Kromasil®
Chiral™

Kromasil Chiral

Designed to stretch the limits

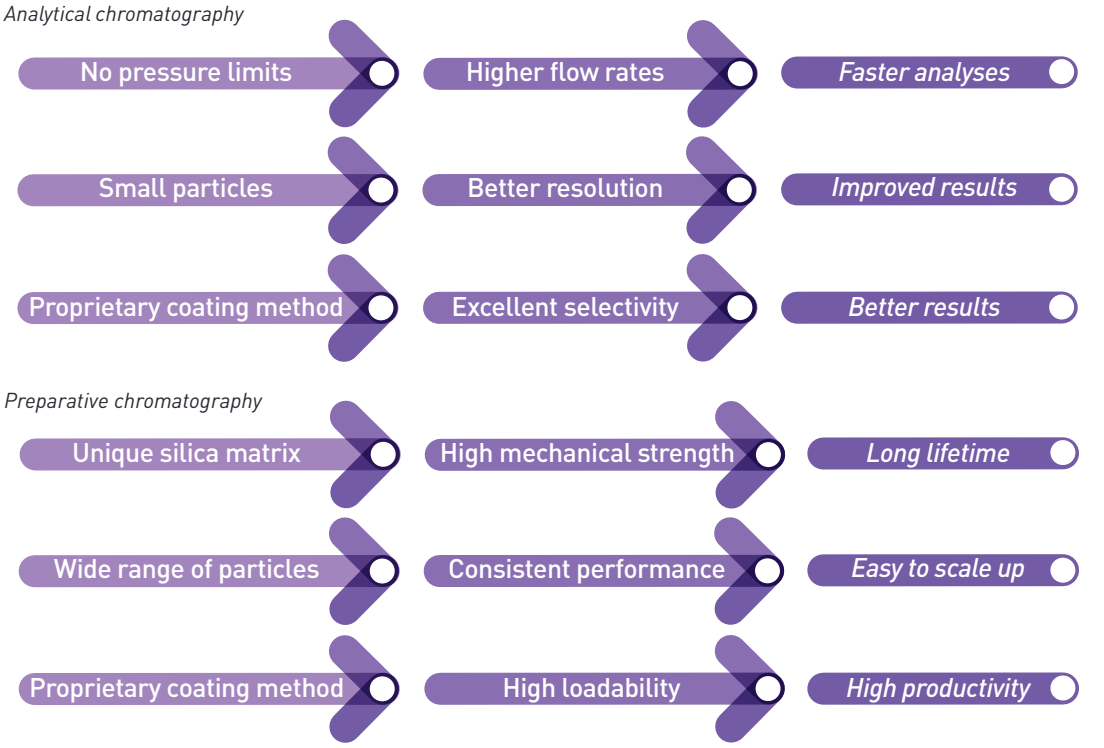
Nouryon

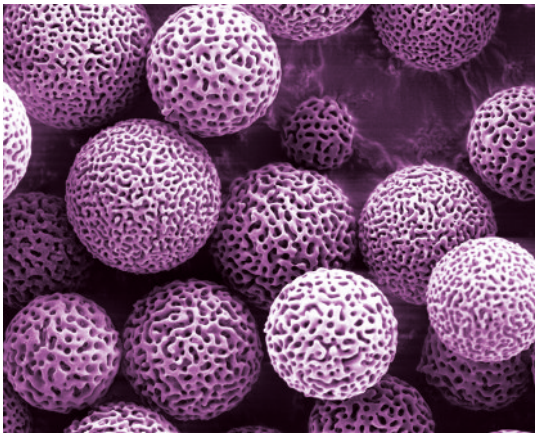
High-performing chiral phases

Polysaccharide-based Kromasil AmyCoat and CelluCoat stretch the limits for chiral chromatography. The silica is based on a proprietary matrix and coated with a functionalized amylose or cellulose selector.

Kromasil AmyCoat and CelluCoat give high resolution, excellent selectivity and stable performance when switching between compatible mobile phases. Users do not have to worry about pressure limits, as both Kromasil AmyCoat and CelluCoat can withstand flow rates equivalent to pressures of up to 400 bar – i.e. the limit for most standard HPLC systems.

Summary of benefits for the Chiral platform





The matrix

Kromasil Chiral is based on super-wide pore silica particles in sizes 3, 5, 10 and 25 µm.

Fast and easy method development

To speed up and simplify method development, Nouryon has removed some of the restrictions for coated polysaccharide phases. In analytical scale chromatography, 3 µm particles and the absence of pressure limits allow fast chromatography with good separation results.

