



**COSMOSIL**

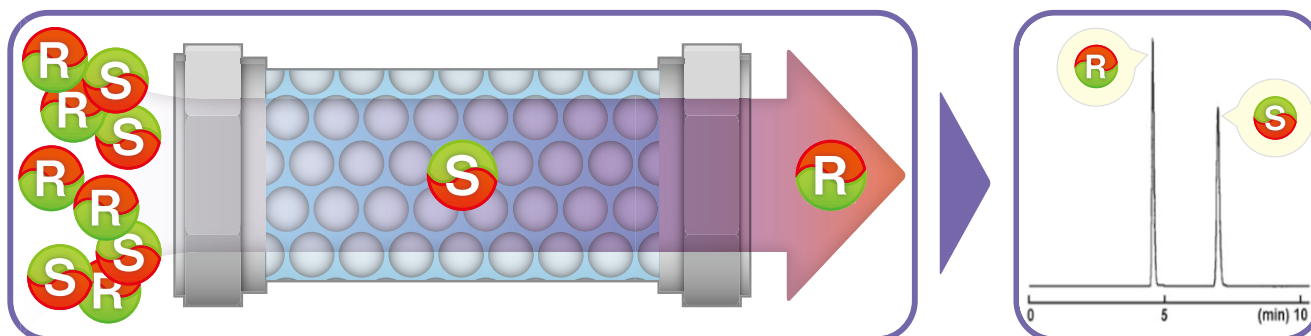
Immobilized Polysaccharide Derivative-Based Chiral Columns

# COSMOSIL CHiRAL Series

- *Immobilized chiral selectors can withstand many different solvents*
- *Sharpen peaks with 3 μm particles*
- *Preparative separations with 5 μm particles*
- *Equivalent performance to columns currently on the market*
- *Competitive price*



