10 µm	1-790608-300
Prep	250 x 30 mm	10 µm	1-790609-300
Prep	500 x 30 mm	10 µm	1-790612-300
Prep	250 x 50 mm	10 µm	1-790610-300
Prep	500 x 50 mm	10 µm	1-790611-300

BEST SELLER

AMINO PHASE

This traditional propyl-amine phase is bonded to 100Å silica and offers a high degree of polar selectivity compared to traditional silica or Ethyl Pyridine phases, allowing a high degree of retention for polar amine compounds.

Amino chemical structure



CELERIS AMINO ORDERING INFORMATION

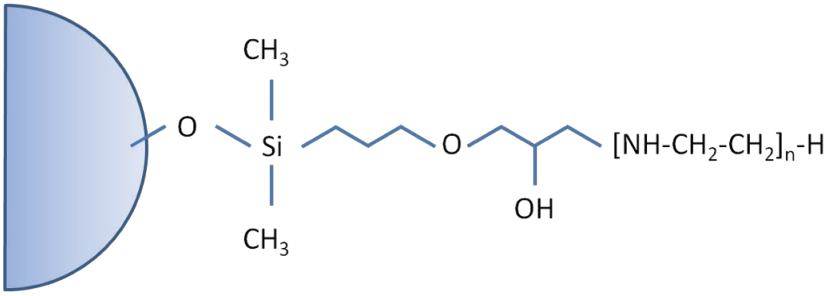
Product Type	Dimensions	Particle Size	Catalog #
Analytical	50 x 2.1 mm	5 µm	1-790717-300
Analytical	100 x 2.1 mm	5 µm	1-790716-300
Analytical	150 x 2.1 mm	5 µm	1-790706-300
Analytical	50 x 3 mm	5 µm	1-790715-300
Analytical	100 x 3 mm	5 µm	1-790713-300
Analytical	150 x 3 mm	5 µm	1-790718-300
Analytical	50 x 4.6 mm	5 µm	1-790714-300
Analytical	100 x 4.6 mm	5 µm	1-790712-300
Analytical	150 x 4.6 mm	5 µm	1-790705-300
Analytical	250 x 4.6 mm	5 µm	1-790701-300
Semi-prep	250 x 10 mm	5 µm	1-790702-300
Semi-prep	100 x 21.1 mm	5 µm	1-790710-300
Semi-prep	150 x 21.1 mm	5 µm	1-790709-300
Semi-prep	250 x 21.1 mm	5 µm	1-790707-300
Prep	150 x 30 mm	5 µm	1-790708-300
Prep	250 x 30 mm	5 µm	1-790703-300
Prep	150 x 50 mm	5 µm	1-790711-300
Prep	250 x 50 mm	5 µm	1-790704-300

BEST SELLER

PEI PHASE

The Polyethylenimine (PEI) phase has nearly three times more amino groups than traditional Amino phases. The stationary phase is a modified polymer which includes several tertiary amine groups in the skeleton of the phase.

PEI chemical structure



CELERIS PEI ORDERING INFORMATION

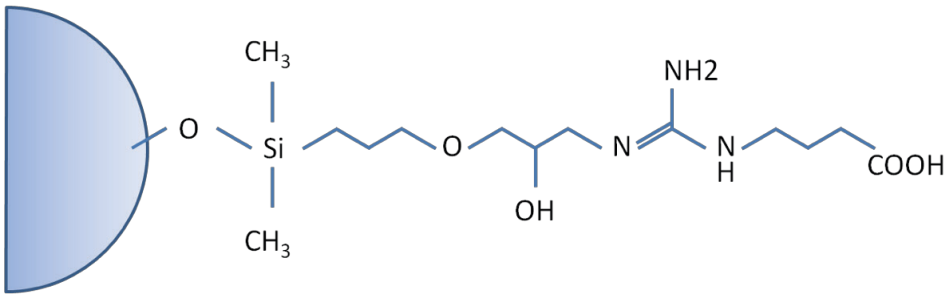
Product Type	Dimensions	Particle Size	Catalog #
Analytical	50 x 2.1 mm	5 µm	1-790817-300
Analytical	100 x 2.1 mm	5 µm	1-790816-300
Analytical	150 x 2.1 mm	5 µm	1-790806-300
Analytical	50 x 3 mm	5 µm	1-790815-300
Analytical	100 x 3 mm	5 µm	1-790813-300
Analytical	150 x 3 mm	5 µm	1-790818-300
Analytical	50 x 4.6 mm	5 µm	1-790814-300
Analytical	100 x 4.6 mm	5 µm	1-790812-300
Analytical	150 x 4.6 mm	5 µm	1-790805-300
Analytical	250 x 4.6 mm	5 µm	1-790801-300
Semi-prep	250 x 10 mm	5 µm	1-790802-300
Semi-prep	100 x 21.1 mm	5 µm	1-790810-300
Semi-prep	150 x 21.1 mm	5 µm	1-790809-300
Semi-prep	250 x 21.1 mm	5 µm	1-790807-300
Prep	150 x 30 mm	5 µm	1-790808-300
Prep	250 x 30 mm	5 µm	1-790803-300
Prep	150 x 50 mm	5 µm	1-790811-300
Prep	250 x 50 mm	5 µm	1-790804-300

BEST SELLER

ARGININE PHASE

The Arginine (ARG) phase is a silica surface modified with the amino acid arginine and exhibits both acidic and basic functionality. The ARG phase has a strong affinity to hydrophilic compounds and offers a mixed-mode type of selectivity compared to other SFC phases.

Arginine chemical structure



CELERIS ARGININE ORDERING INFORMATION

Product Type	Dimensions	Particle Size	Catalog #
Analytical	50 x 2.1 mm	5 µm	1-790917-300
Analytical	100 x 2.1 mm	5 µm	1-790916-300
Analytical	150 x 2.1 mm	5 µm	1-790906-300
Analytical	50 x 3 mm	5 µm	1-790915-300
Analytical	100 x 3 mm	5 µm	1-790913-300
Analytical	150 x 3 mm	5 µm	1-790918-300
Analytical	50 x 4.6 mm	5 µm	1-790914-300
Analytical	100 x 4.6 mm	5 µm	1-790912-300
Analytical	150 x 4.6 mm	5 µm	1-790905-300
Analytical	250 x 4.6 mm	5 µm	1-790901-300
Semi-prep	250 x 10 mm	5 µm	1-790902-300
Semi-prep	100 x 21.1 mm	5 µm	1-790910-300
Semi-prep	150 x 21.1 mm	5 µm	1-790909-300
Semi-prep	250 x 21.1 mm	5 µm	1-790907-300
Prep	150 x 30 mm	5 µm	1-790908-300
Prep	250 x 30 mm	5 µm	1-790903-300
Prep	150 x 50 mm	5 µm	1-790911-300
Prep	250 x 50 mm	5 µm	1-790904-300

BEST SELLER

CELERIS MEDIA & SELECTIVITY

Supercritical fluid chromatography (SFC) is widely recognized as a preferred technique for preparative chiral applications. The use of compressed CO_2 as the primary mobile phase provides many benefits: it is readily available, relatively inexpensive, and safe. It can also be recycled, thus leading to SFC's designation as a "green" technology. Additionally, the viscosities of compressed CO_2 and mixtures with polar modifiers are much lower than those of aqueous mixtures. This allows for chromatographic run times, which are approximately one-third to one-fifth as long as typical HPLC runs. These advantages are clearly applicable to a broad range of separations, beyond just chiral separations.

In the following figures, we demonstrate the benefits of Celeris achiral stationary phases with respect to the selectivity characteristics observed in SFC analyses of acidic, basic, and neutral compounds.

Celeris™ Media Specifications	
Pore Size:	100Å
Surface Area:	350 m^2/g
Particle Size:	5µm and 10µm



Gradient SFC Method Conditions

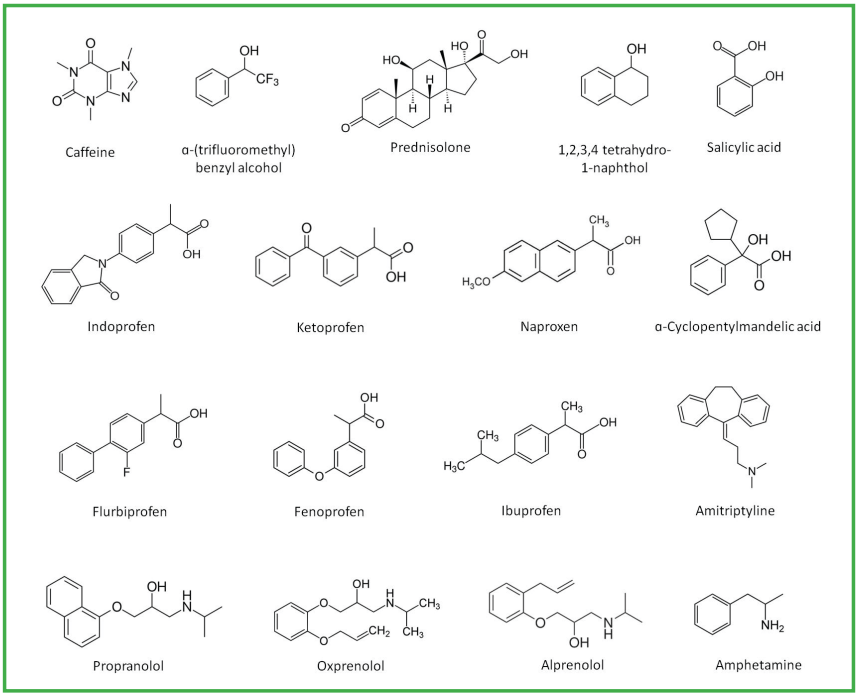
Column	250 mm x 4.6 mm; 5 µm		
Mobile phase A:	Carbon dioxide		
Mobile phase B:	Methanol		
Gradient:	Time (min.)	Flow (mL/min)	%B
	0.00	3.0	5
	10.00	3.0	40
	20.00	3.0	40
Oven Temp.:	30°C		
Pressure:	150 bar		
Detection:	212 nm		

We tested each Celeris phase in gradient SFC mode using the acidic, basic, and neutral probes as shown in the following figures. All analyses were performed using a Shimadzu Nexera SFC/UHPLC system.

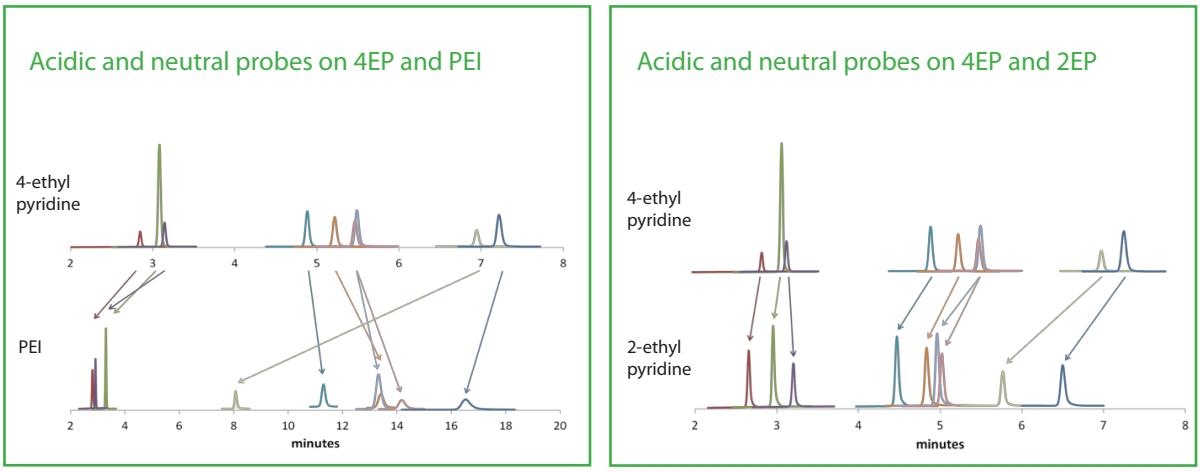
Ask the Expert

Learn more about how Celeris SFC phases can support your separations. Email techsupport@registech.com with your questions.

Structures of acidic, basic, and neutral probes



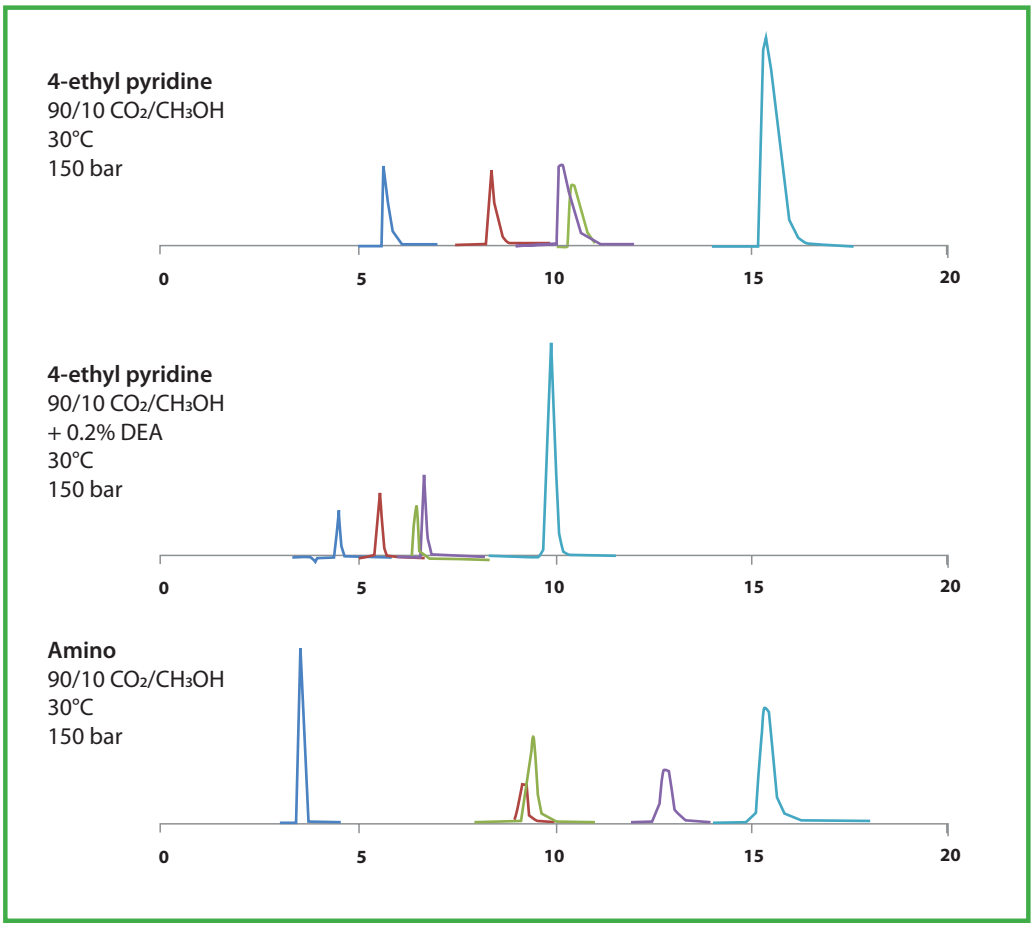
Selectivity of Acidic and Neutral Compounds in Gradient SFC



This figure illustrates the differences in selectivity with a number of elution order changes as well as significant shifts in absolute retention times for acids. The selectivity of PEI is similar to a traditional aminopropyl phase but more retentive of acids.