Good results

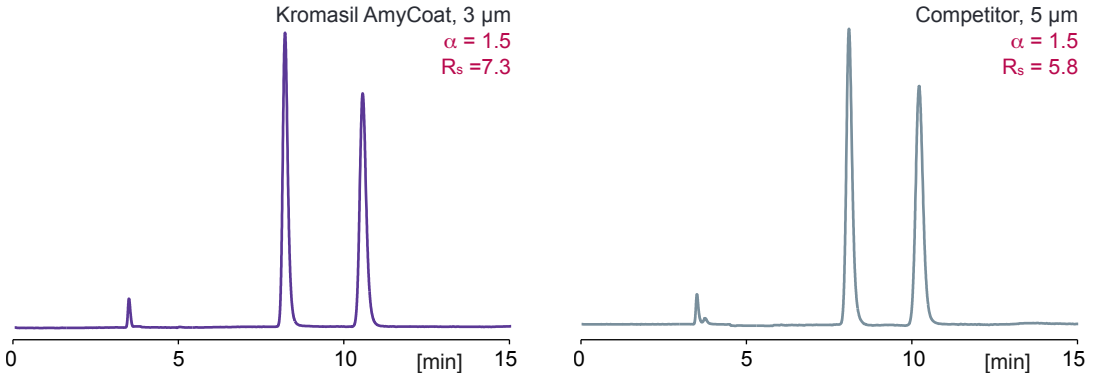
Kromasil AmyCoat and CelluCoat show excellent enantioselectivity for many racemates. In the application section of this guide, there are many chiral applications showing the performance levels scientists can expect.

By having access to 3 µm particles, higher plate count and resolution can be expected for analytical chromatography. Combined with excellent selectivity, this facilitates the separation of enantiomers.

Saving time

With Kromasil AmyCoat and CelluCoat, users get better results faster. Thanks to the absence of pressure limits, analytical chromatography can be run at very high flow rates and thereby save time.

Selectivity and resolution comparison Kromasil AmyCoat 3 µm and main competitor (5 µm)

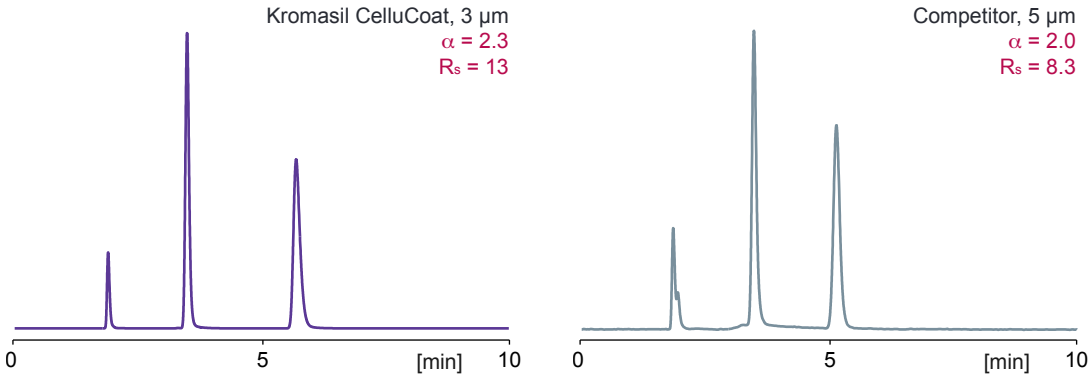


Conditions

Column size: 4.6 × 150 mm
Mobile phase: heptane / 2-propanol / DEA (90/10/0.1)
Flow rate: 0.5 ml/min
Solute: Carbinoxamine
Temperature: 22 °C
Detection: UV @ 226 nm

	α		Rs	
	AmyCoat 3 µm	Competitor 5 µm	AmyCoat 3 µm	Competitor 5 µm
ambucetamide	1.4	1.4	4.8	4.2
carbinoxamine	1.5	1.5	7.3	5.8
ketoprofen	1.4	1.3	4.6	4.3
naproxen	1.2	1.2	3.4	3.1
oxamniquine	1.2	1.2	3.3	3.1
proglumide	2.7	2.8	11.8	9.0
sulindac	1.3	1.3	4.8	3.9

Selectivity and resolution comparison –Kromasil CelluCoat 3 µm and main competitor (5 µm)

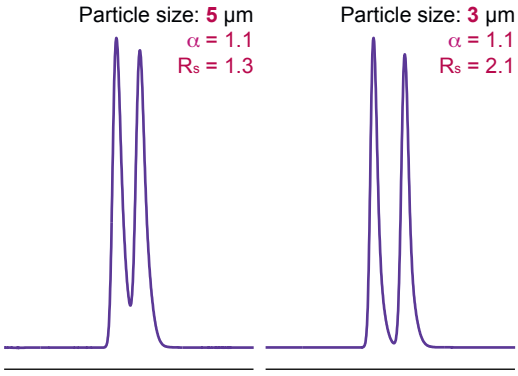


Conditions

Column size: 4.6 × 150 mm
Mobile phase: heptane / 2-propanol (90/10)
Flow rate: 1 ml/min
Solute: trans-stilbene oxide
Temperature: 25 °C
Detection: UV @ 229 nm

	α		Rs	
	CelluCoat 3 µm	Competitor 5 µm	CelluCoat 3 µm	Competitor 5 µm
trans-Stilbene oxide	2.4	2.0	11.5	8.3
Benzoin	1.5	1.5	6.5	5.7
TFAE	2.9	2.9	11.6	11.0
Trögers base	1.4	1.4	3.2	2.7
Oxprenolol	5.6	5.5	14.7	15.1
Naproxen	1.2	1.2	2.6	2.2
Proglumide	1.8	2.0	4.7	3.2