## Conceptual Model



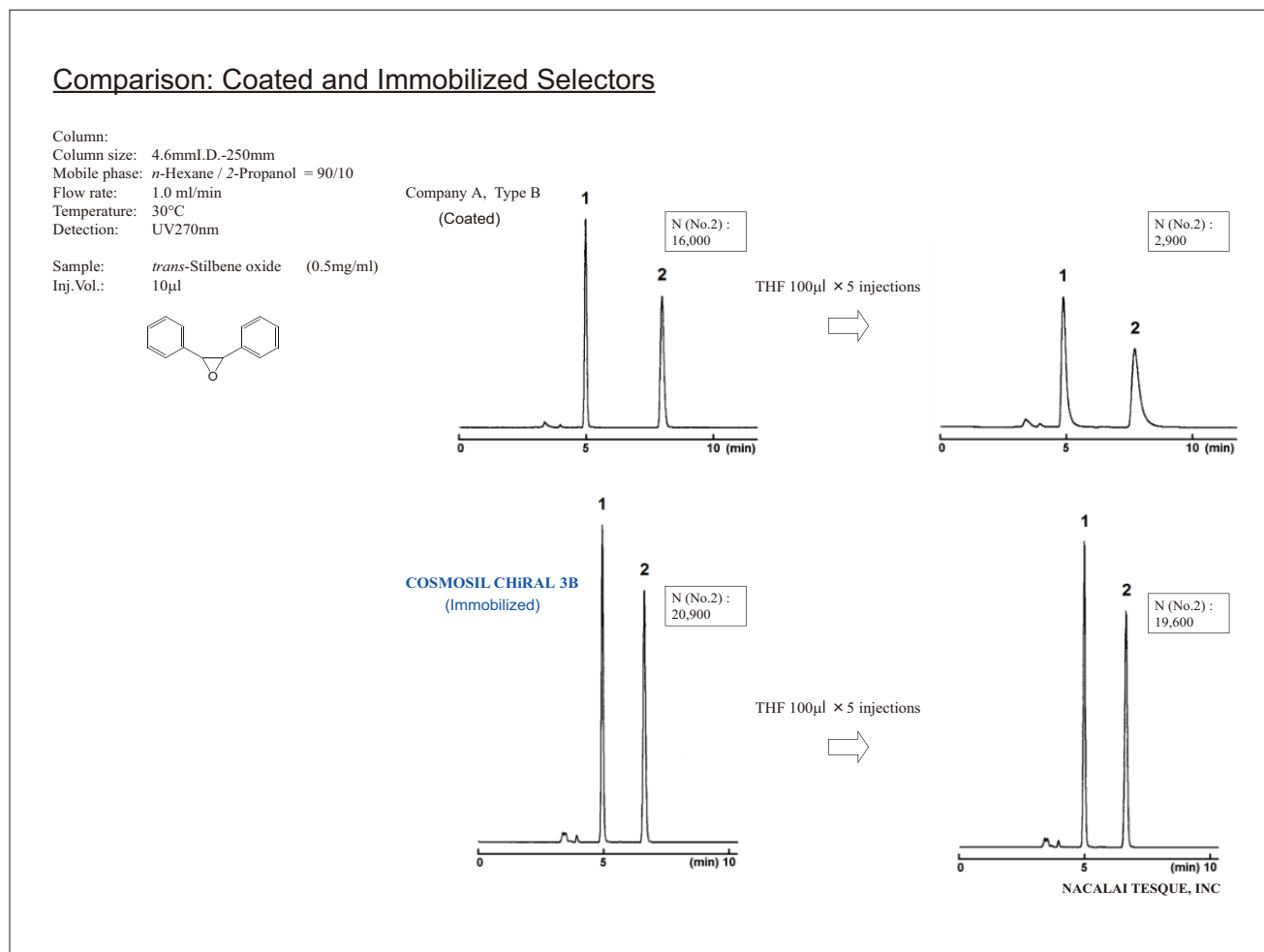
## COSMOSIL CHiRAL Series

Packing Material	COSMOSIL CHiRAL 3A, 5A	COSMOSIL CHiRAL 3B, 5B	COSMOSIL CHiRAL 3C, 5C
USP Code	L99		
Base Material	Silica gel		
Particle Size	3, 5 μm		
Chiral Selector	Amylose tris (3,5-dimethylphenyl carbamate)	Cellulose tris (3,5-dimethylphenyl carbamate)	Cellulose tris (3,5-dichlorophenyl carbamate)
Chiral Selector Type	Immobilized		
Usable pH Range	2-9		

## Immobilized Stationary Phase

### High Resistance to Solvents

The COSMOSIL CHiRAL series uses a chiral selector that is chemically bonded to the silica gel, which results in high resistance to solvents. Tetrahydrofuran (THF) strips coated selectors from the stationary phase, reducing theoretical plates to less than 1/5 in our experiment. However, the same selectors bonded to the silica withstood repeated injections of THF.



### Usable Solvents

Due to its immobilized selectors, various solvents are usable with COSMOSIL CHiRAL. A wide variety of solvents increases your selectivity options.

Solvent	Immobilized		Coated
	Normal phase	Reversed phase	Normal phase
<i>n</i> -Hexane	○*	—	○*
<i>n</i> -Heptane	○	—	○
Methanol	○*	○	○*
Ethanol	○	○	○
2-Propanol (Isopropanol)	○	○	○
Acetonitrile	○*	○	○*
Tetrahydrofuran (THF)	○	○	×
<i>t</i> -Butyl methyl ether	○	—	×
Toluene	○	—	×
Chloroform	○	—	×
Dichloromethane (Methylene chloride)	○	—	×
Ethyl acetate	○	—	×
Water	—	○	—
Aqueous buffer	—	○	—

○ Usable × Unusable

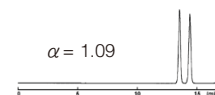
\* Methanol / acetonitrile and *n*-hexane are not miscible with each other, so they should not be mixed for LC.

Elution strength: alcohols, THF >> chloroform > *t*-butyl methyl ether >> alkanes