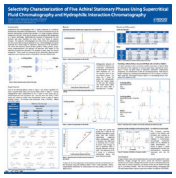
Peak Shape of Basic Probes in Isocratic SFC Mode with and without Additive

It is often necessary to add a co-solvent modifier (acid, base, or salt) to affect the selectivity of the separation or improve peak shape, especially for bases. Figure 7 shows the peak shape of alprenolol, oxprenolol, amphetamine, propranolol, and amitriptyline on 4EP and aminopropyl phases. Peak shape is greatly improved by including 0.2% diethylamine in the co-solvent, methanol, when using 4EP. Peak shape of bases is good on the aminopropyl phase, even without the addition of DEA.



Tech Tip

Download our "Selectivity Characterization of Five Achiral Stationary Phases Using Supercritical Fluid Chromatography and Hydrophilic Interaction Chromatography" poster at registech.com/celeris to learn more.





REVERSED-PHASE
HPLC Columns



REVERSED-PHASE HPLC COLUMNS

EVOKE™ C18 COLUMNS

High performance reversed-phase separations at any scale

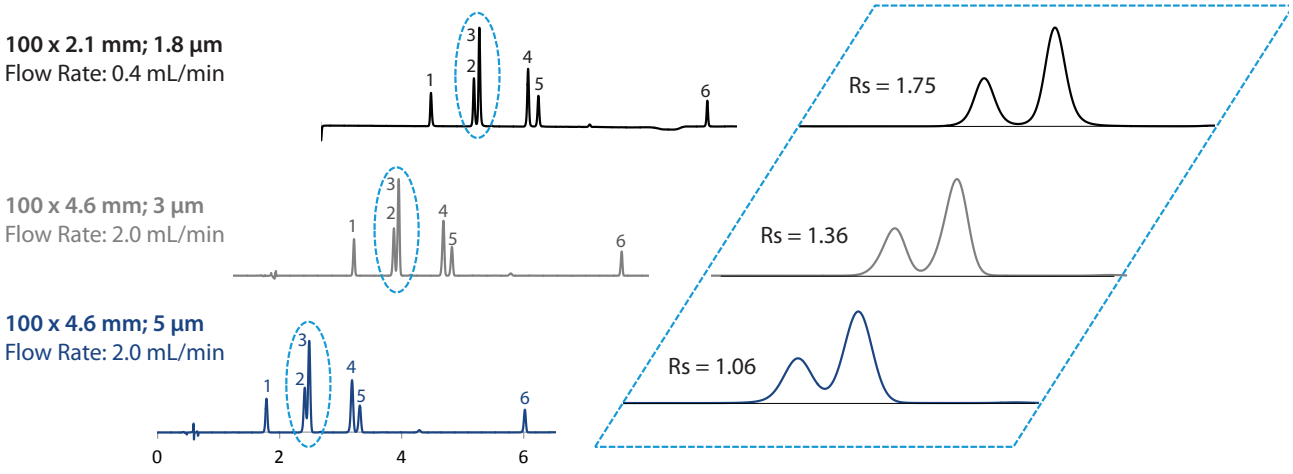
Regis' improved line of C18 columns is optimized for high efficiency separations and excellent column to column reproducibility. Evoke™ C18 columns are manufactured using high purity silica and endcapped using a unique gas-phase technology. Gas-phase endcapping leads to improved surface coverage, shielding acidic silanol groups for a highly inert, hydrophobic surface that results in excellent separation kinetics and provides unique selectivity in comparison to other C18 phases. Additionally, it allows the use of higher concentrations of organic mobile phase for greater sensitivity by electrospray ionization mass spectrometry and improved loading capacity for preparative applications.

High efficiency separations can be achieved on fully porous particles, ranging from 1.8 µm (analytical scale) to greater than 20 µm (process scale purifications). Our most popular column sizes are stocked for immediate delivery.



Scalable Separations across a Wide Range of Particle Sizes

Separation of NSAIDs on Evoke C18

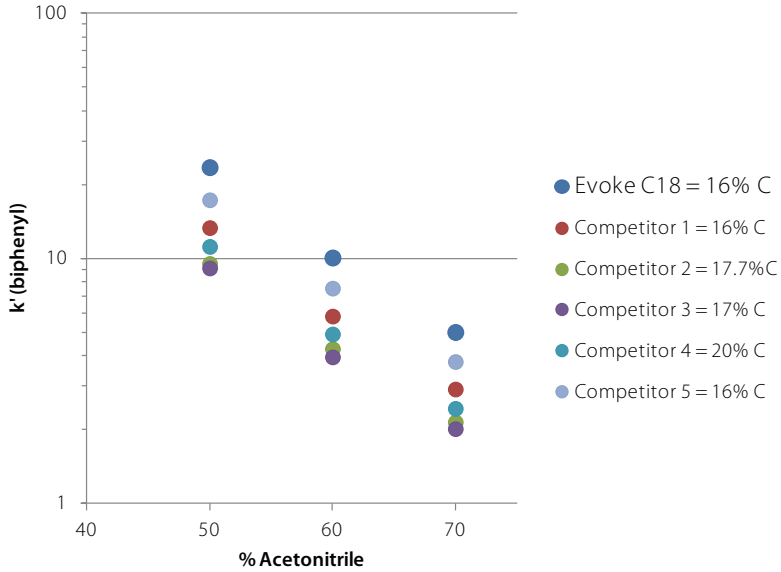


Gradient:

Time (min)	%B
0	40
4	70
6	95

Peak IDs: 1) Indoprofen 2) Ketoprofen 3) Naproxen 4) Fenoprofen 5) Flurbiprofen 6) Ibuprofen
Mobile Phase: A) H_2O + 0.1% TFA; B) ACN + 0.1% TFA
System: Shimadzu Nexera UC
Detection: UV 220 nm

High Capacity C18 Phase



Unique gas-phase endcapping promotes hydrophobic retention for unique selectivity and greater retention over leading high carbon load phases

Evoke™ C18 Media Specifications	
Carbon Content:	16%
Pore Size:	100Å
Surface Area:	~320 m^2/g
pH Range:	2 - 8
Particle Sizes:	1.8, 3, 5, 10 µm and greater*



**Particles larger than 10 µm available upon request*

EVOKE C18 ORDERING INFORMATION

Product Type	Dimensions	Particle Size	Catalog #
Analytical	50 x 2.1 mm	1.8 µm	1-760106-300
Analytical	100 x 2.1 mm	1.8 µm	1-760107-300
Analytical	20 x 3 mm	1.8 µm	1-760103-300
Analytical	50 x 3 mm	1.8 µm	1-760104-300
Analytical	100 x 3 mm	1.8 µm	1-760105-300
Analytical	50 x 4.6 mm	1.8 µm	1-760102-300
Analytical	100 x 4.6 mm	1.8 µm	1-760101-300
Analytical	50 x 2.1 mm	3 µm	1-760206-300
Analytical	150 x 2.1 mm	3 µm	1-760209-300
Analytical	20 x 3 mm	3 µm	1-760203-300
Analytical	50 x 3 mm	3 µm	1-760204-300
Analytical	100 x 3 mm	3 µm	1-760205-300
Analytical	150 x 3 mm	3 µm	1-760210-300
Analytical	50 x 4.6 mm	3 µm	1-760202-300
Analytical	100 x 4.6 mm	3 µm	1-760201-300
Analytical	150 x 4.6 mm	3 µm	1-760207-300
Analytical	150 x 4.6 mm	3 µm	1-760208-300
Analytical	250 x 4.6 mm	3 µm	1-760211-300
Analytical	30 x 2.1 mm	5 µm	1-760319-300
Analytical	50 x 2.1 mm	5 µm	1-760306-300
Analytical	100 x 2.1 mm	5 µm	1-760307-300
Analytical	150 x 2.1 mm	5 µm	1-760309-300

BEST SELLER

EVOKE C18 ORDERING INFORMATION (continued)

Product Type	Dimensions	Particle Size	Catalog #
Analytical	50 x 3 mm	5 µm	1-760304-300
Analytical	100 x 3 mm	5 µm	1-760305-300
Analytical	30 x 4.6 mm	5 µm	1-760318-300
Analytical	50 x 4.6 mm	5 µm	1-760302-300
Analytical	100 x 4.6 mm	5 µm	1-760301-300
Analytical	150 x 4.6 mm	5 µm	1-760308-300
Analytical	250 x 4.6 mm	5 µm	1-760311-300
Semi-prep	250 x 10 mm	5 µm	1-760312-300
Semi-prep	100 x 21.1 mm	5 µm	1-760303-300
Semi-prep	150 x 21.1 mm	5 µm	1-760310-300
Semi-prep	250 x 21.1 mm	5 µm	1-760315-300
Prep	150 x 30 mm	5 µm	1-760316-300
Prep	250 x 30 mm	5 µm	1-760313-300
Prep	150 x 50 mm	5 µm	1-760317-300
Prep	250 x 50 mm	5 µm	1-760314-300
Analytical	50 x 2.1 mm	10 µm	1-760406-300
Analytical	50 x 4.6 mm	10 µm	1-760402-300
Analytical	100 x 4.6 mm	10 µm	1-760401-300
Analytical	150 x 4.6 mm	10 µm	1-760407-300
Analytical	250 x 4.6 mm	10 µm	1-760411-300
Semi-Prep	250 x 10 mm	10 µm	1-760412-300
Semi-Prep	50 x 21.1 mm	10 µm	1-760404-300
Semi-Prep	150 x 21.1 mm	10 µm	1-760410-300
Semi-Prep	250 x 21.1 mm	10 µm	1-760409-300
Prep	50 x 30 mm	10 µm	1-760405-300
Prep	250 x 30 mm	10 µm	1-760413-300
Prep	50 x 50 mm	10 µm	1-760408-300
Prep	250 x 50 mm	10 µm	1-760403-300



RESTRICTED ACCESS MEDIA (RAM) DIRECT INJECTION HPLC COLUMNS

Rapidly separate small molecules from biological matrices

HPLC and LC-MS analysis of small molecules contained within a biological matrix can be a difficult and time-consuming task. The analysis often involves multi-step pretreatment procedures including centrifugation, extraction and filtration. Restricted Access Media (RAM) Direct Injection columns separate small molecules in the presence of much larger analytes without extensive sample pretreatment. You can, therefore, directly inject a variety of complex sample matrices without prior sample clean-up for the separation and detection of drugs, drug metabolites, peptides and other analytes.

RAM Advantages

- ***Eliminates multiple sample pre-treatment steps:*** RAM Direct Injection reduces the number of steps for sample preparation
- ***Use for variety of sample matrices:*** Efficient in the analysis of drugs, drug metabolites, peptides, and other analytes in matrices such as plasma, serum, whole blood, urine, plant and tissue extract, food and beverage, and environmental samples
- ***Compatible with automated sample processing:*** HPLC columns allow for automation, making it possible to process many samples at once
- ***Reduces potentially dangerous sample handling:*** Sample handling is significantly reduced, reducing the workers' exposure to dangerous samples such as plasma, serum, urine and environmental samples
- ***Reduces biohazardous waste:*** RAM Direct Injection columns limit the creation of unnecessary biohazardous waste eliminating SPE disk waste
- ***Lowers cost:*** Because of the benefits described above, RAM Direct Injection often offers the lowest cost solution



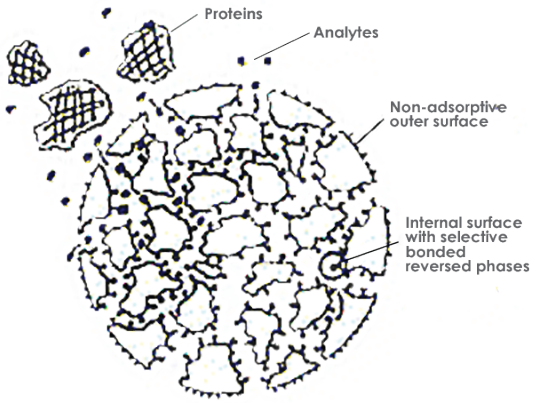
INTERNAL SURFACE REVERSED PHASE (ISRP)

RAM's Internal Surface Reverse Phase (ISRP) material was created specifically for the direct analysis of drugs in serum without extensive sample preparation. The result was a new phase that allows for chromatographic separations without interference by protein adsorption. The efficacy of the GFF II phases has been demonstrated in a variety of applications, including the study of drugs, their metabolites, and the resolution of peptides.

RAM ISRP Structure

Continuing product improvement efforts resulted in the development of the ISRP GFF II, a second-generation phase with an improved that resulted in the following improvements:

- Increased sample retention
- Higher column efficiency
- Greater batch-to-batch reproducibility



Rigid porous hydrophilic particle

Optimizing Selectivity

Many variables can affect the selectivity of the ISRP phase, including:

- ***Mobile Phase Composition:*** The nature of ISRP analytes requires that mobile phases consist of a buffer with varying degrees of modification. Modifiers can include acetonitrile, methanol, isopropanol, and tetrahydrofuran.
- ***Caution:*** Too much modifier can result in matrix precipitation.
- ***pH:*** The pH of the mobile phase can be controlled to avoid protein denaturing and to enhance selectivity. The pH range of the column is between 2.5 and 7.5; however, within the optimal pH range of 6.0 to 7.5, both the proteins and the glycine outer surface take on a negative charge. As a result, negatively charged proteins are repulsed by the outer phase, and pass quickly through the column.
- ***Temperature:*** Separations can also be optimized by varying column temperature. Lower temperatures have been shown to result in increased retention and selectivity.

PINKERTON, GFF II ORDERING INFORMATION

Product Type	Dimensions	Catalog #
Analytical	50 x 2.1 mm	1-731469-300
Analytical	50 x 4.6 mm	1-731470-300
Analytical	150 x 4.6 mm	1-731471-300
Analytical	250 x 4.6 mm	1-731472-300
Guard Kit*	10 x 3 mm	1-731475-300
Guard Replacement Kit*	N/A	1-731474-300

BEST SELLER

SEMI-PERMEABLE SURFACE (SPS)

The inner and outer surfaces of the SPS are bonded separately, allowing each to be varied independently. Available inner surface phase chemistries include ODS, Octyl, and Phenyl, which allow for retention of small molecule analytes. The hydrophilic outer phase of polyethylene glycol provides size exclusion and hydrophilic shielding, which repels large biomolecules.

