

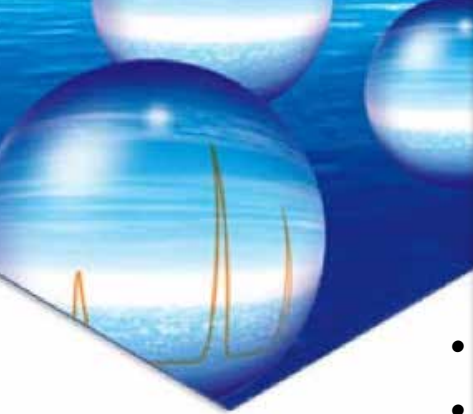


# *ChromegaChiral™*

## *CSP Media and Columns*

pharmaceutical • environmental • chemical • biochemical  
separation & purification





# ChromegaChiral

## Innovative Chiral Stationary Phases Designed to be your Chiral Solution

- *A Recognized Supplier of Quality CSP Media and Columns*
- *Available in 3, 5, 10 and 20 micron for Analytical and Preparative*
- *Comprehensive Technical and Method Development Assistance*
- *A Premium Chiral Column Manufacturer Producing Highly Efficient Columns with Superior Reproducibility*
- *Extensive Capabilities to Produce State-of-the-Art CSP Chemistries*
- *The Experience to Provide Chromatographers with the Best in Chiral Column Technology*

### Chiral Stationary Phases (CSP) and Chirality

Chirality has become critically important in the pharmaceutical, chemical, and agricultural industries. The subtle differences that make compounds chiral can produce dramatically different pharmacological effects in biological systems. As a result, the demand for stereoselective separation techniques and analytical assays to evaluate the enantiomeric purity of chiral compounds, has increased. Chiral chromatography in the forms of HPLC and SFC has become a necessary tool - not only for the analytical determination of enantiomeric purity, but also for the isolation and purification of enantiomers.

As a leader in chiral separations we are able to offer you a broad range of Chiral Stationary Phases (CSPs) for your analytical and preparative chromatography needs. Existing chiral stationary phases can separate a wide variety of chiral mixtures, however there are still enantiomeric mixtures that are difficult to separate limiting their characterization. This provides our drive to develop new CSP's with differing chiral selectivities.

#### Product Features Include:

- Excellent Selectivity Range
- Wide Range of Applications
- Superior Resolution and Efficiency
- High Pressure Limit
- Fast Optimization
- One column for both SFC and HPLC use

#### Available ChromegaChiral Phases:

ChromegaChiral CCA  
ChromegaChiral CCA-F4  
ChromegaChiral CCC  
ChromegaChiral CCJ  
ChromegaChiral CCO

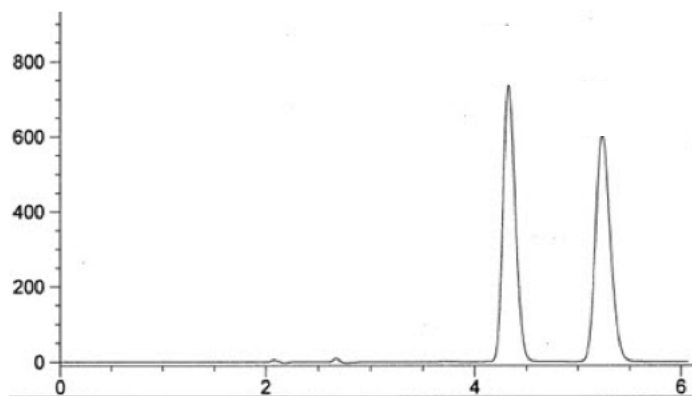
ChromegaChiral CCO-F2  
ChromegaChiral CCO-F4  
ChromegaChiral CCO-F4 T3  
ChromegaChiral CCS  
ChromegaChiral CCU

ChromegaChiral CCX  
ChromegaChiral CC2  
ChromegaChiral CC3  
ChromegaChiral CC4

### ChromegaChiral CCO

A polysaccharide coated chiral stationary phase and columns which are produced using a unique production process of coating the proven chiral selector, tris-(3,5-dimethylphenyl) carbamoyl cellulose on high purity, high performance silica. ChromegaChiral CCO columns are available in 3, 5, 10, and 20 micron particle sizes enabling easy scale up from analytical to preparative scale using HPLC or SFC conditions. Similar in selectivity to ChiralPak® OD.