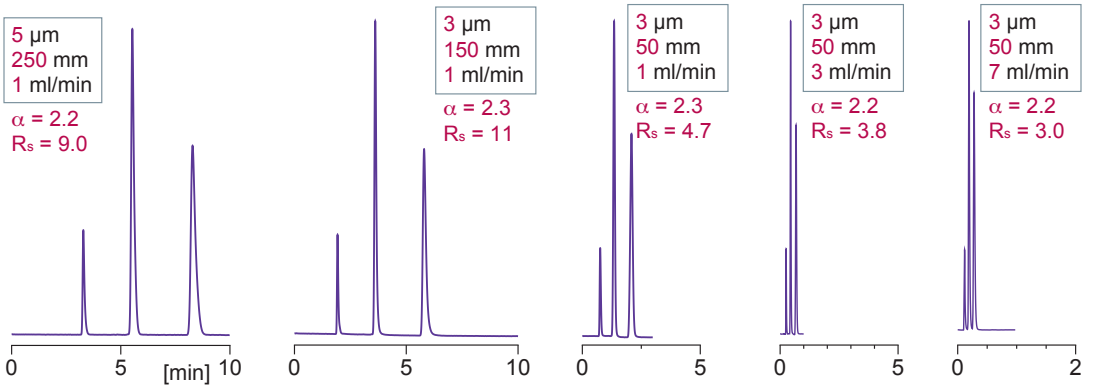
Difference in resolution – Kromasil AmyCoat 3 µm vs. 5 µm



Conditions

Columns: Kromasil *dp*-AmyCoat 4.6 x 150 mm (*dp* = 5 and 3 µm, respectively)
Part number: C05ACA15 and C03ACA15
Solute: trans-2-phenyl-1-cyclohexanol
Mobile phase: heptane / 2-propanol (95/5)
Flow rate: 1 ml/min
Temperature: 25 °C
Detection: UV @ 220 nm

Fast analytical chromatography



Conditions

Columns: Kromasil *dp-Cellu*Coat 4.6 x *length* mm
dp = 5 or 3 µm
length = 50, 150 or 250 mm,
as displayed in figures

Part number: C05CCA25, C03CCA15 and C03CCA05

Mobile phase: heptane / 2-propanol (90/10)

Flow rate: 1 ml/min

Solute: trans-stilbene oxide

Temperature: 25 °C

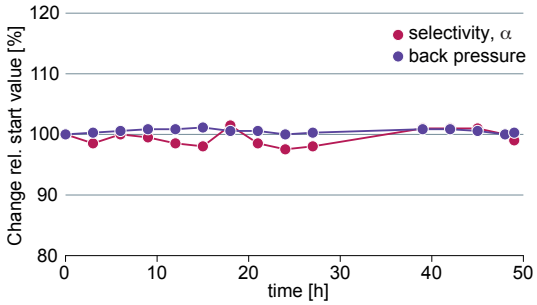
Detection: UV @ 229 nm

Makes everyday work so much easier

Kromasil AmyCoat and CelluCoat allow the user to perform method development without interference from restrictive parameters such as pressure limits, equilibration times and long-term performance.

No pressure limits

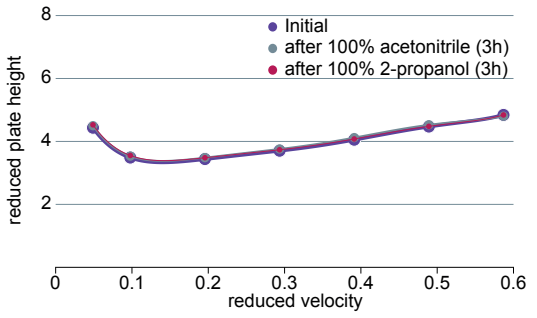
The lack of restrictions on various parameters makes method development particularly user-friendly. One well-known restriction for coated polysaccharide phases is the general pressure limit over the bed. Kromasil AmyCoat and CelluCoat withstand flow rates equivalent to pressures of up to 400 bar—which is about the limit for a standard HPLC system itself. This allows users to run chiral chromatography very fast.



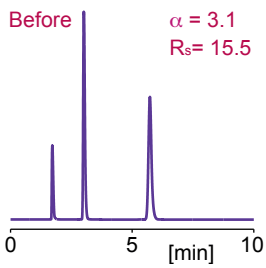
Conditions
Column: Kromasil 3-CelluCoat 4.6 x 50 mm
Part number: C03CCA05
Mobile phase: heptane/2-propanol (90/10)
Solute: trans-stilbene oxide
Flow rate: 7 ml/min
Temperature: 25 °C

Stable performance

When it comes to stability, Kromasil AmyCoat and CelluCoat are compatible with normal, polar organic and reversed mobile phases. Switching between compatible normal to polar organic mobile phases does not lead to any reduction in performance and there is no need for solvent dedicated columns.



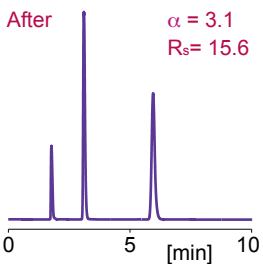
Conditions
Column: Kromasil 5-CelluCoat 4.6 x 250 mm
Part number: C05CCA25
Mobile phase: heptane / 2-propanol (90/10)
Solute: trans-stilbene oxide
Flow rates: 0.1-1.2 ml/min
Temperature: 25 °C



Intermediate elution sequence (10 h)

Mobile phase	Flow rate [ml/min]	Run time [h]	Total back pressure [bar]
heptane / 2-propanol (90/10)	4.3	2	345
2-propanol	0.7	2	260
acetonitrile	1	2	58
ethanol	1	2	188
heptane / 2-propanol (90/10)	1	2	72