ODS C18 ORDERING INFORMATION

Product Type	Dimensions	Particle Size	Catalog #
Analytical	50 x 2.1 mm	5 µm	1-785318-300
Analytical	50 x 4.6 mm	5 µm	1-785018-300
Analytical	150 x 4.6 mm	5 µm	1-785118-300
Analytical	250 x 4.6 mm	5 µm	1-785218-300
Guard Kit	10 x 3 mm	5 µm	1-785418-300
Guard Replacement Kit*	N/A	5 µm	1-785518-300
Guard Cartridge Kit*	10 x 10 mm	5 µm	1-785618-300
Guard Replacement*	10 x 10 mm	5 µm	1-785718-300

BEST SELLER

**Guard kits include 1 holder and 2 guard cartridges; replacement kits include 3 cartridges only.*

OCTYL C8 ORDERING INFORMATION

Product Type	Dimensions	Particle Size	Catalog #
Analytical	50 x 2.1 mm	5 µm	1-785308-300
Analytical	50 x 4.6 mm	5 µm	1-785008-300
Analytical (BEST SELLER)	150 x 4.6 mm	5 µm	1-785108-300
Analytical	250 x 4.6 mm	5 µm	1-785208-300
Guard Kit	10 x 3 mm	5 µm	1-785408-300
Guard Replacement Kit*	N/A	5 µm	1-785508-300
Guard Cartridge Kit*	10 x 10 mm	5 µm	1-785608-300
Guard Replacement*	10 x 10 mm	5 µm	1-785708-300

PHENYL ORDERING INFORMATION

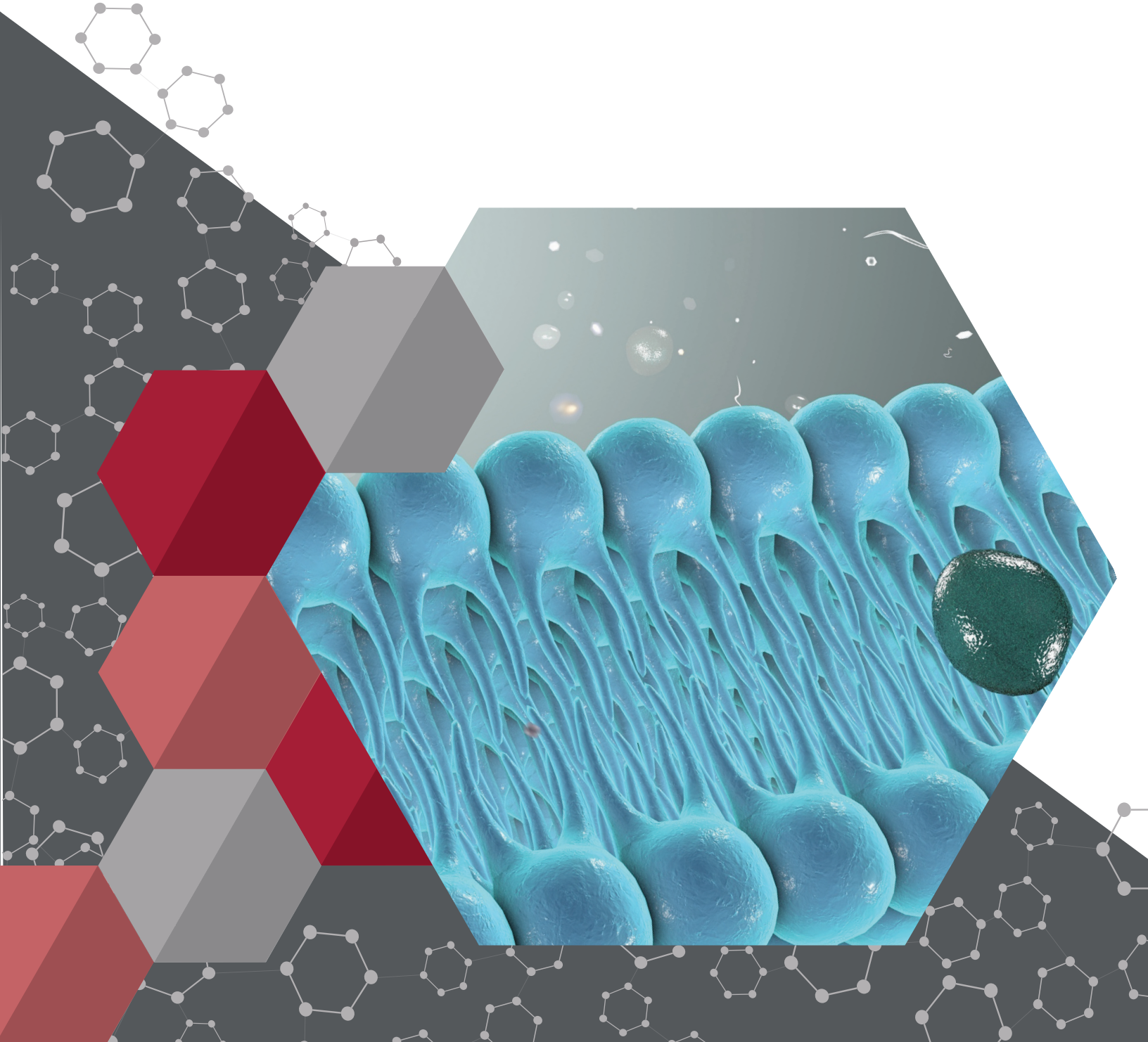
Product Type	Dimensions	Particle Size	Catalog #
Analytical (BEST SELLER)	150 x 4.6 mm	5 µm	1-785107-300
Analytical	250 x 4.6 mm	5 µm	1-785207-300
Guard Kit*	10 x 3 mm	5 µm	1-785407-300
Guard Replacement Kit*	N/A	5 µm	1-785507-300

**Guard kits include 1 holder and 2 guard cartridges; replacement kits include 3 cartridges only.*





IAM Chromatography



WHAT IS IMMOBILIZED ARTIFICIAL MEMBRANE CHROMATOGRAPHY?

Immobilized Artificial Membrane (IAM) technology is an innovative approach to chromatography in which the chromatographic surface emulates the lipid environment of the cell membrane.[1,2] As phospholipids are major components of tissues and cells, drug interaction with phospholipids is an important contributor to distribution. IAM chromatography can be used to quickly measure drug phospholipid interactions via retention times.

This IAM technique provides superior correlation with experimentally determined drug permeability when compared to other chromatographic methods. ODS silica, for example, retains analytes solely on the basis of hydrophobicity. IAM more closely mimics the interaction of analytes with biological membranes, where a combination of hydrophobic, ion pairing, and hydrogen bonding interactions are possible. This combination of interactions measured by the IAM column is known as phospholipophilicity.

IAM chromatography is a simple and reliable tool to measure phospholipid/drug affinity via calibrated retention times on IAM stationary phases. Regis Technologies IAM Columns are high quality, long lasting HPLC columns providing reliable measurements across a wide range of drug molecules. A calibration mixture and instructions how to obtain and use the critical information of drug discovery compounds are also available.

Accelerate Drug Discovery

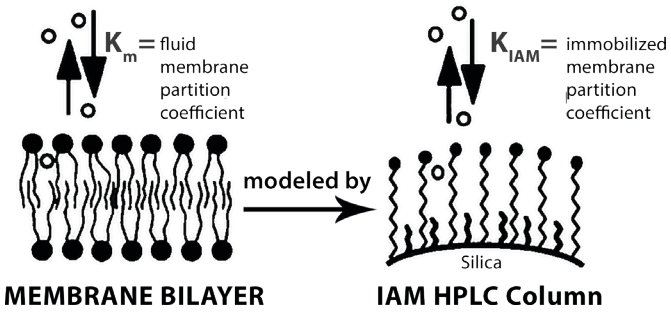
- Rapidly screen drug/phospholipid interactions
- Identify suitable compounds early in the process
- Identify and eliminate compounds with low permeability
- Predict *in vivo* compound behavior, reducing need for animal studies

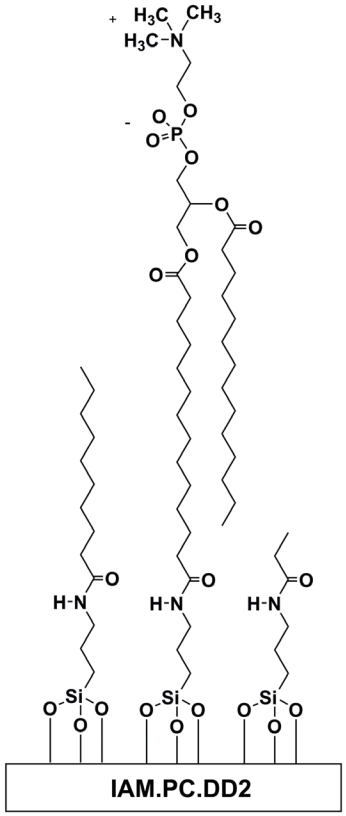
IAM COLUMN STATIONARY PHASE CHARACTERISTICS & USE

- Emulates the lipid environment on a solid surface
- Covalently bonded Phosphatidylcholine (PC) to silica
- Highly stable stationary phase suitable for thousands of injections
- Retention on the IAM stationary phase can be directly related to membrane partition coefficients
- Thousands of drug discovery compounds can be characterized by IAM retention time measurements
- Normalized retention times are used for ranking compounds



Membrane bilayer modeled by IAM



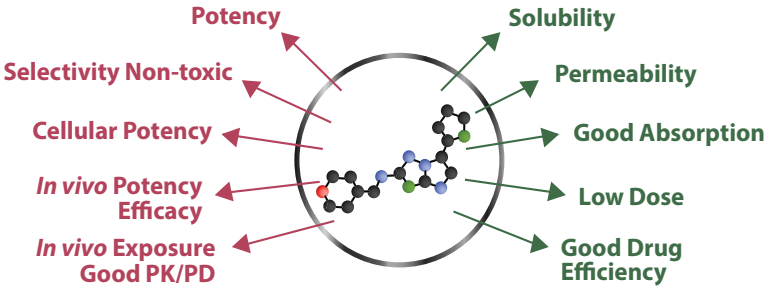


IAM.PC.DD2 Structure

DRUG/PHOSPHOLIPID BINDING CAN INFLUENCE:

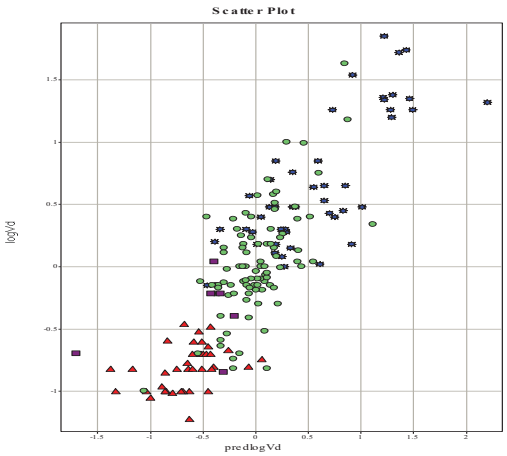
- Permeability
- Absorption
- Solubility enhancement
- Toxicity
- Volume of distribution
- Drug efficiency
- Cellular potency

Important Measurements for Potential Drug Molecules



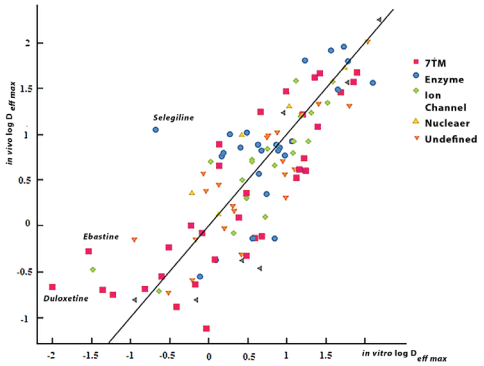
VOLUME OF DISTRIBUTION MODEL

Human clinical steady state volume of distribution (logVdss) data of 130 marketed drug molecules shows trends with the estimated values using IAM and HSA binding data.



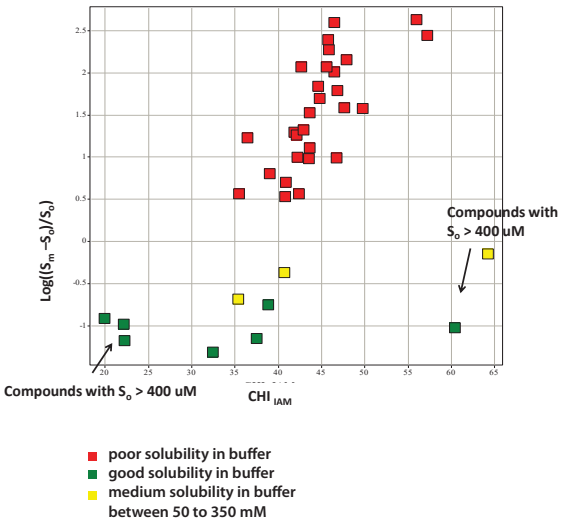
DRUG EFFICIENCY MODEL

The sum of the IAM and HSA binding of compounds models the in vivo *drug efficiency.*



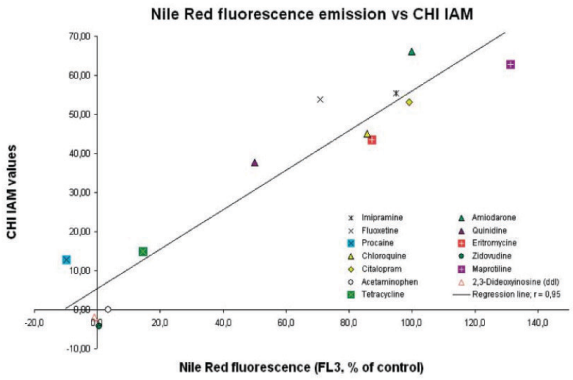
SOLUBILITY ENHANCEMENT BY MICELES IN SIMULATED INTESTINAL FLUIDS

The intestines contain phosphatidyl-choline micelles that enhance the solubility and absorption of nutrients. Solubility enhancement shows good correlation to IAM binding of compounds.



PHOSPHOLIPIDS TOXICITY POTENTIAL

CHI IAM values higher than 50 indicate phospholipidosis potential. Phospholipidosis is an accumulation of lamellar phospholipids in the cell often caused by drugs. Hepatotoxicity caused by phospholipid accumulation detected by Nile Red fluorescence shows excellent correlation to CHI IAM values.



Ask the Expert

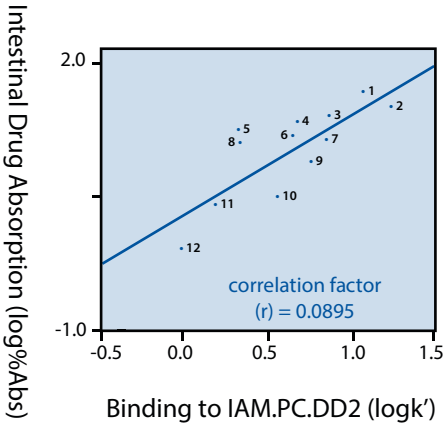
Request a personalized presentation on the benefits of IAM chromatography from Dr. Klara Valko, Director of Bio-Mimetic Chromatography Consultancy, honorary professor at University College London, and former principal investigator for 22 years at GSK. Contact your Regis representative today for a free consultation session with the IAM expert!

EXCELLENT CORRELATION TO TRADITIONAL METHODS

The traditional means of predicting membrane permeability include the use of Caco-2 cell line cultures, intestinal tissue, or liposome assays. These methods are laborious and costly to perform.

Measuring drug permeability in the intestinal tissue, where absorption is occurring, is physiologically more relevant than measuring drug permeability in Caco-2 cells. The example below illustrates that drug absorption in inverted rat intestinal tissue model correlates with drug retention factors k'IAM measured on the IAM.PC.DD2 column.

IAM.PC.DD2 columns measure drug absorption in inverted rat intestinal tissue.