ChromegaChiral CCO 250 X 4.6 mm 5 µm Catalog # 155251-CCO

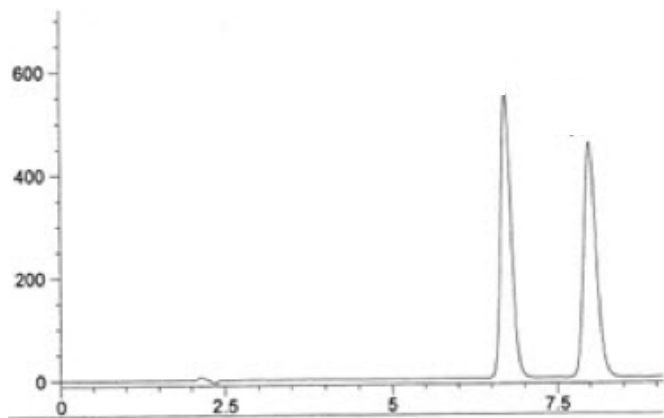


ChromegaChiral CCO Separation of Flavanone  
Mobile Phase: Hexane:IPA (90:10 v/v)  
Temperature: 25°C  
Flow Rate: 1 mL/min  
Detection: UV @ 254nm

## ChromegaChiral CCA

A polysaccharide coated chiral stationary phase and columns which are produced using a unique production process of coating the proven chiral selector, tris-(3,5-dimethylphenyl) carbamoyl amylose on high purity silica gel. ChromegaChiral CCA columns, similar in selectivity to ChiralPak® AD, are available in 3, 5, 10, and 20 micron particle sizes enabling easy scale up from analytical to preparative scale using HPLC or SFC conditions.

ChromegaChiral CCA 250 X 4.6 mm 5 µm Catalog # 155251-CCA

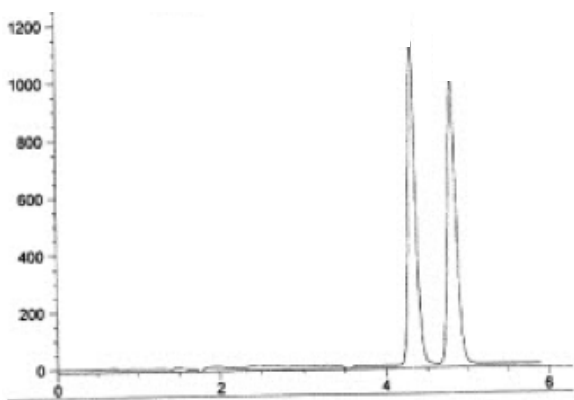


ChromegaChiral CCA Separation of Ketoprofen  
Mobile Phase: Hexane:Ethanol (90:10 v/v) + 0.1% TFA  
Temperature: 25°C  
Flow Rate: 1.5 mL/min  
Detection: UV @ 254 nm

## ChromegaChiral CC2

A modified cellulose including 3-chloro-4 methylphenyl-carbamate bonding groups coated on high purity, high performance spherical silica particles. This combination of bonded groups stabilizes the solubility of coated phase making for a durable phase similar to other widely used coated phases and provides for similar separation behavior to Phenomenex Lux® Cellulose-2

ChromegaChiral CC2 250 X 4.6 mm 5 µm Catalog # 155251-CC2

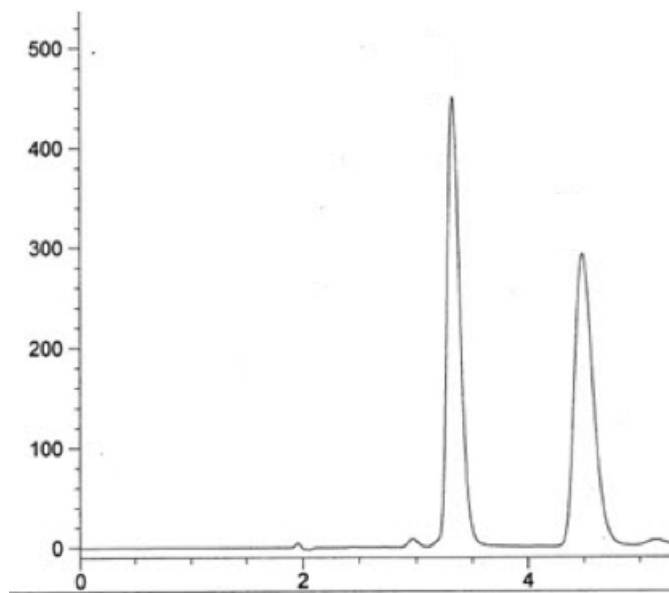


ChromegaChiral CC2 Separation of Metoprolol  
Mobile Phase: Hexane:Ethanol (80:20 v/v) + 0.1% DEA  
Temperature: 25°C  
Flow Rate: 1 mL/min  
Detection: UV @ 220nm