Identical results

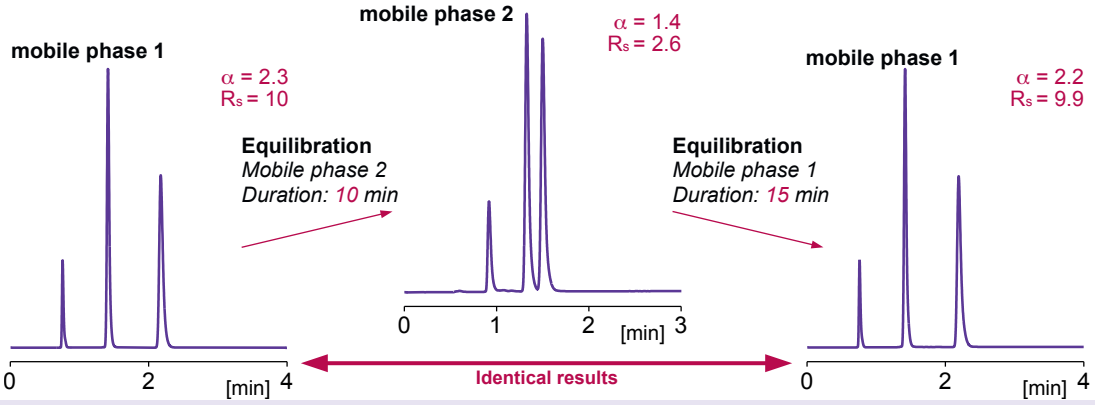


Conditions
Column: Kromasil 3-AmyCoat 4.6 × 150 mm
Part number: C03ACA15
Mobile phase: heptane / 2-propanol (90/10)
Solute: trans-stilbene oxide
Flow rate: 1 ml/min
Temperature: 25 °C
Detection: UV 229 nm

Short equilibration times

Column equilibration is a time-consuming activity when running chiral chromatography. In general, long equilibration times are most pronounced when switching mobile phases containing basic additives to acidic additives or the other way around. The test with a Kromasil CelluCoat 3 µm column switching between two compatible mobile phases shows how short the needed equilibration times actually are.

Freedom to switch solvents with Kromasil CelluCoat

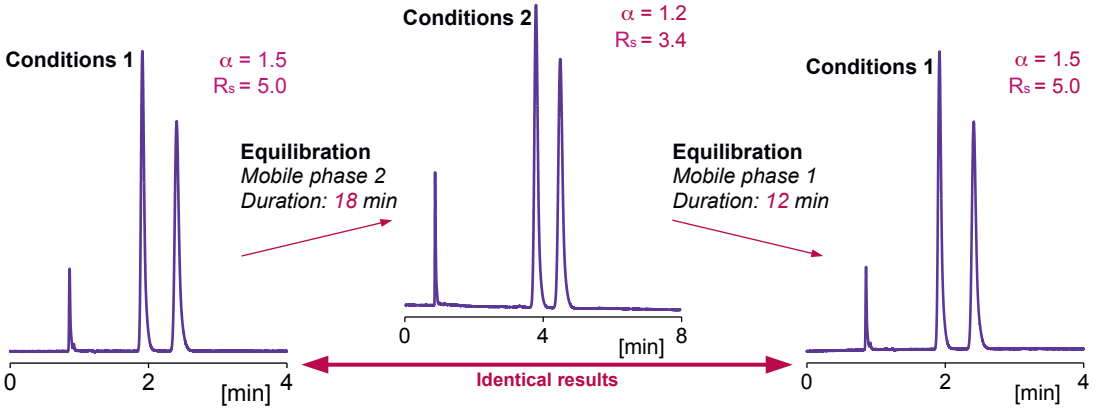


Common conditions
Column: Kromasil 3-CelluCoat 4.6 x 150 mm
Part number: C03CCA25
Solute: trans-stilbene oxide
Flow rate: 2 ml/min
Temperature: 25 °C
Detection: UV 229 nm
Mobile phase 1: heptane / 2-propanol (90/10)
Mobile phase 2: ethanol

No memory effects

These two tests illustrate short equilibration times and additive switches for Kromasil AmyCoat and CelluCoat with absolutely no sign of memory effects.

Freedom to switch additives with Kromasil AmyCoat

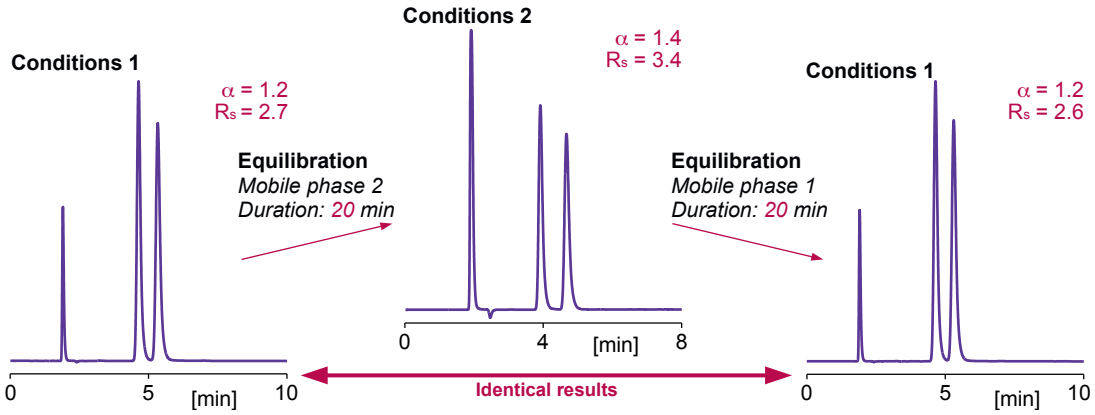


Common conditions
Column: Kromasil 3-AmyCoat 4.6 x 150 mm
Part number: C03ACA15
Flow rate: 2 ml/min
Temperature: 25 °C