1. m-Nitroaniline
2. p-Nitroaniline
3. Salicylic acid
4. p-Toluidine
5. Aniline
6. m-Nitrobenzoic acid
7. Phenol
8. Benzoic acid
9. Acetanilide
10. Antipyrine
11. Theophylline
12. Acetylsalicylic acid

IAM Method Conditions	
Column:	IAM.PC.DD2 10 cm x 4.6 mm i.d.
Mobile Phase:	0.01 M DPBS Buffer, pH 5.4
Flow Rate:	1.0 ml/min
Injection Volume:	10 µL
Detection:	UV 220 nm

Correlating Drug Partitioning into IAM with Rat Intestinal Drug Absorption

Sample	% Absorption of Inverted Rat Intestine	(k') IAM.PC.DD2
m-nitroaniline	77	10.838
p-nitroaniline	68	16.086
Acetylsalicylic acid	60	6.963
p-toluidine	59	4.546
aniline	54	2.069
m-nitrobenzoic acid	53	4.403
phenol	51	6.544
benzoic acid	51	2.088
acetanilide	42	5.096
antipyrine	32	3.350
theophylline	29	1.478
acetylsalcylic acid	20	0.931
r (correlation factor)*		**0.8025**

**r is calculated by plotting log % absorption of inverted rat intestine.*

IAM.PC.DD2 ORDERING INFORMATION

Product Description	Dimensions	Particle Size	Catalog #
IAM.PC.DD2	50 x 3.0 mm	10 µm	1-774017-300
IAM.PC.DD2	100 x 3.0 mm	10 µm	1-774004-300
IAM.PC.DD2	150 x 3.0 mm	10 µm	1-774003-300
IAM.PC.DD2	30 x 4.6 mm	10 µm	1-774010-300
IAM.PC.DD2	100 x 4.6 mm	10 µm	1-774011-300
BEST SELLER IAM.PC.DD2	150 x 4.6 mm	10 µm	1-774014-300
IAM.PC.DD2 Guard Kit Includes one holder and two guard cartridges	10 x 3.0 mm	10 µm	1-774012-300
IAM.PC.DD2 Guard Replacement Kit Includes three guard cartridges	10 x 3.0 mm	10 µm	1-774013-300
BEST SELLER IAM Drug Screen Calibration Mixture (10x1 mL)	10 x 1 mL	N/A	1-774015-300

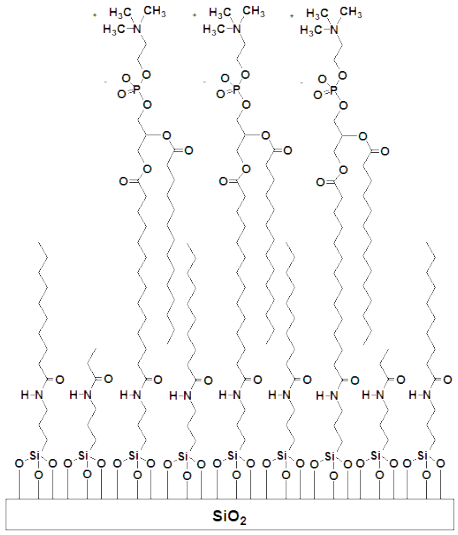
Tech Tip

Visit registech.com/iam for more information in our white paper, detailed user guide, list of references, and more.

IAM FAST-SCREEN MINI COLUMN

Packed with the Ester PC Ligand phase, IAM Fast-Screen Mini columns are a rapid and economical viable screening method for the high throughput estimation of drug permeability.

The IAM.PC Fast-Screen Mini Column, one centimeter in length by 3.0 mm in internal diameter, was specifically designed for rapid estimation of drug permeability in high throughput screening programs. When connected to an HPLC system with an autosampler, a single column can be used in the analysis of hundreds of samples per day with highly reproducible results. The one centimeter Fast-Screen Mini Column is offered not as a separation tool, but rather as a tool for characterizing the chromatographic retention factor (k') of individual analytes. The measured k' of analytes on this column can be used to estimate a value for drug permeability.



IAM.PC.C10/C3 ligand structure

FAST-SCREEN MINI COLUMN ADVANTAGES

- Excellent correlation to traditional methods
- Rapid indication of drug absorption
- High sample throughput
- Highly reproducible results
- Durability
- Cost effectiveness



INTESTINAL TISSUE CORRELATION

Drug permeability predicted by Inverted Rat Intestines correlates well to drug retention factors, k'IAM measured on the IAM Fast-Screen Mini Columns. Note the short retention times.

Correlating Drug Partitioning into IAM with Rat Intestinal Drug Absorption

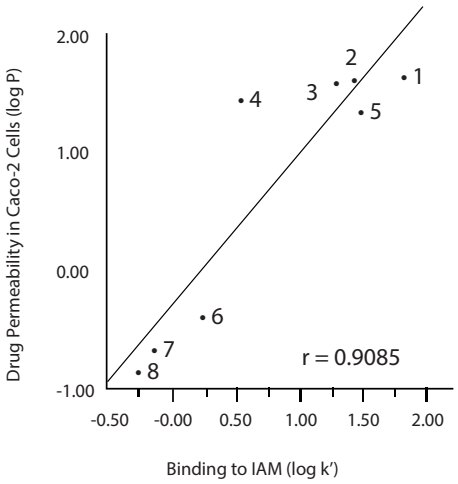
Compound	% Absorption of Inverted Rat Intestine	IAM Fast- Screen Mini Column Retention Time (Sec)	(k') IAM.PC.DD2
m-nitroaniline	77	133.1	15.29
p-nitroaniline	68	177.9	21.84
Acetylsalicylic acid	60	93.8	9.54
p-toluidine	59	79.7	7.48
aniline	54	52.1	3.45
m-nitrobenzoic acid	53	68.1	5.79
phenol	51	94.6	9.66
benzoic acid	51	43.7	2.22
acetanilide	42	43.7	6.97
antipyrine	32	51.8	3.40
theophylline	29	39.3	1.58
acetylsalcylic acid	20	36.1	1.11
r (correlation factor)*			**0.8385**

**r is calculated by plotting log k' vs. log % absorption of inverted rat intestine.*

CACO-2 CELL CORRELATION

The data below shows that drug permeability predicted by Caco-2 cells correlates well to k'IAM measured on the IAM Fast-Screen Mini Columns.

IAM Fast-Screen Correlates with Drug Permeability in Caco-2 Cells	
Column:	IAM Fast-Screen Mini Column 1 cm x 3.0 mm i.d.
Mobile Phase:	0.01 M DPBS Buffer, pH 7.4
Flow Rate:	0.5 ml/min
Injection Volume:	10 µL
Detection:	UV 220 nm

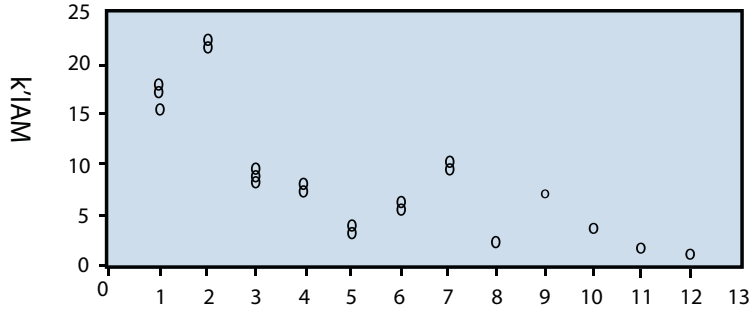


1. Propanolol
2. Alprenolol
3. Warfarin
4. Metoprolol
5. Hydrocortisone
6. Terbutaline
7. Atenolol
8. (AVP) Arginine- Vasopressin

REPRODUCIBLE RESULTS

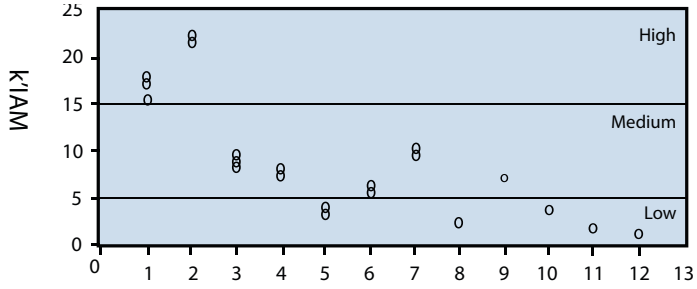
The measured values for k'IAM show excellent reproducibility from both run to run and day to day.

Highly Reproducible k'IAM from 10 Runs over a Two-Day Period



ABILITY TO ESTABLISH PERMEABILITY ZONES FOR HIGH THROUGHPUT SCREENING

Permeability zones can be determined for different analytes when performing large-scale drug absorption screening. Thus, rapid IAM analyses can characterize a drug as having low, medium, or high membrane permeability.



FAST-SCREEN MINI COLUMN ORDERING INFORMATION

Product Description	Dimensions	Particle Size	Catalog #
IAM Fast Screen Mini Column Kit Holder + 2 Columns	10 x 3.0 mm	10 µm	1-775014-300
IAM Fast Screen Mini Column Replacement Kit (6 pack)	10 x 3.0 mm	10 µm	1-775015-300
IAM Fast Screen Mini Column Replacement Kit (12 pack)	10 x 3.0 mm	10 µm	1-775016-300

BEST SELLER

ADDITIONAL IAM COLUMNS

IAM.PC

IAM.PC is for simplified protein isolation and purification, allowing for rapid purification of membrane proteins while maintaining biological activity.

The phase is based on the prevalent membrane lipid, phosphatidylcholine (PC), and consists of monolayers of amphiphilic phospholipids covalently bonded to aminopropyl silica particles through a terminal amide linkage. As a result, the bulky phosphatidylcholine groups shield many of the amine binding sites on the silica surface, preventing amine interaction with the protein molecules.

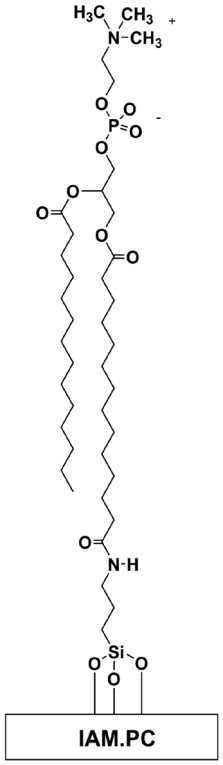
The membrane nature of the IAM phase imparts surface characteristics, which are useful in the chromatography of membrane proteins. These include high protein loading, increased protein recovery, recovery of functional activity, and selectivity for membrane proteins.

Large membrane proteins can interact with any combination of polar head, hydrophobic chain, or inner amine groups. The subsurface has been shown to interact with certain solutes and may or may not contribute to the separation of a given biomolecule.

IAM.PC Applications

Numerous applications have been developed using IAM.PC columns:

- Purification of Cytochrome P450
- Isolation of membrane proteins
- Prediction of solute transport across human skin
- Prediction of amino acid transport across the blood-brain barrier
- Binding of solutes to liposome membranes
- Immobilization of trypsin and chymotrypsin for the determination of their inhibitor and substrate activity



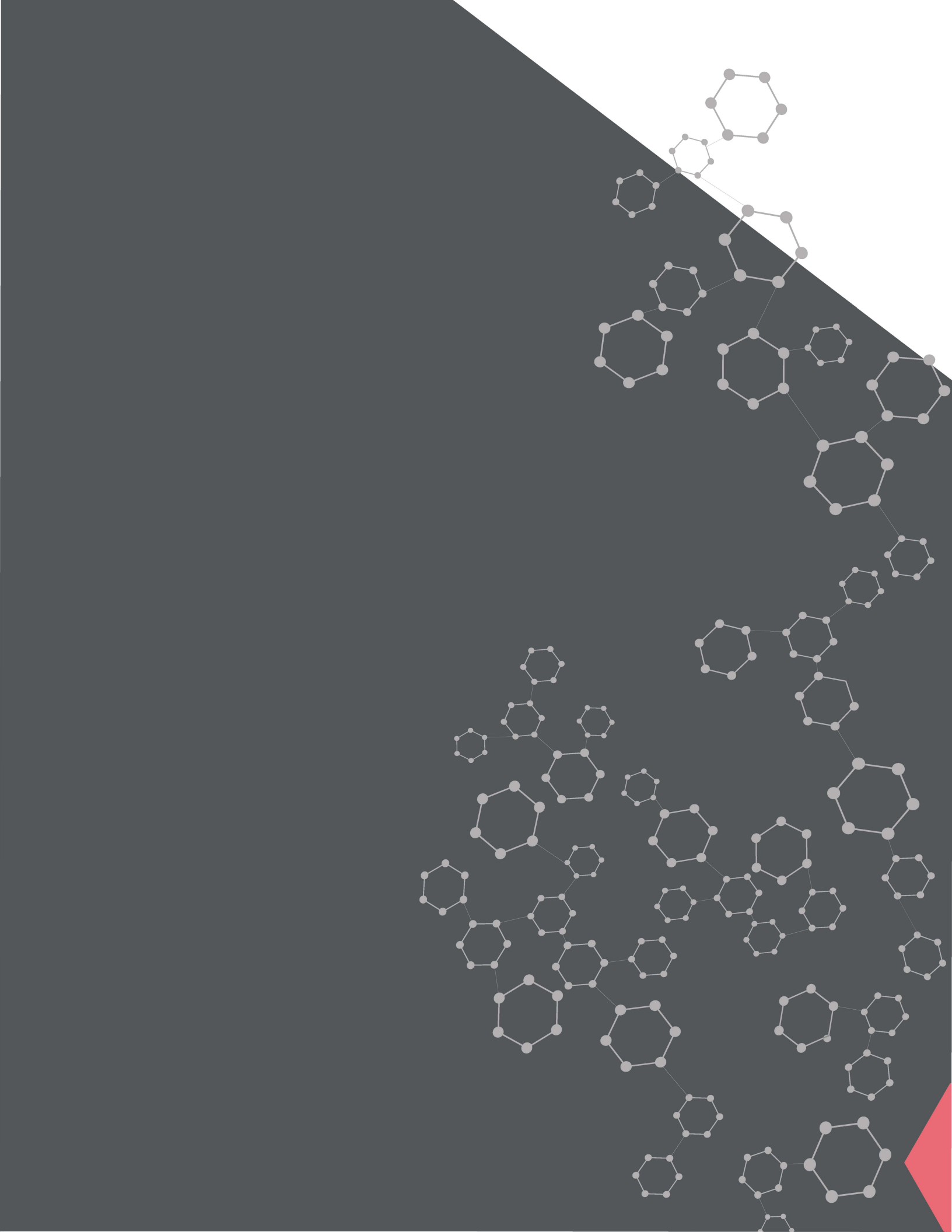
IAM.PC Structure The Phosphatidylcholine is covalently bound to propylamine groups, which are in turn bound to silica.

ADDITIONAL IAM COLUMNS ORDERING INFORMATION

Product Description	Dimensions	Particle Size	Catalog #
BEST SELLER IAM.PC	30 x 4.6 mm	10 µm	1-770007-300
IAM.PC	150 x 4.6 mm	10 µm	1-770001-300
IAM.PC Guard Kit Includes 1 holder and 2 guard cartridges	10 x 3.0 mm	10 µm	1-771001-300
IAM.PC Guard Replacement Kit Includes 3 guard cartridges	10 x 3.0 mm	10 µm	1-774001-300
BEST SELLER IAM.PC.MG	150 x 4.6 mm	10 µm	1-772001-300
IAM.PC.MG	30 x 4.6 mm	10 µm	1-772007-300
IAM.PC.MG Guard Kit	10 x 3.0 mm	10 µm	1-773001-300

IAM References

1. Pidgeon, C.; et al.; IAM Chromatography: An *in vitro* Screen for Predicting Drug Membrane Permeability; *J. Med.* Chem. **1995,** *38*, 590–594.
2. O ng, S.; et al.; Thermodynamics of Solute Partitioning into Immobilized Artificial Membranes; *Anal. Chem*. **1995**, *67*, 755–762.



ION PAIRING
Reagents



Ion Pair Reagents

Ion Pair Chromatography is a method for improving the separation of charged analytes. In the resolution of organic ions with conventional HPLC methods, use of ion pair reagents can enhance peak shape and retention time when common remedies such as modifying eluent ratios or changing stationary phases fail.