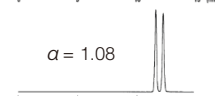
### Selectivity Depends on the Solvent

Column: COSMOSIL CHiRAL 3B, 4.6 mm I.D. x 250 mm  
 Sample: 1-Acenaphthenol

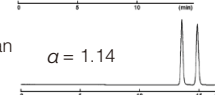
Hexane / Ethanol = 97 / 3



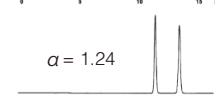
Hexane / 2-Propanol = 95 / 5



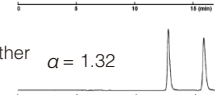
Hexane / Tetrahydrofuran = 90 / 10



Hexane / Chloroform = 65 / 35



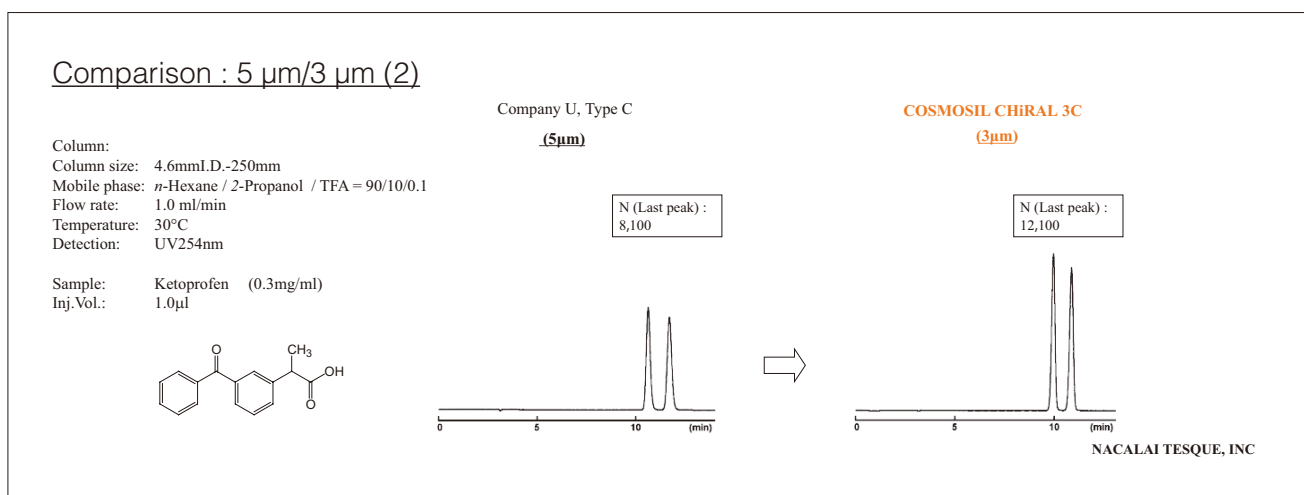
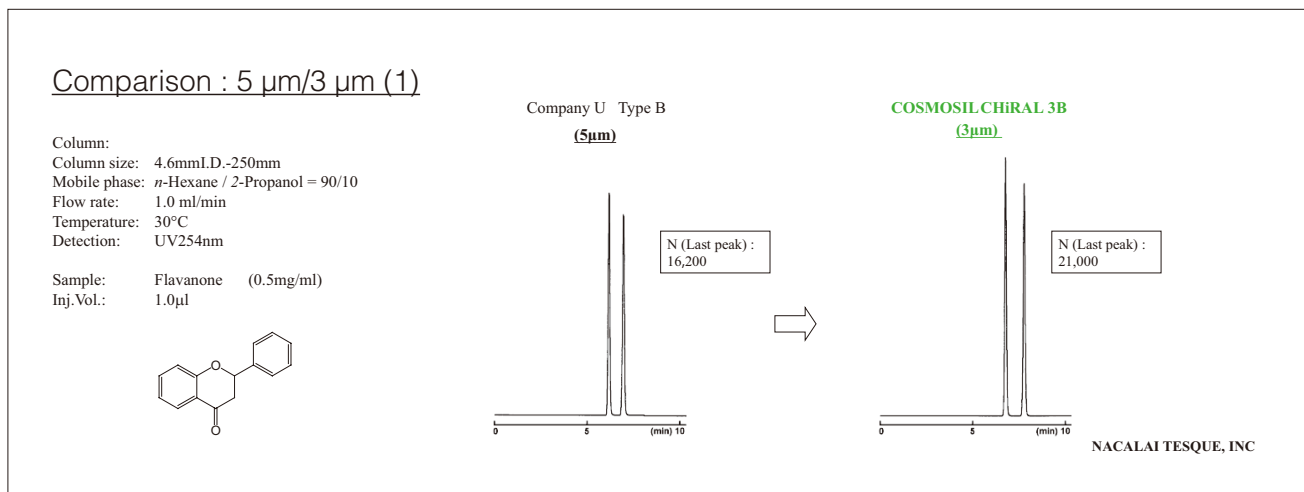
Hexane / *t*-Butylmethylether = 60 / 40