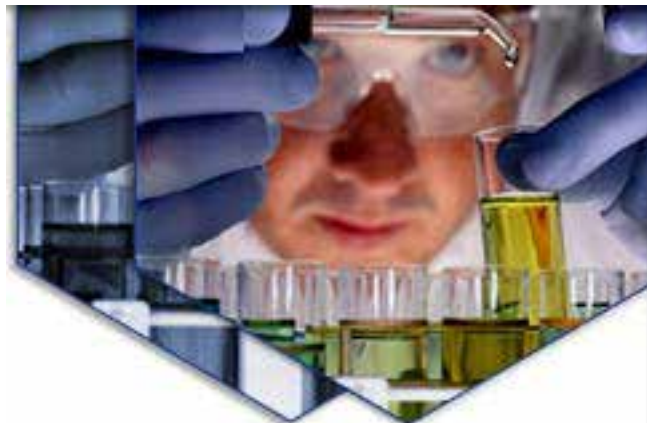
## ChromegaChiral CCC

A modified cellulose including the combination of 3-chloro-4 methylphenylcarbamate and 3,5-dichlorophenylcarbamate bonding groups coated on high purity, high performance spherical silica particles. This combination of bonded groups stabilizes the solubility of coated phase making for a durable phase similar to other widely used coated phases. The use of cellulose modified with chlorinated phenyl groups provides for the separation for many previously unresolved/poorly resolved chiral mixtures by providing unique separation characteristics.

ChromegaChiral CCC 250 X 4.6 mm 5 µm Catalog # 155251-CCC



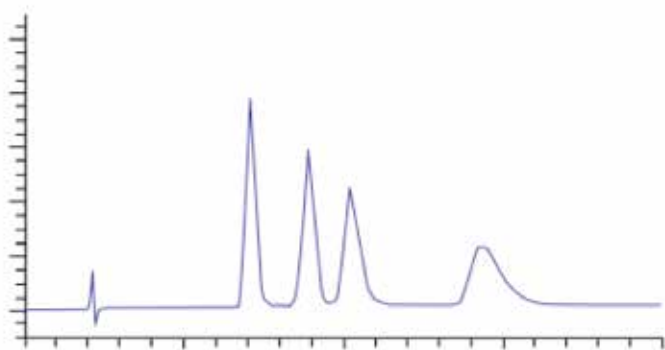
ChromegaChiral CCC Separation of Warfarin  
Mobile Phase: Hexane:Ethanol (70:30 v/v) + 0.1% Acetic Acid  
Temperature: 25°C  
Flow Rate: 1mL/min  
Detection: UV @ 254 nm





### ChromegaChiral CC3

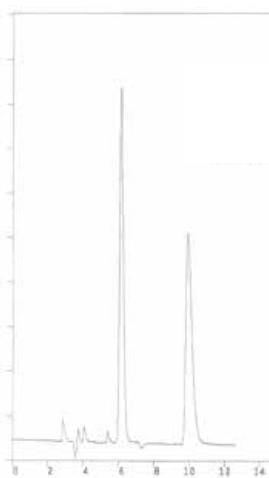
ChromegaChiral CC3 (amylose tris(5-chloro-2-methylphenylcarbamate) is a new product for high resolution chiral separations based on a new halogenated carbohydrate based chiral stationary phase. Similar in selectivity to ChiralPak® AY-H.



ChromegaChiral CC3 Separation of Cyclandelate  
Mobile Phase: Hexane:Ethanol (95:5 v/v)  
Temperature: 25°C  
Flow Rate: 1.5 mL/min  
Detection: UV @ 220nm

### ChromegaChiral CC4

ChromegaChiral CC4 (cellulose tris(4-chloro-3-methylphenylcarbamate) is another new product for high resolution chiral separations based on a new halogenated carbohydrate based chiral stationary phase. It is a modified cellulose coated on high purity, high performance spherical silica particles. The chemical modification includes the chemical bonding of 4-chloro-3-methylphenylcarbamate to cellulose. The use of cellulose modified with chlorinated phenyl groups provides a separation opportunity for many previously unresolved and poorly resolved chiral mixtures. Similar in selectivity to ChiralPak® OZ-H.