The Advantages of Ion Pair Chromatography

In the past, chromatographic separation of charged analytes has been achieved by ion suppression (the careful adjustment of the mobile phase pH to result in a nonionized analyte). Determining the optimum mobile phase pH in ion suppression, however, often requires extensive method development. Samples containing more than one ionizable component were often unusable. The imitations of ion suppression led to the development of a new, more generally applicable approach to the separation of ionized components: ion pair chromatography. Developed by Dr. Gordon Schill in 1973, ion pair chromatography relies upon the addition of ionic compounds to the mobile phase to promote the formation of ion pairs with charged analytes. These reagents are comprised of an alkyl chain with an ionizable terminus (figure 1). When used with common hydrophobic HPLC phases in the reversed-phase mode, ion pair reagents can be used to selectively increase the retention of charged analytes (figure 2).

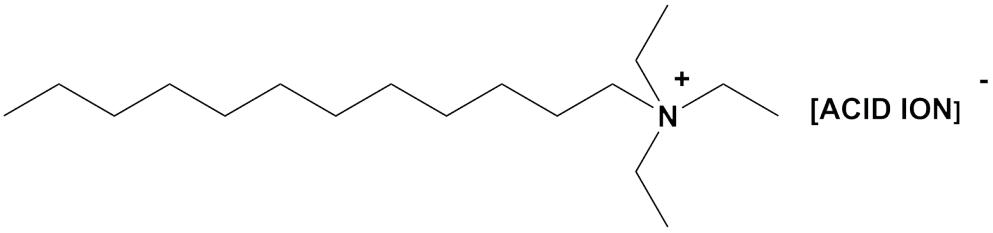


Figure 1. Quaternary Amine (Q-Series) Ion Pair Reagent.

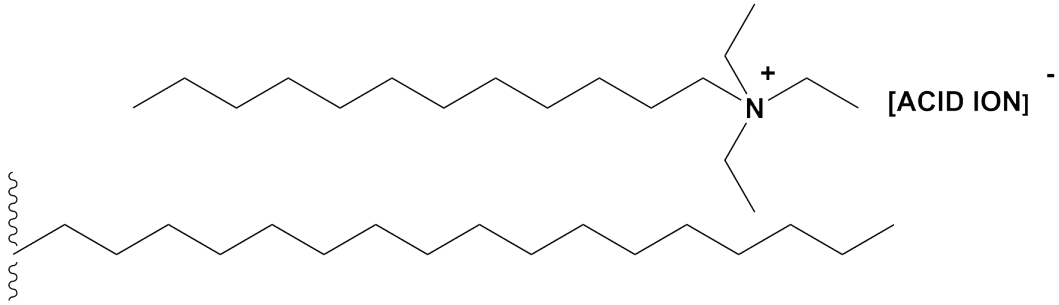


Figure 2. Quaternary Amine (Q-Series) Ion Pair Reagent interacting with C-18 Support.

Although ion exchange chromatography has become a popular mode of separation, it is not useful in all situations. The advantages of ion pair chromatography over ion exchange chromatography are:

- Simple preparation of buffers
- Wide choice of carbon chain lengths for improved retention and separation
- Significantly reduced separation time
- Simultaneous separation of both ionized and nonionized solutes
- Highly reproducible results
- Improved peak shape

Regis Provides a Wide Range of Reagents

Regis manufactures both ultrapure anionic Sulfonate (S-Series) and cationic Quaternary Amine (Q-Series) ion pair concentrates in the following alkyl chain lengths: pentyl, hexyl, heptyl, octyl, and dodecyl. Alkyl chains are represented by cardinal numbers in the naming of our products, i.e., 5, 6, 7, 8, and 12. See product descriptions on the following pages.

Purity Matters

Purity is of key importance in the manufacturing of our Ion Pair Reagents. Regis S-Series and Q-Series products are synthesized in accordance with the industry's highest quality standards, resulting in exceptional purity. This is demonstrated in table 1 and 2. UV transparency as low as 200 nm can be achieved for both the S-Series and Q-Series reagents. In most cases, these absorbances are lower than those for HPLC grade acetonitrile and methanol. Although the S-Series and Q-Series ion pair reagents can be used at wavelengths less than 210 nm, the crucial factors in determining what wavelength to use are the integrity of the detector optics and the purity of the organic modifiers. Regis also supplies bulk Sulfonates and several additional bulk Ion Pair Reagents to complement the separation capabilities of the Sulfonate S-Series and Quaternary Amine Q-Series.

Optical Absorbance (AUFS)		
S-Series	200 nm	210 nm
S5	0.006	0.002
S6	0.048	0.018
S7	0.008	0.001
S8	0.001	0.003
CH_3CN	0.076	0.013
CH_3OH	0.940	0.510

Table 1. Typical optical absorbances (AUFS) at 0.005 M.

Optical Absorbance (AUFS)		
Q-Series	200 nm	210 nm
Q5	0.006	0.002
Q6	0.048	0.018
Q7	0.008	0.001
Q8	0.001	0.003
Q12	0.002	0.003

Table 2. Typical optical absorbances (AUFS) at 0.005 M.

Retention Times (min)		Retention Ratio	
Q-Series	Benzoic Acid	Benzyl Alcohol	Acid/ Alcohol
Q5	4.53	9.17	0.49
Q6	6.50	8.60	0.76
Q7	8.24	9.13	0.90
Q8	12.36	8.94	1.38
Q12	79.53	8.52	9.33

Table 3. Retention vs. chain length.

[benzoic acid/benzyl alcohol in (60/40) water/ methanol]					
Q-6		Q7		Q8	
pH	R	pH	R	pH	R
7.50	0.59	7.50	0.88	7.51	1.06
6.50	0.70	6.51	1.00	6.54	1.29
5.50	0.96	5.52	1.23	5.50	1.59

Table 4. Retention ratio R as a function of pH.

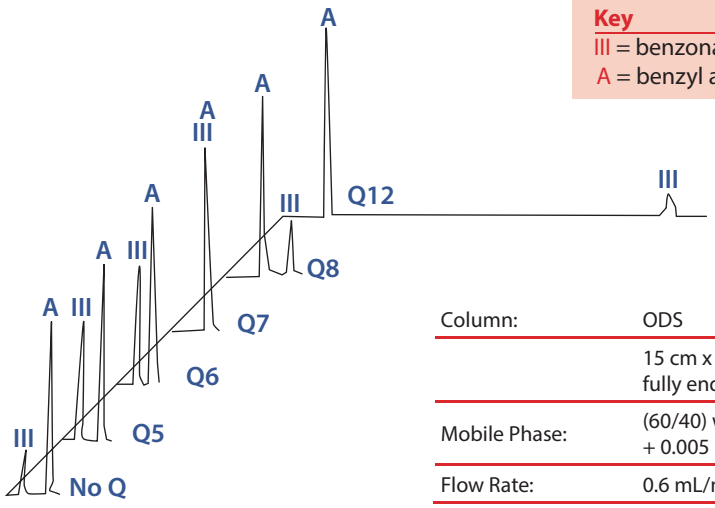
Tech Tip

How to Select a Regis Ion Pair Reagent for Method Development

To choose the proper reagent, alkyl chain lengths must be taken into consideration. The chain lengths enable selective separation of the analyte. The longer the chain, the more hydrophobic the counterion, and therefore, greater the retention. Retention may increase by a factor of almost 20 when going from pentyl (Q5) to dodecyl (Q12), as illustrated in table 3 and figure 3. Both table 3 and figure 3 demonstrate that the Q-reagent chain length governs benzoic acid retention times but does not affect the benzyl alcohol retention times. Similar behavior can also be achieved with the S-Series.

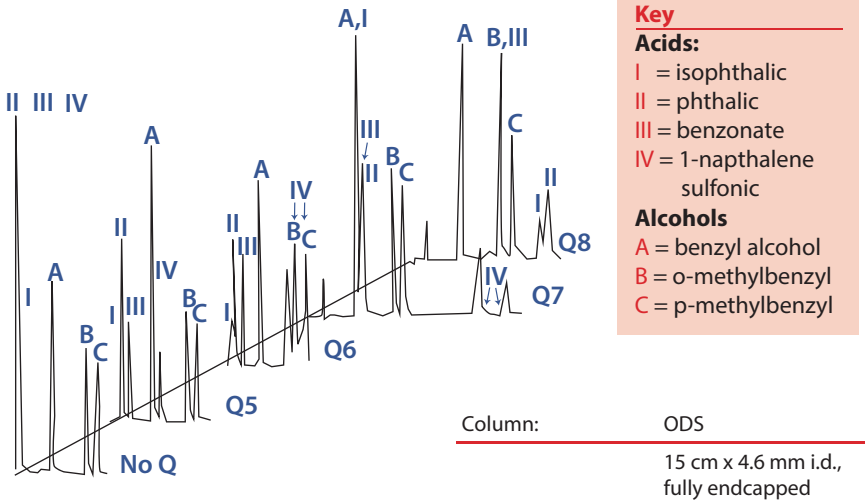
The following are guidelines to developing a successful method using Regis' ion pair reagents:

1. *Select a column — endcapped ODS (octadecylsilyl) is most common.*
2. *Use only HPLC-grade water and chromatography grade reagents in mobile phase preparation.*
3. *Choose the mobile phase components and concentrations that give the best separation.*
4. *If nonionic components are present in the sample, optimize the resolution prior to attempting ionic separations.*
5. *Select the appropriate ion pair series to provide the necessary counterion. Use the Q-series for acidic compounds and the S-series for basic compounds.*
6. *Through a process of elimination, choose the alkyl chain length which results in the best separation (figure 4).*
7. *Once the reagent has been selected, adjust the pH of the mobile phase to maximize resolution. Because slight modification of pH can profoundly affect retention and selectivity, make all adjustments in small increments and monitor carefully (table 4).*
8. *Ideally, the ion pair reagent concentration in the mobile phase should be 0.005 M. However, small adjustments in reagent concentration may increase retention slightly and optimize the separation.*



Column:	ODS
	15 cm x 4.6 mm i.d., fully endcapped
Mobile Phase:	(60/40) water/methanol + 0.005 M Q-Series
Flow Rate:	0.6 mL/min

Figure 3. Retention increases with Q-Reagent chain length.



Column:	ODS
	15 cm x 4.6 mm i.d., fully endcapped
Mobile Phase:	(60/40) water/methanol + 0.005 M Q-Series
Flow Rate:	0.6 mL/min

Figure 4. In a mixture of ionic and nonionic compounds, first separate the nonionic compounds from each other (see above). Then, choose the the ionic compounds as desired. Here, Q6 seems to be the reagent of choice since all ion pair reagent that retains peaks are visibly separated.





Ask the Expert

Did you know Regis launched a new generation of C18 columns? Consult your technical representative and see page 54 to learn more about our Evoke™ reversed-phase columns.

S-SERIES ION PAIR CONCENTRATES FOR CATIONS

The sulfonates are sodium salts that act as an anionic counterion for the separation and resolution of positively charged analytes. The sulfonates are available as ion pair concentrates—premixed 0.5 M solutions of alkyl sulfonates. When diluted to 1 L with HPLC-grade water, a 10 mL bottle forms a 0.005 M solution. Larger quantities are available upon request.

S-SERIES ORDERING INFORMATION

Product Description	Packaged Size	Catalog #
Ion Pair Concentrate Sampler Kit (S5, S6, S7, S8)	4 x 10 mL	1-405020-200
BEST SELLER Ion Pair Concentrate S5	5 x 10 mL	1-405025-200
Ion Pair Concentrate S6	5 x 10 mL	1-405026-200
Ion Pair Concentrate S7	5 x 10 mL	1-405027-200
Ion Pair Concentrate S8	5 x 10 mL	1-405028-200
Ion Pair Concentrate S5	100 mL	1-405035-200
Ion Pair Concentrate S6	100 mL	1-405036-200
Ion Pair Concentrate S7	100 mL	1-405037-200
Ion Pair Concentrate S8	100 mL	1-405038-200



BULK ION PAIR REAGENTS FOR CATIONS

Bulk powder: fine, purified crystals, for use as a buffer in large scale mobile phase preparation. Larger quantities are available upon request.

SULFONATES ORDERING INFORMATION

Product Description	Packaged Size	Catalog #
1-Pentanesulfonate	25 g	1-403025-200
1-Pentanesulfonate	100 g	1-403125-200
1-Pentanesulfonate	1000 g	1-403325-200
1-Hexanesulfonate	25 g	1-403026-200
1-Hexanesulfonate	100 g	1-403126-200
1-Hexanesulfonate	500 g	1-403226-200
1-Hexanesulfonate	1000 g	1-403326-200
1-Heptanesulfonate	25 g	1-403027-200
1-Heptanesulfonate	100 g	1-403127-200
1-Heptanesulfonate	1000 g	1-403327-200
1-Octanesulfonate	25 g	1-403028-200
1-Octanesulfonate	100 g	1-403128-200
1-Octanesulfonate	1000 g	1-403328-200

BEST SELLER



Q-SERIES ION PAIR CONCENTRATES FOR ANIONS

The Q-series is comprised of quaternary alkyltriethylamines that can be used for the resolution of negatively charged species. This unique set of cationic reagents was developed to complement the Sulfonate Series (S-Series) and is exclusively manufactured by Regis. The Quaternary Alkyltriethylamines are available as ion pair concentrates —premixed 0.5 M solutions of alkylamines. When diluted to 1 L with HPLC-grade water, a 10 mL bottle forms a 0.005 M buffered solution.

Q-SERIES ORDERING INFORMATION

Product Description	Packaged Size	Catalog #
Ion Pair Concentrate Sampler Kit (Q5, Q6, Q7, Q8, Q12)	5 x 10 mL	1-404020-200
Ion Pair Concentrate Q12	5 x 10 mL	1-404021-200
Ion Pair Concentrate Q5	5 x 10 mL	1-404025-200
Ion Pair Concentrate Q6	5 x 10 mL	1-404026-200
Ion Pair Concentrate Q7	5 x 10 mL	1-404027-200
Ion Pair Concentrate Q8	5 x 10 mL	1-404028-200
BEST SELLER Ion Pair Concentrate Q12	100 mL	1-404031-200
Ion Pair Concentrate Q12	500 mL	1-404041-200
Ion Pair Concentrate Q5	100 mL	1-404035-200
Ion Pair Concentrate Q6	100 mL	1-404036-200
Ion Pair Concentrate Q7	100 mL	1-404037-200
Ion Pair Concentrate Q8	100 mL	1-404038-200



OTHER REGIS BULK ION PAIR REAGENTS FOR ANIONS

Tetrabutyl Ammonium Phosphate is a complementary bulk ion pair reagent used for the resolution of negatively charged analytes.

TBAP ORDERING INFORMATION

Product Description	Packaged Size	Catalog #
Tetrabutyl Ammonium Phosphate 0.5 M (pH=7.5)	10 mL	1-680502-200
Tetrabutyl Ammonium Phosphate 0.5 M (pH=7.5)	500 mL	1-680503-200
Tetrabutyl Ammonium Phosphate 0.5 M (pH=7.5)	1 L	1-680504-200
Tetrabutyl Ammonium Phosphate 0.5 M (pH=7.5)	50 mL	1-680505-200

BEST SELLER



Ask the Expert

Ask us about custom sizes if you don't see the size you're looking for!

Ion Pair Resources

1. Perry, J. A.; Glunz, L. G.; Szczerba, T. J.; Hocson, V. S.; Reagents for Ion Pair Reversed-Phase HPLC. *Am. Lab.* **1984,** 16(10), 114—119.
2. Eksborg, S.; Lagerstrom, P.; Modin, R.; Schill, G.; Ion Pair Chromatography of Organic Compounds. *J. Chrom.* **1973,** 83, 99.
3. Eksborg, S.; Schill, G.; Ion Pair Partition Chromatography of Organic Ammonium Compounds. *Anal. Chem.* **1973**, 45, 2092.