Conditions 1
Mobile phase:
heptane / 2-propanol / DEA (90/10/0.1)
Solute: carbinoxamine
Detection: UV @ 228 nm

Conditions 2
Mobile phase:
heptane / 2-propanol / TFA (90/10/0.1)
Solute: ketoprofen
Detection: UV @ 250 nm

Freedom to switch additives with Kromasil CelluCoat



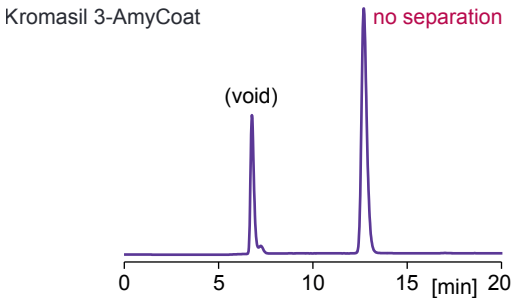
Common conditions
Column: Kromasil 3-CelluCoat 4.6 x 150 mm
Part number: C03CCA15
Flow rate: 1 ml/min
Temperature: 25 °C

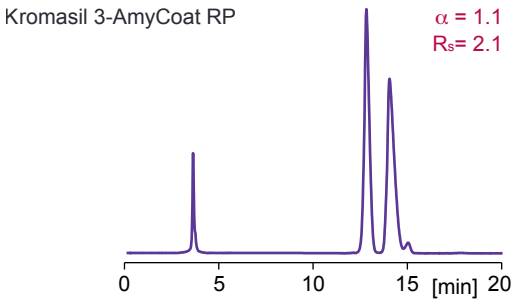
Conditions 1
Mobile phase:
heptane / 2-propanol / TFA (90/10/0.1)
Sample: naproxene
Detection: UV @ 226 nm

Conditions 2
Mobile phase:
heptane / 2-propanol / DEA (90/10/0.1)
Sample: Tröger's base
Detection: UV @ 220 nm

Reverse phase compatibility

Many chiral separations are run under normal phase conditions. Sometimes, though, reversed-phase conditions are required to achieve separation. While it is possible to convert Kromasil AmyCoat or CelluCoat columns to run under RP-mode, it might be quicker and more efficient to use a column initially conditioned for RP-mode: Kromasil AmyCoat RP and CelluCoat RP.





Conditions
Phases: Kromasil 3-AmyCoat and Kromasil 3-AmyCoat RP
Column size: 4.6 x 150 mm
Part numbers: C03ACA15 and C03ARA15, respectively
Mobile phase: NP: heptane / 2-propanol (90/10)
RP: acetonitrile / water (40/60)
Solute: 2-phenyl-2-butanol
Flow rate: 0.25 ml/min and 0.5 ml/min, respectively
Temperature: 22 °C
Detection: UV @ 210 nm and 254 nm, respectively

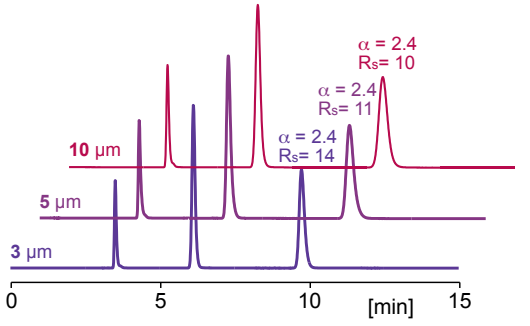
Works all the way

Kromasil products are well known for their ability to work along the whole spectrum from analytical to industrial scale chromatography. Kromasil AmyCoat and CelluCoat are no exception.

Simplifies method development

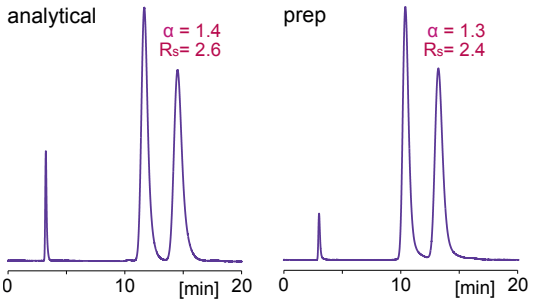
With particle sizes from 3 µm to 25 µm giving identical selectivity, Kromasil AmyCoat and CelluCoat make it easy to scale up while retaining excellent performance. As for all Kromasil products, the user can perform the required method development in analytical scale columns and then scale up to a larger column. For example, 3 µm particles in an analytical scale column can be scaled to a larger column packed with 10 µm particles. If the initial goal is to scale up the process, an analytical column packed with 10 µm particles can be used right from the start.