ChromegaChiral CC4 Separation of Hydrobenzoin  
Mobile Phase: Ethanol:Hexane (15:85 v/v)  
Temperature: 25°C  
Flow Rate: 1 mL/min  
Detection: UV @ 220nm

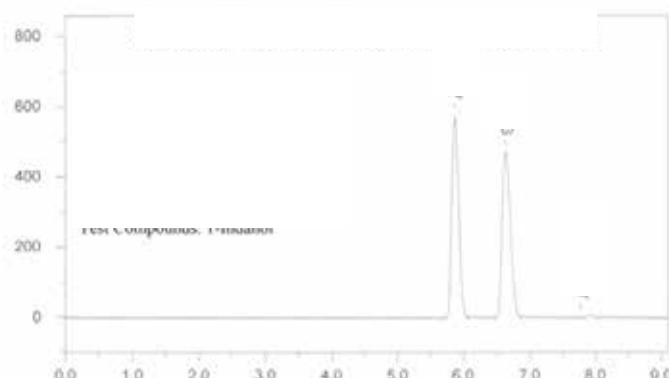
ChromegaChiral CC4 250 X 4.6 mm 5 µm Catalog # 155251-CC4

4 Visit our web site at [www.esind.com](http://www.esind.com) or call 1-800-356-6140

### ChromegaChiral CCS

ChromegaChiral CCS (amylose tris [(S)-α-methylbenzylcarbamate]) permits the enantiomeric separation of 1-Indanol without the addition of DEA (Diethyl amine). Historically DEA has been commonly used to improve peak shape for chiral separations of compounds such as 1-Indanol. ChromegaChiral CCS separates the 1-Indanol enantiomers with sharp peaks without DEA, providing superior chiral separations, sample loading and peak shape performance. Similar in selectivity to ChiralPak® AS-H.

ChromegaChiral CCS 250 X 4.6 mm 5 µm Catalog # 155251-CCS

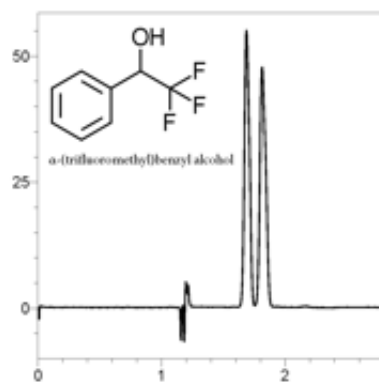


ChromegaChiral CCS Separation of 1-Indanol without DEA additive  
Mobile Phase: Hexane:IPA (90:10 v/v)  
Temperature: 25°C  
Flow Rate: 1 mL/min  
Detection: UV @ 254nm

### ChromegaChiral CCA F4

ChromegaChiral CCA F4 is a 4-Fluoro 3-methylphenyl amylose phase which can be used in SFC or HPLC. The addition of a fluorine atom into a phenyl carbamate amylose structure can be useful in promoting a fluorophilic retention mechanism which can provide improved retention for fluorinated compounds.

ChromegaChiral CCA-F4 250 X 4.6 mm 5 µm Catalog # 155251-CCA-F4

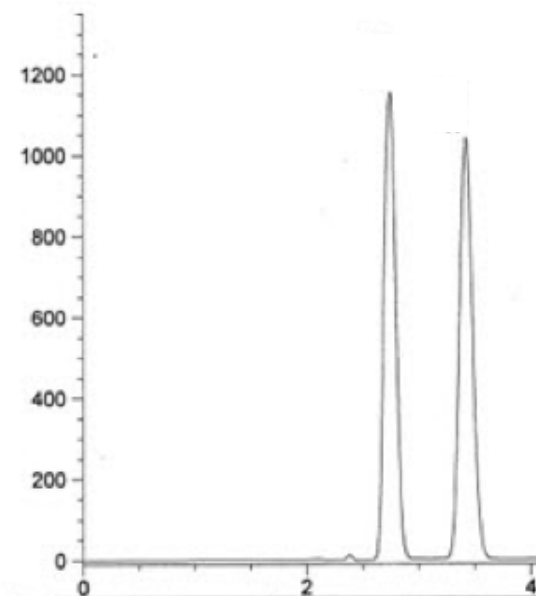


ChromegaChiral CCA-F4  
Mobile Phase: 5% Methanol/CO<sub>2</sub>  
Temperature: 40°C  
Flow Rate: 3 mL/min  
BPR: 100 Bar  
Detection: UV @ 254nm