DERIVATIZING
Reagents



DERIVATIZATION REAGENTS

Rely on high purity products from an experienced manufacturer

Regis Technologies has its roots in the manufacture of fine organic chemicals. For over 60 years, we have been manufacturing high purity reagents according to controlled manufacturing procedures, and meeting strict quality control specifications before release.

Derivatization is primarily performed to modify an analyte's functionality to enable chromatographic separations. The formation of chemical derivatives to facilitate meaningful analysis has long been a common practice in gas chromatography (GC). For the analytical chemist, derivatization can be the key to unlocking and simplifying many complex separation problems.

Derivatization, accomplished through alteration of functional groups, provides:

- Increased sample volatility
- Improved selectivity and chromatographic efficiency
- Enhanced detectability

Sample volatility or thermal stability is crucial in GC applications. If a sample does not possess these important characteristics, GC analysis is highly unproductive. Derivatization techniques have been developed to address these issues to ensure successful separations. In GC derivatization, replacement of active hydrogen in functional groups, such as -COOH, -OH, -NH, and -SH, is the primary area of concern and is accomplished through silylation, acylation, or alkylation.

DERIVATIZATION REAGENT OFFERINGS

For more than 50 years, Regis has been a leader in the manufacture of highly pure derivatization reagents for gas chromatography. We offer a full range of silylation, acylation, and alkylation reagents.

- **Silylation Reagents** (see page 91)
  - BSA
  - BSTFA
  - Deriva-Sil
  - HMDS
  - Hydrox-Sil
  - MSTFA
  - MtBSTFA
  - TMCS
  - TMSI
- **Alkylation Reagents** (see page 98)
  - 3.0 N HCl in n-Butanol
  - BF3 in Methanol
- **Acylation Reagents** (see page 100)
  - HFBA
  - HFBI
  - HFIP
  - MBTFA
  - MCF
  - MTPA-Cl
  - PFPA
  - PFPOH
  - TFAA
  - TPC
- **Chiral Derivatization Reagents** (see page106)
  - Acetonitrile
  - Pyridine



FUNCTIONAL GROUPS TABLE

GC Derivatization Method

Functional Group	Silylation	Acylation	Alkylation
Active Hydrogens	BSTFA, BSTFA/TMCS, Deriva-Sil, Hydrox-Sil, TBH MSTFA, MtBSTFA, TMSI	PFPOH/PFPA	DMF Dialkylacetals
Carboxylic Acids	BSTFA, Hydrox-Sil Concentrate., MtBSTFA, TMSI	PFPOH/PFPA	BF3/Methanol, BF3/n-Butanol, DMF Dialkylacetals, TBH
Alcohols and Phenols: unhindered and moderately hindered	BSA, BSTFA/TMCS, HMDS, MtBSTFA/t-BDMCS	HFBI, Fluorinated anhydrides (HFBA, PFPA, TFAA), MBTFA, MCF*	DMF Dialkylacetals, PFB-Br/TBA-H-SO4, TBH
Alcohols and Phenols: highly hindered	BSTFA/TMCS, Deriva-Sil, Deriva-Sil Concentrate	Fluorinated anhydrides (HFBA, PFPA, TFAA), HFBI, MBTFA, PFBCl	DMF Dialkylacetals, PFB-Br/TBA-H-SO4, TBH
Amines: primary and secondary	BSTFA, MtBSTFA/t-BDMCS	Fluorinated anhydrides (HFBA, PFPA, TFAA), HFBI, MBTFA, PFBCl, TPC*	DMF Dialkylacetals, TBH
Amides	BSA, BSTFA, BSTFA/TMCS, Deriva-Sil Concentrate	HFBI	DMF Dialkylacetals
Amino Acids	BSTFA, TMSI	HFBI (+ Silylation)	DMF Dialkylacetals, TBH, 3N HCl in n-Butanol
Catecholamines	TMSI	Fluorinated anhydrides (HFBA, PFPA, TFAA), HFBI	
Carbohydrates and Sugars	HMDS, Hydrox-Sil AQ, TMSI	MBTFA	
Inorganic Anions	BSTFA, MtBSTFA		
Nitrosamines		HFBI	
Sulfonamides	BSTFA	Fluorinated anhydrides (HFBA, PFPA, TFAA)	DMF Dialkylacetals, PFB-Br/TBA-H-SO4

Derivatization reagents are listed in alphabetical order, not in order of preference.

*For Chiral Analysis

Source: Knapp, D.R. Handbook of Analytical Derivatization Reactions; John Wiley and Sons: New York, 1979.

SILYLATION REAGENTS

Silylation is the most widely used derivatization procedure for sample analysis by GC. The popularity of silylation reagents is enhanced by their ease of use and formation of derivatives. In silylation, an active hydrogen is replaced by an alkylsilyl group, such as trimethylsilyl (TMS) or t-butyldimethylsilyl (t-BDMS). Compared to their parent compounds, silyl derivatives are more volatile, less polar, and more thermally stable. As a result, GC separation is improved and detection is enhanced.

Silylation reagents are generally moisture sensitive, requiring them to be sealed to prevent deactivation. The derivatives of TMS reagents are also more sensitive. In response to this difficulty, t-BDMS reagents were introduced, which enabled the formation of derivatives 10,000 times more stable to hydrolysis than the TMS ethers.

Both TMS and t-BDMS reagents are suitable for a wide variety of compounds, offer excellent thermal stability, and can be used under a variety of GC conditions and applications. Analysis by the popular combination of gas chromatography and mass spectrometry (GS/MS) often requires special sample derivatization. Particularly effective in these applications is MtBSTFA.

REGISIL® BSTFA (RC-1)

N,O-Bis(trimethylsilyl)trifluoroacetamide

CAS# 25561-30-2

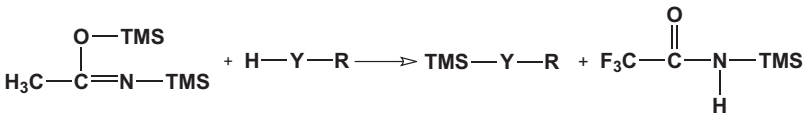
BSTFA reacts faster and more completely than BSA, due to the trifluoroacetamide leaving group. The high volatility of BSTFA and its byproducts results in non-co-elution of early eluting peaks. Additionally, the highly volatile and stable products result in low detector noise and fouling. The reagent boasts excellent solubility.



REGISIL® BSTFA ORDERING INFORMATION

BEST SELLER

Packaged Size	Catalog #
10 x 1 g	1-270111-200
4 x 5 g	1-270112-200
25 g	1-270113-200
100 g	1-270114-200
1000 g	1-270116-200



TMS= $Si(CH_3)_3$

Y = O, S, NH, NR^1, COO

R, R^1 = Alk, Ar

REGISIL® BSTFA + 1% TMCS (RC-2)

N,O-Bis(trimethylsilyl)trifluoroacetamide + 1% Trimethylchlorosilane

CAS# 25561-30-2; 75-77-4

The addition of TMCS catalyzes reactions of hindered functional groups in secondary alcohols and amines. BSTFA is fast-reacting, highly volatile, and exceptionally soluble.

REGISIL® BSTFA + 1% TMCS ORDERING INFORMATION

Packaged Size	Catalog #
10 x 1 g	1-270121-200
4 x 5 g	1-270122-200
25 g	1-270123-200
100 g	1-270124-200
1000 g	1-270126-200

BEST SELLER



REGISIL® BSTFA + 10% TMCS (RC-3)

N,O-Bis(trimethylsilyl)acetamide

CAS# 25561-30-2; 75-77-4

The addition of TMCS catalyzes reactions of hindered functional groups in secondary alcohols and amines. BSTFA is fast-reacting, highly volatile, and exceptionally soluble.

REGISIL® BSTFA + 10% TMCS ORDERING INFORMATION

Packaged Size	Catalog #
10 x 1 g	1-270131-200
4 x 5 g	1-270132-200
25 g	1-270133-200
100 g	1-270134-200
1000 g	1-270135-200

BEST SELLER



BSA

N,O-Bis(trimethylsilyl)acetamide

CAS# 10416-59-8

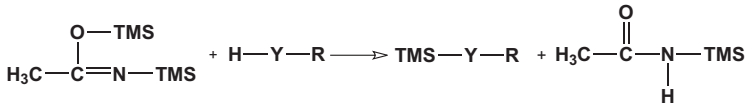
BSA forms highly stable TMS derivatives with most organic functional groups under mild reaction conditions.



BSA ORDERING INFORMATION

Packaged Size	Catalog #
10 x 1 g	1-270501-200
25 g	1-270503-200
100 g	1-270504-200

BEST SELLER



TMS= $Si(CH_3)_3$

Y = O, S, NH, NR^1, COO
R, R^1 = Alk, Ar

MSTFA

N-Methyltrimethylsilyltrifluoroacetamide

CAS# 24589-78-4

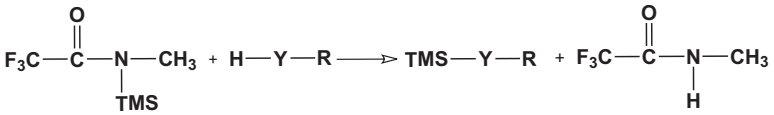
MSTFA is the most volatile of the TMS-acetamide and useful in the analysis of volatile trace materials. MSTFA is more volatile than BSA or BSTFA but has similar silylation strength.



MSTFA ORDERING INFORMATION

Packaged Size	Catalog #
10 x 1 g	1-270590-200
10 g	1-270589-200
25 g	1-270593-200
100 g	1-270594-200
1000 g	1-270592-200

BEST SELLER



TMS= $Si(CH_3)_3$

Y = O, S, NH, NR^1, COO
R, R^1 = Alk, Ar

MSTFA +1% TMCS

N,-Methyltrimethylsilyltrifluoroacetamide + 1% Trimethylchlorosilane

CAS# 24589-78-4; 75-77-4

The addition of TMCS catalyzes reactions of hindered functional groups in secondary alcohols and amines. MSTFA is extremely volatile for the analysis of volatile trace materials.

MSTFA ORDERING INFORMATION

Packaged Size	Catalog #
10 x 1 g	1-270690-200
10 g	1-270691-200
25 g	1-270693-200
100 g	1-270694-200

BEST SELLER



MtBSTFA

N-Methyl-N-(t-butyldimethylsilyl)trifluoroacetamide

CAS# 77377-52-7

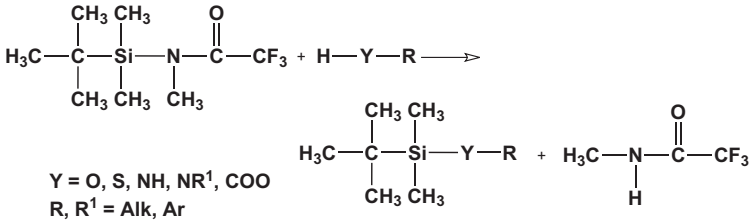
MtBSTFA replaces active hydrogens to form t-BDMS derivatives. Derivatization is usually complete upon dissolution with this exceptionally strong, yet mild silylating reagent. MtBSTFA derivatives are 104 times more stable to hydrolysis than their corresponding TMS derivatives and produce easily interpreted mass spectra for GC/MS.



MtBSTFA ORDERING INFORMATION

Packaged Size	Catalog #
5 x 1 g	1-270241-200
2 x 5 g	1-270242-200
25 g	1-270243-200

BEST SELLER



MtBSTFA + 1% T-BDMCS

N-Methyl-N-(t-butyldimethylsilyl)trifluoroacetamide + 1% tert-Butylchlorodimethylsilane

CAS# 77377-52-7; 18162-48-6

Addition of t-BDMCS to MtBSTFA catalyzes reactions of hindered alcohols and amines.



MtBSTFA + 1% T-BDMCS ORDERING INFORMATION

Packaged Size	Catalog #
5 g	1-270141-200
2 x 5 g	1-270142-200
10 x 1 g (BEST SELLER)	1-270144-200
25 g	1-270143-200

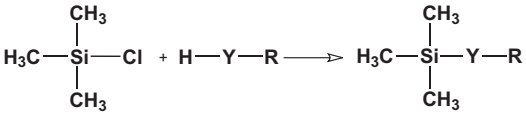
TMCS

Trimethylchlorosilane

CAS# 75-77-4

TMCS is used as a catalyst to increase reactivity of other silylation reagents.





Y = O, S, NH, NR^1
R, R^1 = Alk, Ar

TMCS ORDERING INFORMATION

Packaged Size	Catalog #
25 g (BEST SELLER)	1-270601-200
100 g	1-270602-200

TMSI

Trimethylsilylimidazole

CAS# 18156-74-6

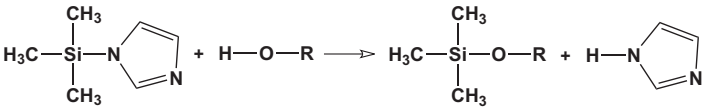
TMSI is a potent, selective TMS donor that reacts with alcohols and phenols but not amines or amides. TMSI derivatizes wet sugar samples, hindered hydroxyl groups in steroids, and amino acids in fluorinated acylation reagents. TMSI is used in the preparation of dual perfluoroacyl and TMS derivatives.



TMSI ORDERING INFORMATION

Packaged Size	Catalog #
10 x 1 g	1-270401-200
5 g	1-270402-200
25 g	1-270403-200

BEST SELLER



R, R^1 = Alk, Ar

HMDS

Hexamethyldisilazane

CAS# 999-97-3

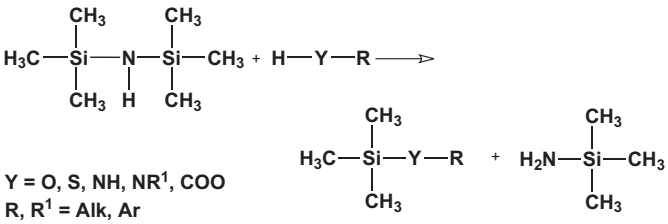
HMDS is a weak TMS donor, used for silylation of carbohydrates and as a mixture with pyridine and trifluoroacetic acid.



HMDS ORDERING INFORMATION

Packaged Size	Catalog Number
25 g	1-270651-200
100 g	1-270652-200

BEST SELLER



Y = O, S, NH, NR^1, COO
R, R^1 = Alk, Ar

HYDROX-SIL

1,1,1,3,3,3-Hexamethyldisilazane + Chlorotrimethylsilane + Pyridine

CAS# 999-97-3; 75-77-4; 110-86-1

Fast formation of the TMS derivatives of organic acids, unhindered alcohols and phenols, and some amines. Concentrate does not contain pyridine.



HYDROX-SIL ORDERING INFORMATION

Product	Packaged Size	Catalog Number
BEST SELLER Hydrox-Sil	10 x 1 mL	1-270455-200
Hydrox-Sil	25 mL	1-270457-200
Hydrox-Sil AQ	10 x 1 mL	1-270451-200
Hydrox-Sil AQ	25 mL	1-270453-200
Hydrox-Sil Concentrate	25 mL	1-270458-200

DERIVA-SIL

N,O-Bis(trimethylsilyl)trifluoroacetamide + Trimethylchlorosilane + Trimethylsilylimidazole

CAS# 25561-30-2; 75-77-4; 18156-74-6

Deriva-Sil derivatizes sterically-hindered compounds and reacts with carbohydrates, hydroxy- and keto-steroids, fatty acids and some amines and amides. Derivatizations are complete in minutes. Concentrate does not contain pyridine.