Easy to scale up



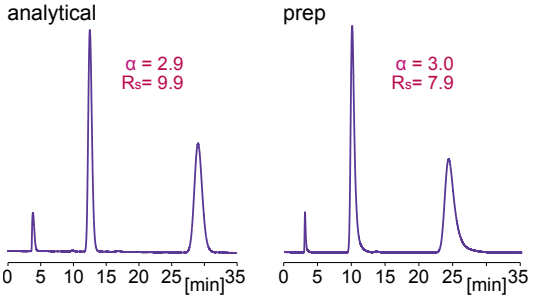
Conditions
Columns: Kromasil dp CelluCoat, 4.6 × 150 mm, where dp = 3, 5 and 10 µm, respectively
Part numbers: C03CCA15, C05CCA15 and C10CCA15
Mobile phase: heptane / 2-propanol (90/10)
Solute: trans-stilbene oxide — Flow rate: 0.5 ml/min
Temperature: 25 °C — Detection: UV @ 229 nm

Kromasil AmyCoat



Conditions
Stationary phase: Kromasil AmyCoat, 10 µm
Mobile phase: heptane/2-propanol (90/10)
Solute: trifluoro-anthrylethanol
Temperature: 20 °C — Detection: UV @ 254 nm
Analytical conditions
Column size: 4.6 × 150 mm — Part number: C10ACA15
Flow rate: 0.5 ml/min
Prep conditions
DAC system: NovaSep Pack-n-Sep, 50 mm i.d.
Bed length: 135 mm — Flow rate: 60 ml/min

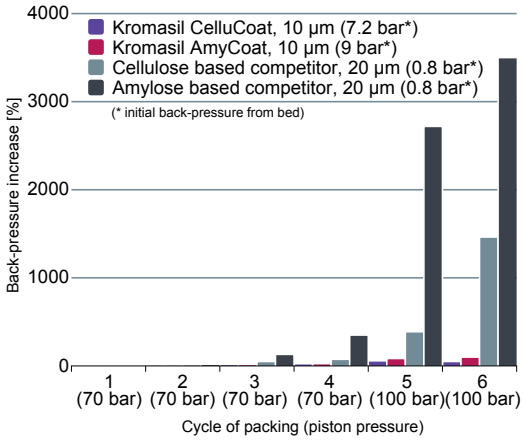
Kromasil CelluCoat



Conditions
Stationary phase: Kromasil CelluCoat, 10 µm
Mobile phase: heptane/2-propanol (90/10)
Solute: trifluoro-anthrylethanol
Temperature: 20 °C — Detection: UV @ 254 nm
Analytical conditions
Column size: 4.6 × 150 mm — Part number C10CCA15
Flow rate: 0.5 ml/min
Prep conditions
DAC system: NovaSep Pack-n-Sep, 50 mm i.d.
Bed length: 132 mm — Flow rate: 60 ml/min

Mechanically strong

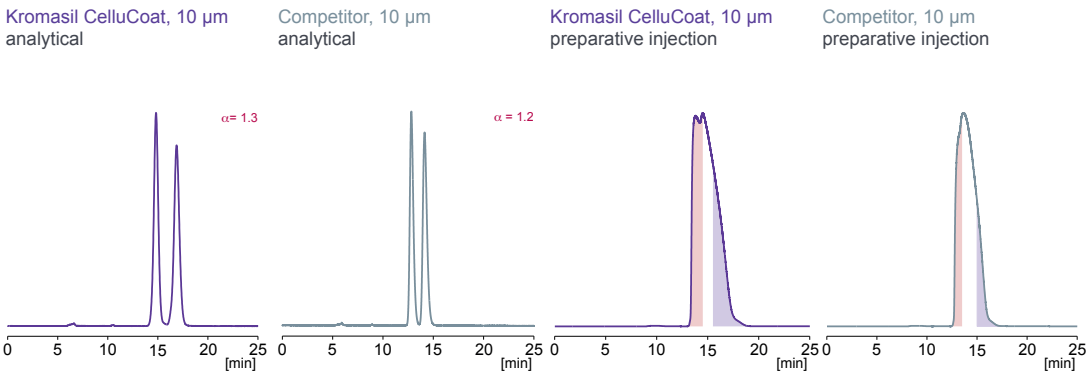
Mechanical strength is an important parameter for product lifetime. Kromasil AmyCoat and CelluCoat have mechanically strong spherical silica, which withstands repeated cycles of packing. The test was designed to exert greater than normal mechanical stress on the chiral stationary phases, and is performed at a packing pressure above the maximum 50 bar recommended by the manufacturer of the main competitor cellulose and amylose based phases.



The relative back pressure increase is a measure of the degree of degradation of the material after repeated packings. Actual particle size for cellulose and amylose based competitor is about three times larger than that for Kromasil, which explains the difference in initial back pressure (back pressure is inversely proportional to the square of the particle size).

Loadability for your preparative needs

As for all kromasil products, The Kromasil Chiral phases have easy scalability from analytical to preparative chromatography.



	Enantiomer 1		Enantiomer 2	
	Purity [%]	Yield [%]	Purity [%]	Yield [%]
Kromasil CelluCoat	91.2	73.3	94.4	50.1
Competitor	91.4	46.7	96.6	24.9

Conditions

Columns: Kromasil 10-CelloCoat 4.6 x 250 mm and Competitor, 10 µm, 4.6 x 250 mm, respectively
Mobile phase: heptane / 2-propanol / TFA (90/10/0.1)
Sample: Naproxen
Flow rate: 0.5 ml/min
Temperature: 25 °C

Analytical conditions
Sample load: 20 µg

Preparative conditions
Sample load: 5 mg
Fraction size: 0.5 min

Fully back-integrated

Nouryon manufactures the super wide pore silica for Kromasil polysaccharide products and performs all subsequent steps leading to the final product. All products are fully traceable.