## ChromegaChiral CCO F2

ChromegaChiral CCO F2 is a 2-Fluoro 5-methylphenyl cellulose phase which can be used in SFC or HPLC. The addition of a fluorine atom into a phenyl carbamate cellulose structure can be useful in promoting a fluorophilic retention mechanism which can provide improved retention for fluorinated compounds. A fluorophilic retention mechanism can be particularly useful in medicinal chemistry and drug discovery, where more than a third of newly approved small molecule drugs contain fluorine.

ChromegaChiral CCO F2 250 X 4.6 mm 5  $\mu$ m Catalog # 155251-CCO-F2



ChromegaChiral CCO F2 HPLC Separation of Cyclandelate  
Mobile Phase: Hexane:IPA (80:20 v/v)  
Temperature: 25°C  
Flow Rate: 1 mL/min  
Detection: UV @ 220nm

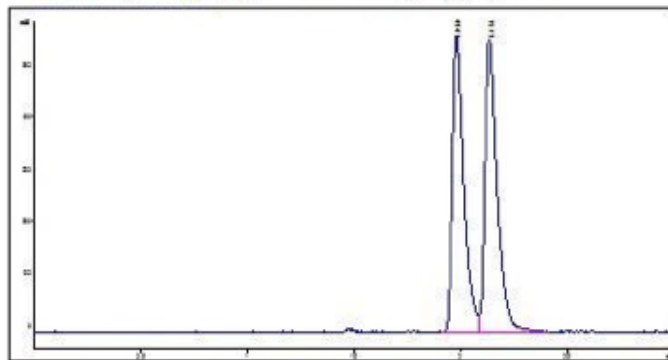


ChromegaChiral CCO F2 SFC Separation of Warfarin  
Mobile Phase: CO<sub>2</sub>:Methanol (80:20 v/v)  
Temperature: 10°C  
Flow Rate: 4 mL/min  
Pressure: 350 Bar

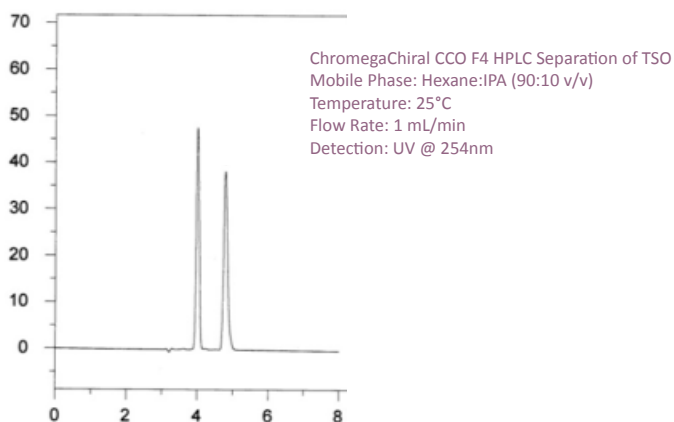
## ChromegaChiral CCO F4

ChromegaChiral CCO F4 is a 4-Fluoro 3-methylphenyl cellulose phase which can be used in SFC or HPLC. The addition of a fluorine atom into a phenyl carbamate cellulose structure is useful in promoting a fluorophilic retention mechanism which provides improved retention for fluorinated compounds. A fluorophilic retention mechanism is particularly useful in medicinal chemistry and drug discovery, where more than a third of newly approved small molecule drugs contain fluorine.