DERIVA-SIL ORDERING INFORMATION

Product	Packaged Size	Catalog Number
BEST SELLER Deriva-Sil	10 x 1 mL	1-270151-200
Deriva-Sil Concentrate	25 mL	1-270150-200

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ALKYLATION REAGENTS

As with other derivatization reagents, alkylation reagents reduce molecular polarity by replacing active hydrogens with an alkyl group. These reagents are used to modify compounds having acidic hydrogens, such as carboxylic acids and phenols. Alkylation reagents can be used alone to form esters, ethers, and amides or they can be used in conjunction with acylation or silylation reagents. A two-step approach is commonly used in the derivatization of amino acids, where multiple functional groups on these compounds may necessitate protection during derivatization.

Esterification, the reaction of an acid with an alcohol in the presence of a catalyst to form an ester, is the most popular method of alkylation, due to the availability of reagents and ease of use. Alkylation reagents are available in several configurations that enable the formation of a variety of esters. Alkyl esters are stable, and can be formed quickly and quantitatively. By altering the length of the substituted alkyl group, retention of the derivative can be varied. In addition to the formation of simple esters, alkylation reagents can be used in extractive procedures where biological matrices can be present.

BF3 in METHANOL

Boron Trifluoride, 14% in Methanol

CAS# 373-57-9

BF3 in Methanol is the most commonly used method of forming methyl esters of organic acids.

BF3 in METHANOL ORDERING INFORMATION

Packaged Size	Catalog #
5 x 8 mL	1-270265-200
100 mL	1-270260-200
500 mL	1-270263-200
1000 mL	1-270264-200

BEST SELLER



3.0N HCL in N-BUTANOL

3N Hydrochloric Acid in Butan-1-ol

CAS# 7647-01-0

3N HCl in n-Butanol is required for newborn screening for metabolic disorders. Neonatal screening, which has become a standard procedure in many countries, measures amino acids and acylcarnitines from a single drop of blood. Blood concentration of one or several of these compounds is either abnormally high or low in a variety of metabolic disorders in newborns. Derivatization with 3N HCl in n-Butanol ensures butylation of the carboxyl acid group of the analyte and formation of butyl ester, which forces ionization or makes charging of the analytes more efficient. Although direct analysis of extracted acycarnitine without derivatization is possible, according to different reports, butylesterification is superior with regard to sensitivity and specificity.

Many factors contribute to the success of a newborn screening process. Any impurities in derivatization reagent can potentially interfere with the analysis. 3N HCl in n-Butanol from Regis Technologies is manufactured under CGMP protocols to assure highest quality and lot-to-lot consistency for this reagent. Each lot is tested by tandem mass spectrometry to ensure absence of contaminants that may interfere with analysis. Our Quality Assurance department reviews and approves all production documentation and test results. Regis takes necessary precautions that assure the quality of our 3N HCl in n-Butanol.

3N HCL in N-BUTANOL ORDERING INFORMATION

Packaged Size	Catalog #
4 x 25 mL	1-201007-200
100 mL	1-201009-200
500 mL	1-201010-200

BEST SELLER



Ask the Expert

Frequent user? Set up a recurring order for convenience. Our Customer Service team can reserve a lot for your account and release the quantity you need at your request or on a predetermined schedule for a consistent, reliable supply. Email us at cservice@registech.com to learn more.

ACYLATION REAGENTS

Acylation reagents offer the same types of advantages available from silylation reagents: creating less polar, more volatile derivatives. However, in comparison to silylating reagents, the acylating reagents can more readily target highly polar, multi-functional compounds, such as carbohydrates and amino acids. In addition, acylating reagents offer the distinct advantage of introducing electron-capturing groups, thus enhancing detectability during analysis.

Generally, these reagents are available as acid anhydrides, acyl derivatives, or acyl halides. The acyl halides and acyl derivatives are highly reactive and may be suited for use where issues of steric hindrance may be a factor. Acid anhydrides are available in a number of fluorinated configurations, which improve detection. These fluorinated anhydride derivatives are used primarily for Electron Capture Detection (ECD), but can also be used for Flame Ionization Detection (FID). Fluorinated anhydrides are often used in derivatizing samples to confirm drugs of abuse. Despite the special utility of these reagents, their acidic nature requires that any excess or byproducts be removed prior to analysis to prevent deterioration of the column.

HFBA

Heptafluorobutyric Anhydride

CAS# 336-59-4

HFBA is frequently used for the confirmation of drugs of abuse and reacts with alcohols, amines, and phenols. Bases such as triethylamine and trimethylamine can be added to promote reactivity to HFBA. HFBA is most commonly used for ECD because its derivatives are most sensitive to ECD.

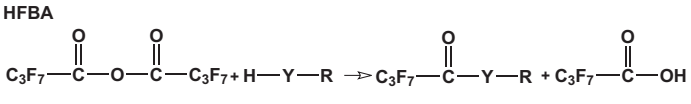


HFBA ORDERING INFORMATION

Packaged Size	Catalog #
10 x 1 g	1-270851-200
25 g	1-270853-200

BEST SELLER

HFBA



HFBI

Heptafluorobutyrylimidazole

CAS# 32477-35-3

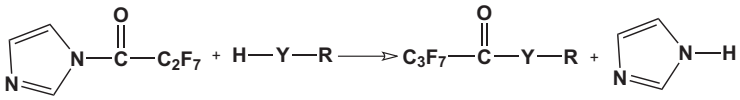
HFBI readily forms derivatives with phenols, alcohols, and amines suitable for ECD. The reactions are fast and mild, and imidazole is not acidic; so, no decomposition or corrosion occurs on columns.



HFBI ORDERING INFORMATION

Packaged Size	Catalog Number
5 x 1 g	1-270611-200
5 g	1-270612-200
25 g	1-270613-200

BEST SELLER



Y = O, S, NH, NR^1
R, R^1 = Alk, Ar

HFIP

1,1,1,3,3,3-Hexafluoro-2-Propanol

CAS# 920-66-1

HFIP is an esterification reagent for the determination of aromatic acids in tissue by GC and electron capture detection (ECD).

HFIP ORDERING INFORMATION

Packaged Size	Catalog Number
10 g	1-270701-200
25 g	1-270702-200
100 g	1-270704-200

BEST SELLER



MBTFA

N-Methyl-bis(trifluoroacetamide)

CAS# 685-27-8

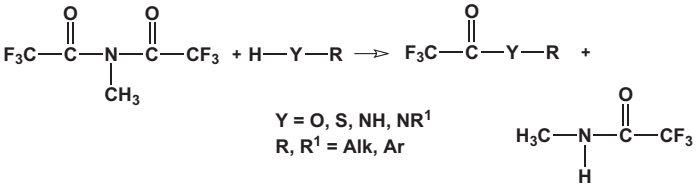
MBTFA reacts rapidly under mild conditions with primary and secondary amines, while it reacts more slowly with alcohols, phenols, and thiols. MBTFA works well in the analysis of sugars.



MBTFA ORDERING INFORMATION

Packaged Size	Catalog Number
10 x 1 g	1-270092-200
100 g	1-270093-200
25 g	1-270095-200

BEST SELLER



MCF

(-)-(1R)-Menthylchloroformate 0.1 M in Chloroform

CAS# 14602-86-9

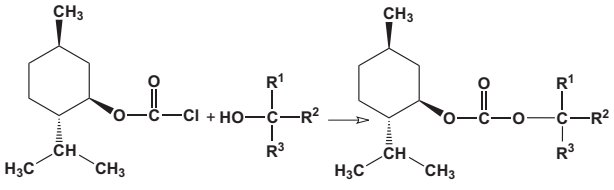
MCF is a companion reagent to TPC. MCF is most generally used for the resolution of optically active alcohols. MCF reacts with amines also, but the resulting diastereomers are harder to separate than are the TPC derivatives.



MCF ORDERING INFORMATION

Packaged Size	Catalog Number
25 mL	1-440003-200

BEST SELLER



(R)-(-)-MTPA-CL

(R)-(-)-a-Methoxy-a-(trifluoromethyl)phenylacetyl chloride

CAS# 39637-99-5

(R)-(-)-MTPA-Cl, or Mosher's Acid Chloride, is a GC chiral and specialty derivatization reagent that is used for the determination of enantiomeric purities of alcohols and amines.

(R)-(-)-MTPA-CL ORDERING INFORMATION

Packaged Size	Catalog Number
100 mg	1-270900-200
500 mg	1-270901-200
1000 mg	1-270902-200

BEST SELLER



PFPA

Pentafluoropropionic Anhydride

CAS# 356-42-3

PFPA is most commonly used for ECD and reacts with alcohols, amines, and phenols. Bases such as triethylamine and trimethylamine can be added to promote reactivity. PFPA is frequently used for the confirmation of drugs of abuse. PFPA derivatives require the lowest analysis temperatures.

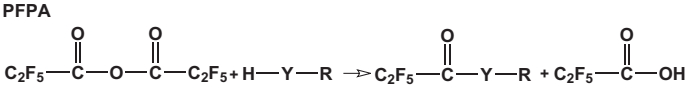


PFPA ORDERING INFORMATION

Packaged Size	Catalog Number
10 x 1 g	1-640110-200
25 g	1-640113-200
100 g	1-640114-200
1000 g	1-640115-200

BEST SELLER

PFPA



PFPOH

Pentafluoropropanol

CAS# 422-05-9

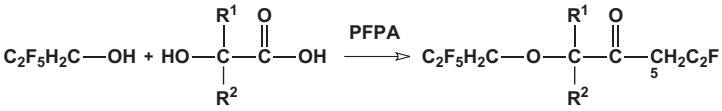
Use PFPOH in combination with PFPA to make derivatives of the most common functional groups, especially polyfunctional bio-organic compounds. The formed derivatives are highly suitable for ECD.



PFPOH ORDERING INFORMATION

Packaged Size	Catalog Number
5 g	1-270815-200
25 g	1-270816-200

BEST SELLER



TFAA

Trifluoroacetic Anhydride

CAS# 407-25-0

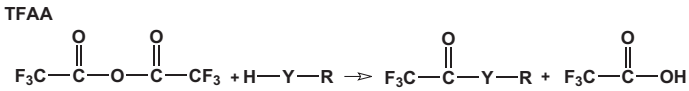
TFAA is most commonly used for ECD and reacts with alcohols, amines, and phenols. Bases such as triethylamine and trimethylamine can be added to promote reactivity to TFAA. TFAA is frequently used for the confirmation of drugs of abuse and is the most reactive and volatile of the anhydrides.



TFAA ORDERING INFORMATION

Packaged Size	Catalog Number
10 x 1 g	1-270841-200
25 g	1-270843-200

BEST SELLER



TPC

N-Trifluoroacetyl-L-prolyl chloride 0.1 M in Chloroform

CAS# 36724-68-2

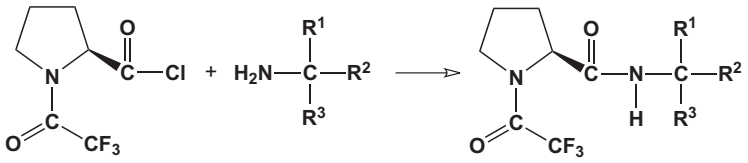
TPC is the reagent of choice for the resolution of optically active amines by gas chromatography. TPC provides sample volatility and couples with amines to form diastereomers which can be separated on GC columns. Its use in the determination of amphetamines and other drugs of abuse testing has attracted considerable interest.



TPC ORDERING INFORMATION

Packaged Size	Catalog Number
5 mL	1-440002-200
25 mL	1-440001-200

BEST SELLER



R^1, R^2, R^3 = H, Alk, Ar

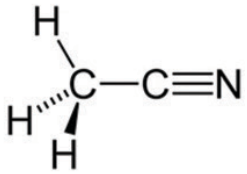
Tech Tip

Look to our GC Derivatization Reagent Procedures and GC Derivatization Methods manuals for advice on using these reagents. Download them today at registech.com/gc.

CHIRAL DERIVATIZATION REAGENTS

Gas chromatography chiral analysis of enantiomeric compounds on achiral stationary phases requires the use of enantiopure derivatization reagents. These reagents generally target one specific functional group to produce diastereomers of each of the enantiomeric analytes. From the resulting chromatograms, calculations are conducted to determine the enantiomeric concentration of the analyte.

ACETONITRILE



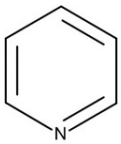
Acetonitrile

CAS# 75-05-8

A high purity reagent packaged under nitrogen and sealed with Teflon®-coated septa. This allows for easy access to sample without exposure to moisture and oxygen. Also known as Methyl Cyanide, Ethyl Nitrile, Cyanomethane, or CAN.



PYRIDINE



Pyridine

CAS# 110-86-1

A high purity reagent packaged under nitrogen and sealed with Teflon®-coated septa. This allows for easy access to sample without exposure to moisture and oxygen. Also known as azabenzene or azine.

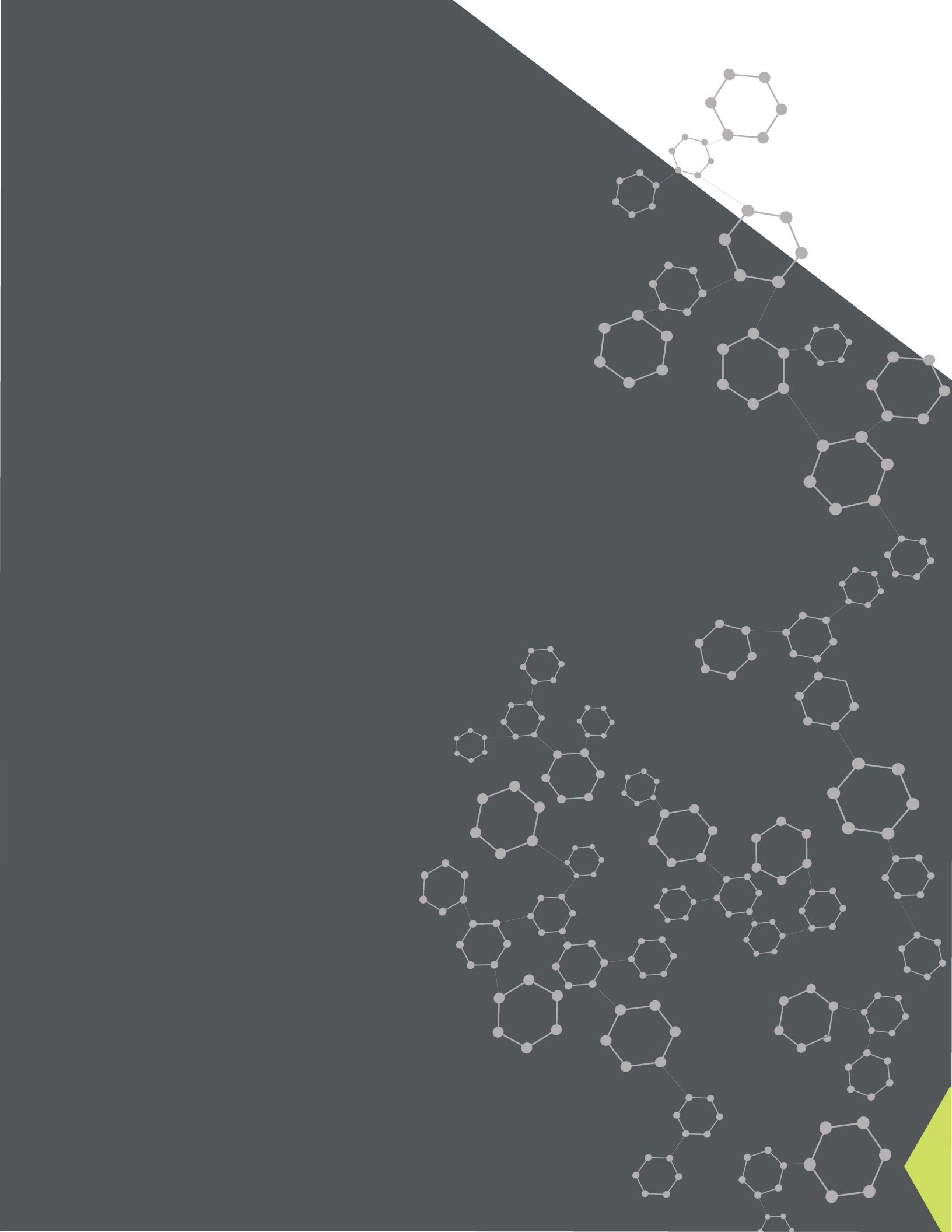


CHIRAL DERIVATIZATION REAGENTS ORDERING INFORMATION

Product	Packaged Size	Catalog Number
Acetonitrile	2 x 25 mL	1-270010-200
BEST SELLER Pyridine	2 x 25 mL	1-270013-200

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Reagents



BIOLUMINESCENT REAGENTS

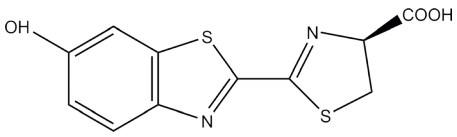
Whether performing reporter gene assays, ELISA and HTS assays, ATP swabs, whole animal assays, or other imaging applications, choose Regis Technologies' high purity D-Luciferin and Coelenterazine for a high quality product at an affordable price:

- For *in vitro* and *in vitro* assays
- High signal and low noise, >99% Purity
- Excellent reproducibility and sensitivity
- Quality products, delivered in days from a trusted supplier

High Purity and Quality Guaranteed

Our bioluminescent reagents are manufactured and tested in our FDA-inspected, GMP-certified facility for a minimum purity of 99% by HPLC and 99.5% enantiomeric purity by chiral HPLC. Additional quality tests include water by titration, and identity by FTIR. Other tests are available by request for optimum quality control of raw material entering your processes.