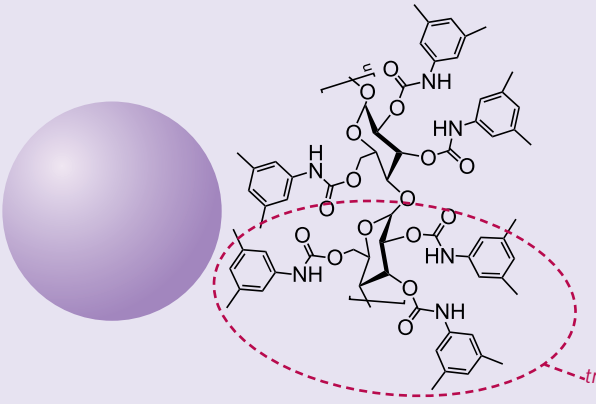
Every manufacturing step is ensured through Nouryon's detailed quality system, and the final product is never released until it has passed a rigorous quality control test sequence.

See the application part of this guide for examples of preparative applications of Kromasil AmyCoat and CelluCoat.

Product characteristics

Kromasil AmyCoat and AmyCoat RP
Coated selector: tris-(3.5-dimethylphenyl) carbamoyl amylose.
Particle sizes: 3, 5, 10 and 25 µm

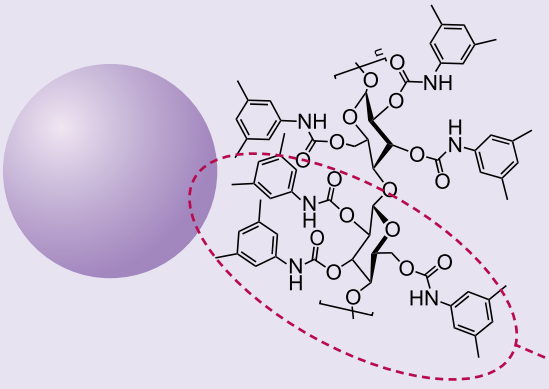
Packed density: 0.58 g/ml
Mechanical stability: allows packing at up to 700 bar (1 000 psi)



tris-(3.5-dimethylphenyl)carbamoyl amylose

Kromasil CelluCoat and CelluCoat RP
Coated selector: tris-(3.5-dimethylphenyl) carbamoyl cellulose.
Particle sizes: 3, 5, 10 and 25 µm

Packed density: 0.58 g/ml
Mechanical stability: allows packing at up to 700 bar (1 000 psi)



tris-(3.5-dimethylphenyl)carbamoyl cellulose

Compatible mobile phases

Kromasil AmyCoat and CelluCoat[1]

alkane/2-propanol	100/0 to 0/100
alkane/ethanol	100/0 to 0/100
alkane/methanol[2]	100/0 to 0/100
alkane/MTBE	100/0 to 50/50
ethanol/methanol	100/0 to 0/100
(SFC) CO_2/alcohol	100/0 to 50/50

Kromasil AmyCoat only[1]

acetonitrile/methanol	0/100 to 15/85 85/15 to 100/0
acetonitrile/2-propanol	100/0 to 0/100
ethanol/MTBE	100/0 to 70/30

Kromasil CelluCoat only[1]

acetonitrile/methanol	85/15 to 100/0
ethanol/MTBE	100/0 to 50/50

Kromasil AmyCoat RP and CelluCoat RP

Aqueous solution	Organic modifiers	Organic part[1]	Temperature
acetic acid, 0.1%[1]	*For all listed aqueous solutions:* acetonitrile[3], methanol[3], ethanol, 2-propanol	10-100 %	5-40°C
potassium phosphate buffer 0-0.5 M, pH 2.0-8.0 (i.e. 50 mM at pH 2.0, 20 mM at pH 8.0)		10-85 %	pH < 7: 5-40°C pH > 7: 5-25°C
phosphoric acid, aq. sol. at pH 2.0		*as above*	*as above*
sodium hexafluorophosphate aq. sol. (i.e. 100 mM at pH 2.0, 50 mM at pH 5.0)		*as above*	*as above*
sodium borate buffer 0-0.2 M, pH 7.5-9.0 (i.e. 20 mM at pH 9.0)		*as above*	5-25°C
water		10-100 %	5-40°C

Availability

Please check the tables with part numbers in the availability part of this guide.