ChromegaChiral CCO F4 250 X 4.6 mm 5  $\mu$ m Catalog # 155251-CCO-F4

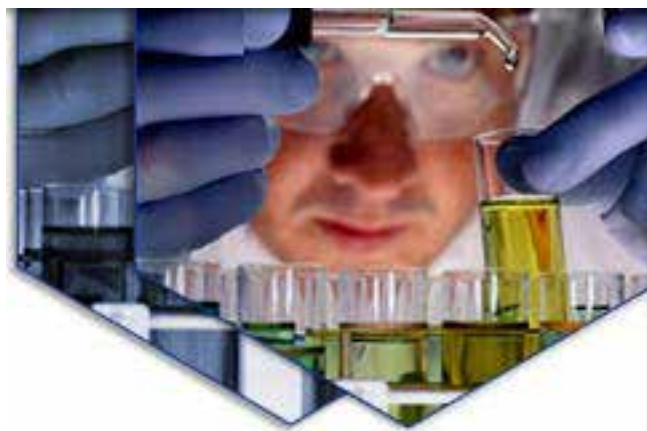


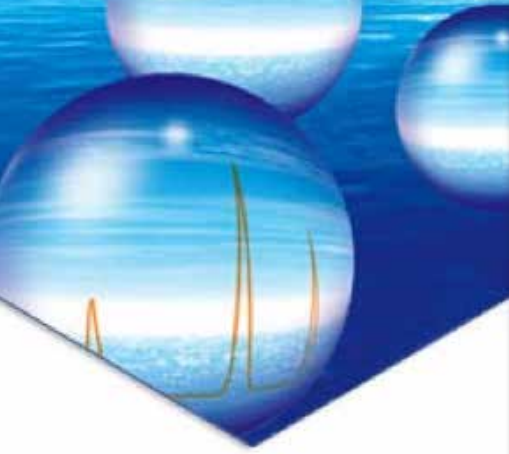
ChromegaChiral CCO F4 SFC Separation of Difluoro-R-Benzoate in 3 minutes  
Mobile Phase: CO<sub>2</sub> 100%  
Temperature: 10°C  
Flow Rate: 4 mL/min  
Pressure: 350 Bar



ChromegaChiral CCO F4 HPLC Separation of TSO  
Mobile Phase: Hexane:IPA (90:10 v/v)  
Temperature: 25°C  
Flow Rate: 1 mL/min  
Detection: UV @ 254nm

For ordering information please see Page 7.

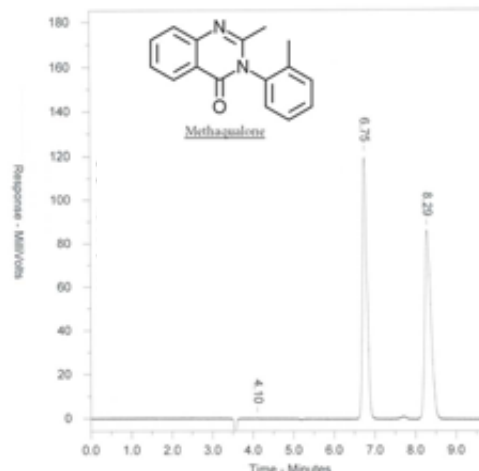




## ChromegaChiral CCX

ChromegaChiral CCX a modified amylose includes the combination of methylbenzylcarbamate and 3,5-dimethylphenylcarbamate groups. This combination stabilizes the solubility of coated phase making for a durable phase similar to other widely used coated phases.

ChromegaChiral CCX 250 X 4.6 mm 5 µm Catalog # 155251-CCX

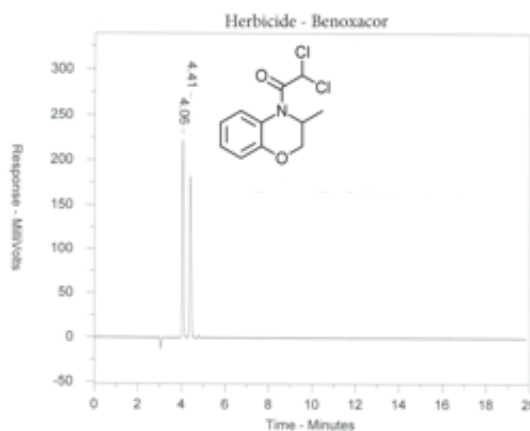


ChromegaChiral CCX  
 Mobile Phase: Methanol/CO<sub>2</sub> (20:80)  
 Temperature: 35°C  
 Flow Rate: 4 mL/min  
 BPR: 150 bar  
 Detection: UV @ 254nm

## ChromegaChiral CCU

ChromegaChiral CCU a modified amylose includes the combination of methylbenzylcarbamate and 3-chloro-4 methylphenylcarbamate groups. This combination stabilizes the solubility of coated phase making for a durable phase similar to other widely used coated phases.