LUCIFERIN



Luciferin is a common bioluminescent reporter used for *in vitro* imaging, often used to indicate the presence of energy, functioning as a life-death stain. It is also commonly used for *in vitro* research, including luciferase and ATP assays, gene reporter assays, high throughput sequencing and various contamination assays. Luciferin is available in many different forms, but the most popular is D-Luciferin Potassium salt. Regis crystallizes its D-Luciferin dissolved in aqueous solution, and then crystallizes it a second time to achieve a more reliable, fast-dissolving reaction within 1-5 minutes for faster experimental results.

Affordable, Convenient Quantities

All products are available in a variety of convenient packaged sizes for easy ordering online or by purchase order. Custom packaging and custom sizes are also available.

Contact us about ordering single lots in excess of 200 grams which reduces costs and requires fewer qualification runs of individual lots, saving you even more money.

D-LUCIFERIN POTASSIUM SALT ORDERING INFORMATION

Packaged Size	Catalog #
100 mg	1-360221-200
1 g	1-360222-200
10 x 100 mg	1-360223-200
10 g	1-360224-200
10 x 1 g	1-360225-200
4 x 25 mg	1-360226-200

BEST SELLER



D-LUCIFERIN SODIUM SALT ORDERING INFORMATION

Packaged Size	Catalog #
100 mg	1-360241-200
1 g	1-360242-200
10 x 100 mg	1-360243-200
10 g	1-360244-200
10 x 1 g	1-360245-200
4 x 25 mg	1-360246-200



D-LUCIFERIN FREE ACID ORDERING INFORMATION

Packaged Size	Catalog #
100 mg	1-360201-200
1 g	1-360202-200
10 x 100 mg	1-360203-200
10 g	1-360204-200
10 x 1 g	1-360205-200

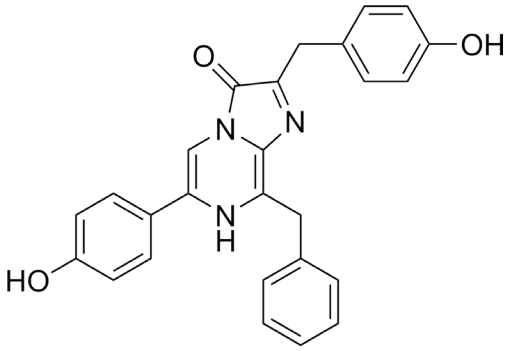


FIREFLY DEHYDROLUCIFERIN ORDERING INFORMATION

Packaged Size	Catalog #
10 mg	1-360301-200
100 mg	1-360304-200



COELENTERAZINE



Whether performing reporter gene assays, ELISA and HTS assays, ATP Coelenterazine is commonly used for bioluminescent calcium detection and the monitoring of reporter genes in BRET, ELISA and HTS methods as well as chemiluminescent detection of superoxide anions and peroxynitrite in cells or tissues.

The most commonly used form of coelenterazine is the "native" form. Coelenterazine Native works best for many applications but may require additions of small amounts of acid for faster dissolution in alcohols.

Coelenterazine-H has a 10- to 20-fold higher luminescent intensity than that of native Coelenterazine, making it a useful tool for measuring small changes in Calcium ion concentrations in *in vitro* studies. This makes Coelenterazine-H the choice for certain biological applications.

In our GMP facility we use a two-step process to crystallize, freeze, and then evaporate lyophilized forms of coelenterazine for fast-dissolving, reliable bioluminescent media.

Affordable, Convenient Quantities

All products are available in a variety of convenient packaged sizes for easy ordering online or by purchase order. Custom packaging and custom sizes are also available.

Contact us about ordering single lots in excess of 200 grams which reduces costs and requires fewer qualification runs of individual lots, saving you even more money.

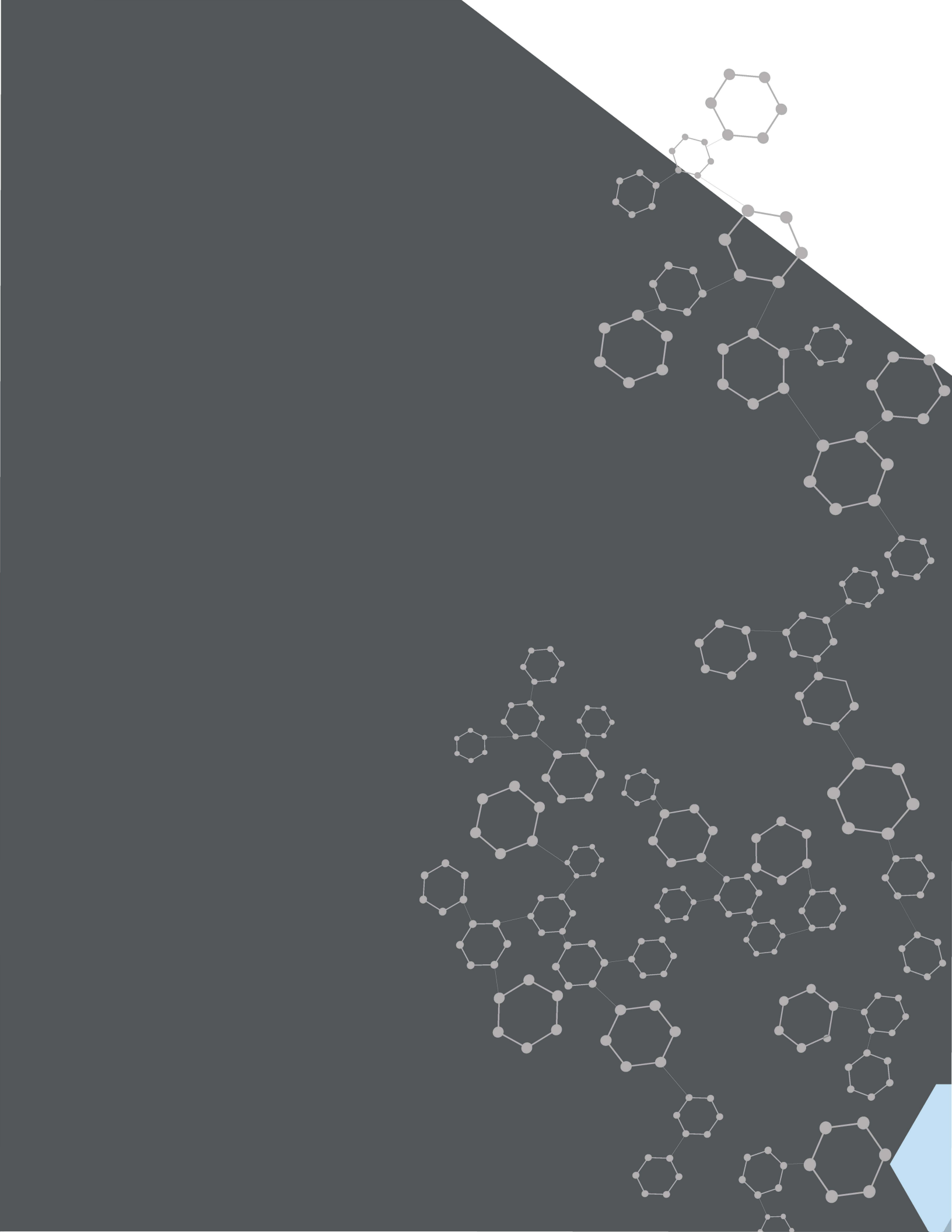
COELENTERAZINE ORDERING INFORMATION

Product	Packaged Size	Catalog #
Coelenterazine Native, Lyophilized	1 mg	1-361201-200
BEST SELLER Coelenterazine Native	10 mg	1-361204-200
Coelenterazine-H	1 mg	1-361301-200
Coelenterazine-H	10 mg	1-361304-200



Ask the Expert

Regis manufactures these products in our GMP facility. Our Process Research team has extensive knowledge on bioluminescent reagents that they are happy to share with you. Email techsupport@registech.com with your questions!



REGIS® CUSTOM PHARMA

MANUFACTURING

Capabilities



REGIS CUSTOM PHARMA CGMP MANUFACTURING

Expedite Your Drug to Market

Custom Pharma Services for Small Molecules

- CGMP API Manufacturing
- HPAPI Manufacturing
- CGMP & non-GMP SFC Separations
- Analytical Method Development
- Impurity Isolation & Characterization
- Stability Services
- Process Research & Development

Experience & Expertise

Regis has successfully brought multiple products through validation and onto the market. Put our expertise in synthesis and pharmaceutical services to work to speed your drug to market. We will advance your active pharmaceutical ingredient (API) from initial pre-clinical development to scale-up and clinical trials, through validation and commercial manufacturing.

Regulatory Compliance

The U.S. Food & Drug Administration (FDA) routinely inspects our GMP facility. Our last three FDA audits have earned perfect results with zero objectionable findings (i.e. Form 483 observations). Regis uses internal and customer audits, consultation, and training to continuously prepare to meet the FDA's and Regis' own standard of excellence.

People

Customers consider us for our technical expertise and outstanding history of FDA compliance, but they choose us for the engaging people found in every department from purchasing to process development. Our team has a wealth of experience and education, and we look forward to introducing you to each person who will contribute to your project.

Reachable & Responsive

We value your input as much as your business. We are family-owned and operated, and our small size allows us to be accessible, responsive, and to act quickly. Our team of experienced chemists, project managers, and support staff values each client and is dedicated to helping their work move forward.

Project Management

Your dedicated project manager will take the time to get to know you and what you feel would make the project successful, including timelines, quantity, and quality. In constant communication with our analytical, production, and quality groups, your manager ensures everyone is working to best meet your needs and keeps you informed and included. All project managers have chemistry backgrounds and industry experience.

Learn more about our custom pharma services and capabilities at registech.com.

Ask a Client

> ***"Regis wants us to succeed…for our project to succeed. We get the best people and their best effort."***
>
> ***– Vice President, Drug Discovery & Development, Tolero Pharmaceuticals, Inc.***



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PLACING ORDERS

Online: Visit **registech.com** to purchase most products with an easy online checkout process.
By Email: **cservice@registech.com**
By Phone: (847) 967–6000 (8am-5pm central time)
By Fax: (847) 967–5876

MINIMUM ORDERS

Regis does not require a minimum order.

ORDER CONFIRMATION

Confirming orders is not required. However, if it is your policy to send confirmations, please clearly indicate CONFIRMING ORDER. Regis will not accept responsibility for duplication of a shipment if CONFIRMING ORDER is not indicated.

PAYMENT & TERMS

Domestic orders can be paid by bank wire transfer or credit card (Visa/ Mastercard accepted). International orders must be paid by bank wire transfer. See invoice for details.

Prices are EXW Regis Technologies, Morton Grove, IL.

Regis Technologies Banking Information:
FIRST AMERICAN BANK
1650 Louis Avenue
Elk Grove Village, IL 60007
USA

SWIFT CODE: FAMBUS44
ABA NUMBER: 071922777
ACCT NUMBER: 45040104804

Terms: Net 30 days. To qualify, new customers are subject to credit approval.

Shipping: Prepaid and added to the invoice unless arranged separately.

Quantity Discounts: Regis welcomes the opportunity to quote on larger quantities or bulk shipments of products listed in this catalog. Please contact Customer Service or your sales representative for more details.

SHIPPING

Default Carrier: All items are shipped via FedEx ground service unless otherwise prearranged.

Requested Expedited Shipping and Alternate Carriers: Overnight or second day air service is available upon request. In order to comply with federal and international regulations, Regis reserves the right to change requested transportation in accordance with carrier guidelines.

Hazardous Goods: Regulations require that hazardous goods be shipped in certified containers, bags, and/or cartons. Any special packaging and/or freight charges for these items will be prepaid and added to the invoice.

Items are shipped from: Morton Grove, Illinois, USA.

Insurance Charges: Prepaid and added to the invoice

International: Freight charges are prepaid and added to the invoice unless otherwise requested.

RETURNS

All returns are subject to approval. Approved items require a Returned Merchandise Authorization (RMA) number that can be obtained from Regis Customer Service. Returns will not be accepted without an RMA.

Certain products may not be returned for credit under any circumstance. These items include but are not limited to: any product that was opened and/or used, certain chemical reagents, custom products and/or special orders. Returns must be requested within 60 days of receiving the item by contacting Regis Customer Service.

Except in the case of manufacturer defect or shipping error, returns are subject to a 15% or $15.00 restocking fee, whichever is greater.

Please inspect shipping carton and contents carefully upon arrival. If products are missing or defective, contact Regis Customer Service for assistance. Until the product has been evaluated, retain all product packaging.

Every effort is taken in minimize product damage while in transit. However, if loss or damage should occur:

1. Save shipping cartons in their entirety.
2. Contact the carrier immediately to file a damage claim.
3. For additional assistance in filling claims, contact Regis Customer
3. Service.

Regis appreciates the opportunity to support your work. For optimal success, contact us for help before and/or after your purchase for technical support.

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Statement concerning the possible use of a product is made without representation or warranty that any such use is free of patent infringement and is not to be considered a recommendation to infringe on any patent.

TECHNICAL SUPPORT

Regis operates a 36,000 square foot GMP facility for the research, development, and manufacturing of our products. A dedicated chromatography applications laboratory is available to support our customers both pre- and post-sale.

Chiral customers can take advantage of our free chiral screening. With no obligation, submit a small sample of your racemate and receive a complimentary, optimized method within days.

Our technical team looks forward to speaking with you and helping you find the right products for your applications. Contact us today for product recommendations and support for using our reagents and columns.

- Contact our technical support team at **techsupport@registech.com.**
- Find your local technical representative at **chromsales@registech.com.**
- Download technical resources, such as application notes and posters at **registech.com.**

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