Ordering Kromasil Chiral products

Contact info

Head office

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Separation Products
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T +86 21 2220 5729 (direct)
F +86 21 2220 5558

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F +1 845 277 1406

e-mail: kromasil@nouryon.com
web: www.kromasil.com

Find a distributor:

www.kromasil.com/distributor_network

Kromasil Chiral, bulk media

Family	Phase	Particle size, [µm] 3	5	10	16
Chiral	AmyCoat	●	●	C10ACblk	C25ACblk
Chiral	AmyCoat RP	●	●		
Chiral	CelluCoat	●	●	C10CCblk	C25CCblk
Chiral	CelluCoat RP	●	●		

● : analytical product, only available in slurry-packed columns

Kromasil Chiral, 4.6 mm i.d. columns

Family	Phase	particle size [µm]	column size, i.d. × length [mm] 4.6 × 50	4.6 × 150	4.6 × 250
Chiral	AmyCoat	3	C03ACA05	C03ACA15	
Chiral	AmyCoat	5	C05ACA05	C05ACA15	C05ACA25
Chiral	AmyCoat	10	C10ACA05	C10ACA15	C10ACA25
Chiral	AmyCoat	25	C25ACA05	C25ACA15	C25ACA25
Chiral	AmyCoat RP	3	C03ARA05	C03ARA15	
Chiral	AmyCoat RP	5	C05ARA05	C05ARA15	C05ARA25
Chiral	AmyCoat RP	10	C10ARA05	C10ARA15	C10ARA25
Chiral	AmyCoat RP	25	C25ARA05	C25ARA15	C25ARA25
Chiral	CelluCoat	3	C03CCA05	C03CCA15	
Chiral	CelluCoat	5	C05CCA05	C05CCA15	C05CCA25
Chiral	CelluCoat	10	C10CCA05	C10CCA15	C10CCA25
Chiral	CelluCoat	25	C25CCA05	C25CCA15	C25CCA25
Chiral	CelluCoat RP	3	C03CRA05	C03CRA15	
Chiral	CelluCoat RP	5	C05CRA05	C05CRA15	C05CRA25
Chiral	CelluCoat RP	10	C10CRA05	C10CRA15	C10CRA25
Chiral	CelluCoat RP	25	C25CRA05	C25CRA15	C25CRA25
Chiral	KIT*	3	C03CKA05		

**: Set of 4 columns with Chiral phases (AmyCoat, AmyCoat RP, CelluCoat and CelluCoat RP) in one box*

Kromasil Chiral, 10 mm i.d. columns

			column size, i.d. × length [mm]
Family	Phase	particle size [µm]	10 × 250
Chiral	AmyCoat	5	C05ACP25
Chiral	AmyCoat	10	C10ACP25
Chiral	AmyCoat	25	C25ACP25
Chiral	AmyCoat RP	5	C05ARP25
Chiral	AmyCoat RP	10	C10ARP25
Chiral	AmyCoat RP	25	C25ARP25
Chiral	CelluCoat	5	C05CCP25
Chiral	CelluCoat	10	C10CCP25
Chiral	CelluCoat	25	C25CCP25
Chiral	CelluCoat RP	5	C05CRP25
Chiral	CelluCoat RP	10	C10CRP25
Chiral	CelluCoat RP	25	C25CRP25

Kromasil Chiral, 21.2 mm i.d. columns

			column size, i.d. × length [mm]	
Family	Phase	particle size [µm]	21.2 × 150	21.2 × 250
Chiral	AmyCoat	5	C05ACQ15	C05ACQ25
Chiral	AmyCoat	10	C10ACQ15	C10ACQ25
Chiral	AmyCoat	25	C25ACQ15	C25ACQ25
Chiral	AmyCoat RP	5	C05ARQ15	C05ARQ25
Chiral	AmyCoat RP	10	C10ARQ15	C10ARQ25
Chiral	AmyCoat RP	25	C25ARQ15	C25ARQ25
Chiral	CelluCoat	5	C05CCQ15	C05CCQ25
Chiral	CelluCoat	10	C10CCQ15	C10CCQ25
Chiral	CelluCoat	25	C25CCQ15	C25CCQ25
Chiral	CelluCoat RP	5	C05CRQ15	C05CRQ25
Chiral	CelluCoat RP	10	C10CRQ15	C10CRQ25
Chiral	CelluCoat RP	25	C25CRQ15	C25CRQ25

Kromasil Chiral, 30 mm i.d. columns

Family	Phase	particle size [µm]	column size, i.d. × length [mm] 30 × 250
Chiral	AmyCoat	5	C05ACR25
Chiral	AmyCoat	10	C10ACR25
Chiral	AmyCoat	25	C25ACR25
Chiral	AmyCoat RP	5	C05ARR25
Chiral	AmyCoat RP	10	C10ARR25
Chiral	AmyCoat RP	25	C25ARR25
Chiral	CelluCoat	5	C05CCR25
Chiral	CelluCoat	10	C10CCR25
Chiral	CelluCoat	25	C25CCR25
Chiral	CelluCoat RP	5	C05CRR25
Chiral	CelluCoat RP	10	C10CRR25
Chiral	CelluCoat RP	25	C25CRR25

Kromasil Chiral, 50 mm i.d. columns

Family	Phase	particle size [µm]	column size, i.d. × length [mm] 50 × 250
Chiral	AmyCoat	5	C05ACT25
Chiral	AmyCoat	10	C10ACT25
Chiral	AmyCoat	25	C25ACT25
Chiral	AmyCoat RP	5	C05ART25
Chiral	AmyCoat RP	10	C10ART25
Chiral	AmyCoat RP	25	C25ART25
Chiral	CelluCoat	5	C05CCT25
Chiral	CelluCoat	10	C10CCT25
Chiral	CelluCoat	25	C25CCT25
Chiral	CelluCoat RP	5	C05CRT25
Chiral	CelluCoat RP	10	C10CRT25
Chiral	CelluCoat RP	25	C25CRT25

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