ChromegaChiral CCU 250 X 4.6 mm 5 µm Catalog # 155251-CCU

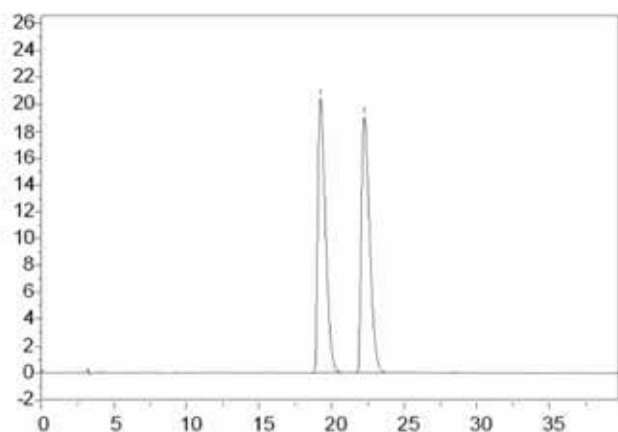


ChromegaChiral CCX  
 Mobile Phase: Methanol/CO<sub>2</sub> (10:90)  
 Temperature: 35°C  
 Flow Rate: 4 mL/min  
 BPR: 150 bar  
 Detection: UV @ 254nm

## ChromegaChiral CCJ

ChromegaChiral CCJ (cellulose 4-methylbenzoate) is a new product for high resolution chiral separations based on a new halogenated carbohydrate based chiral stationary phase. Similar in selectivity to ChiralPak® OJ-H.

ChromegaChiral CCJ 250 X 4.6 mm 5 µm Catalog # 155251-CCJ

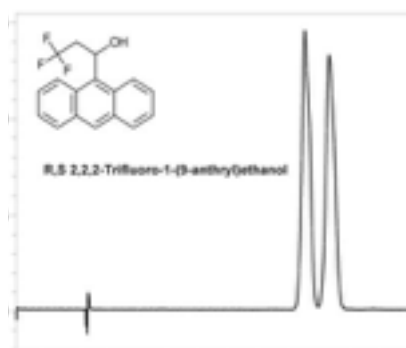


ChromegaChiral CCJ Separation of Flavanone  
 Mobile Phase: Hexane:IPA (90:10 v/v)  
 Temperature: 25°C  
 Flow Rate: 1 mL/min  
 Detection: UV @ 254nm

## ChromegaChiral CCO-F4T3

ChromegaChiral CCO-F4T3 (4-Fluoro-3-(trifluoromethyl) phenyl cellulose) incorporates fluoro groups into its structure. The addition of a fluorine atom into a phenyl cellulose structure is useful in providing improved retention for fluorinated compounds.

ChromegaChiral CCO-F4T3 250 X 4.6 mm 5 µm Catalog # 155251-CCO-F4T3

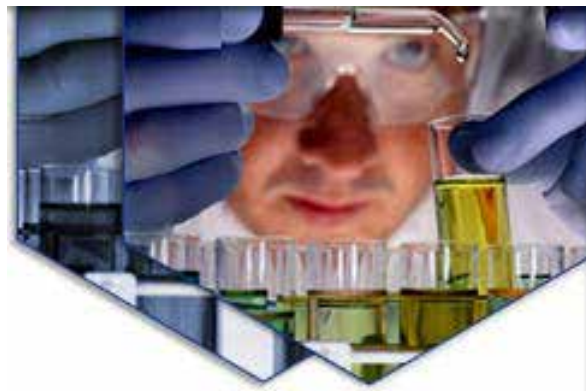


ChromegaChiral CCO-F4T3  
 Mobile Phase: 5% Methanol/CO<sub>2</sub>  
 Temperature: 40°C  
 Flow Rate: 3 mL/min  
 BPR: 100 bar  
 Detection: UV @ 254nm

<b>ChromegaChiral Columns - Ordering Information</b>					
<b>Description</b>	<b>Analytical (100 x 4.6 mm)</b>	<b>Analytical (150 x 4.6 mm)</b>	<b>Analytical (250 x 4.6 mm)</b>	<b>Semi-Preparative (250 x 20 mm ID)</b>	<b>Preparative (250 x 30 mm ID)</b>
<b>5 micron</b>					
ChromegaChiral CCO	125251-CCO	135251-CCO	155251-CCO	158251-CCO	15N251-CCO
ChromegaChiral CCA	125251-CCA	135251-CCA	155251-CCA	158251-CCA	15N251-CCA
ChromegaChiral CCC	125251-CCC	135251-CCC	155251-CCC	158251-CCC	15N251-CCC
ChromegaChiral CCJ	125251-CCJ	135251-CCJ	155251-CCJ	158251-CCJ	15N251-CCJ
ChromegaChiral CCS	125251-CCS	135251-CCS	155251-CCS	158251-CCS	15N251-CCS
ChromegaChiral CC2	125251-CC2	135251-CC2	155251-CC2	158251-CC2	15N251-CC2
ChromegaChiral CC3	125251-CC3	135251-CC3	155251-CC3	158251-CC3	15N251-CC3
ChromegaChiral CC4	125251-CC4	135251-CC4	155251-CC4	158251-CC4	15N251-CC4
ChromegaChiral CCX	125251-CCX	135251-CCX	155251-CCX	158251-CCX	15N251-CCX
ChromegaChiral CCU	125251-CCU	135251-CCU	155251-CCU	158251-CCU	15N251-CCU
<b>10 micron</b>					
ChromegaChiral CCO	125351-CCO	135351-CCO	155351-CCO	158351-CCO	15N351-CCO
ChromegaChiral CCA	125351-CCA	135351-CCA	155351-CCA	158351-CCA	15N351-CCA
ChromegaChiral CCC	125351-CCC	135351-CCC	155351-CCC	158351-CCC	15N351-CCC
ChromegaChiral CCJ	125351-CCJ	135351-CCJ	155351-CCJ	158351-CCJ	15N351-CCJ
ChromegaChiral CCS	125351-CCS	135351-CCS	155351-CCS	158351-CCS	15N351-CCS
ChromegaChiral CC2	125351-CC2	135351-CC2	155351-CC2	158351-CC2	15N351-CC2
ChromegaChiral CC3	125351-CC3	135351-CC3	155351-CC3	158351-CC3	15N351-CC3
ChromegaChiral CC4	125351-CC4	135351-CC4	155351-CC4	158351-CC4	15N351-CC4
ChromegaChiral CCX	125351-CCX	135351-CCX	155351-CCX	158351-CCX	15N351-CCX
ChromegaChiral CCU	125351-CCU	135351-CCU	155351-CCU	158351-CCU	15N351-CCU
<b>Description</b>	<b>Analytical (100 x 4.6 mm)</b>	<b>Analytical (150 x 4.6 mm)</b>	<b>Analytical (250 x 4.6 mm)</b>	<b>Semi-Preparative (150 x 20 mm ID)</b>	<b>Preparative (250 x 20 mm ID)</b>
<b>5 micron</b>					
ChromegaChiral CCA F4	125251-CCA-F4	135251-CCA-F4	155251-CCA-F4	138251-CCA-F4	158251-CCA-F4
ChromegaChiral CCO F2	125251-CCO-F2	135251-CCO-F2	155251-CCO-F2	138251-CCO-F2	158251-CCO-F2
ChromegaChiral CCO F4	125251-CCO-F4	135251-CCO-F4	155251-CCO-F4	138251-CCO-F4	158251-CCO-F4
ChromegaChiral CCO F4T3	125251-CCO-F4T3	135251-CCO-F4T3	155251-CCO-F4T3	138251-CCO-F4T3	158251-CCO-F4T3
<b>10 micron</b>					
ChromegaChiral CCA F4			155351-CCA-F4	138351-CCA-F4	158351-CCA-F4
ChromegaChiral CCO F2			155351-CCO-F2	138351-CCO-F2	158351-CCO-F2
ChromegaChiral CCO F4			155351-CCO-F4	138351-CCO-F4	158351-CCO-F4
ChromegaChiral CCO F4T3			155351-CCO-F4T3	138351-CCO-F4T3	158351-CCO-F4T3

### Guaranteed Performance

Every ES Industries column is guaranteed to deliver the highest plate counts and most symmetrical peaks for even the most difficult analysis. We are confident the ChromegaChiral line of products will deliver the highest quality and most reliable columns available to you.



*Other innovative products available from ES Industries:*

- *Achiral SFC Columns and Media*
- *Sub-2  $\mu\text{m}$  HPLC Columns*
- *State of the art Reverse Phase HPLC Columns*
- *Unique Reverse Phase HPLC Columns*
- *Fluorinated Columns*
- *HILIC Columns*
- *LC-MS Columns*
- *MacroSep BIO-Gold Columns*
- *Commercial Equivalent Columns*
- *Bio-Analytical Columns*
- *HPLC Columns for Petroleum Products*
- *Phenyl Columns*



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