## Available in 3 $\mu\text{m}$ Particles

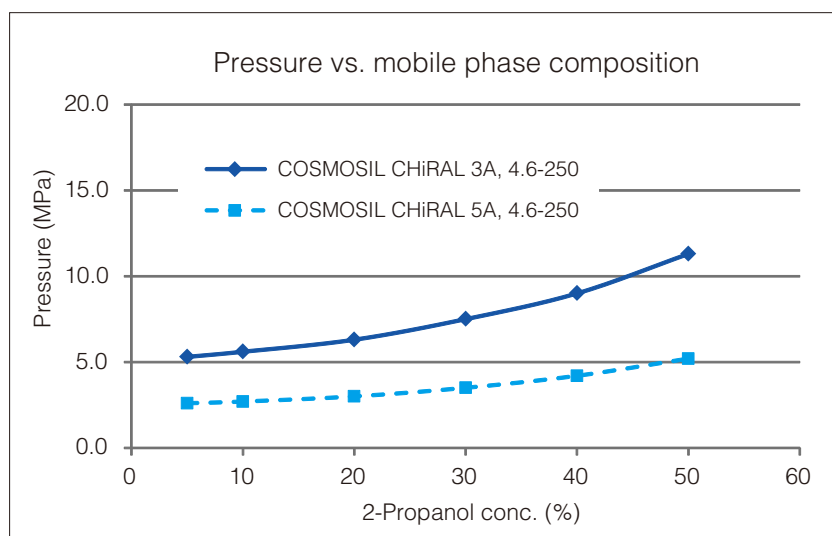
### Sharp Peaks

COSMOSIL CHiRAL columns are available in 3  $\mu\text{m}$  particles, which yield sharper peaks than conventional 5  $\mu\text{m}$  particles. Columns for preparative separations are available with 5  $\mu\text{m}$  particles.



### Moderate Backpressure

The COSMOSIL CHiRAL 3 series (3  $\mu\text{m}$  particles) puts moderately higher pressure on the system compared to conventional 5  $\mu\text{m}$  particles. This improves reproducibility for low-pressure solvents, such as hexane, that may otherwise cause pump irregularities. As shown in the figure below, increased 2-propanol concentration causes higher pressure. However, even at 50% (v/v), the pressure did not exceed 12 MPa. At the lowest concentration of 5% (v/v), the backpressure was 5.3 MPa. This range allows high flexibility in mobile phase composition and selectivity.



#### Conditions

Packing material: COSMOSIL CHiRAL 3A (3 $\mu\text{m}$ )  
 COSMOSIL CHiRAL 5A (5 $\mu\text{m}$ )

Column size: 4.6 mm I.D. x 250 mm

Mobile phase: Hexane / 2-Propanol  
 (ratio as in figure)

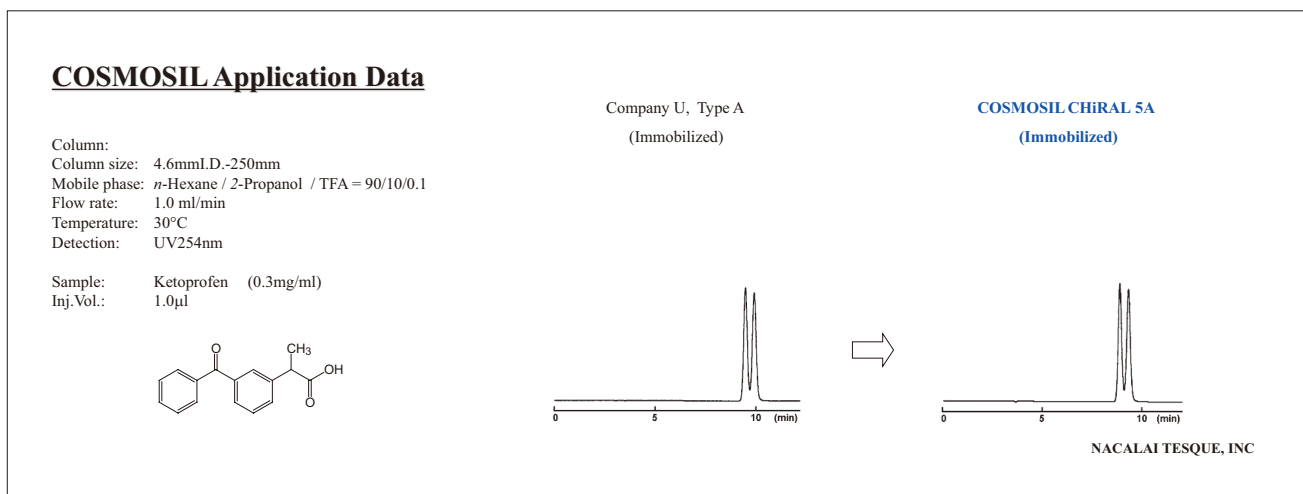
Temperature: 30°C

Flow rate: 1.0 ml/min

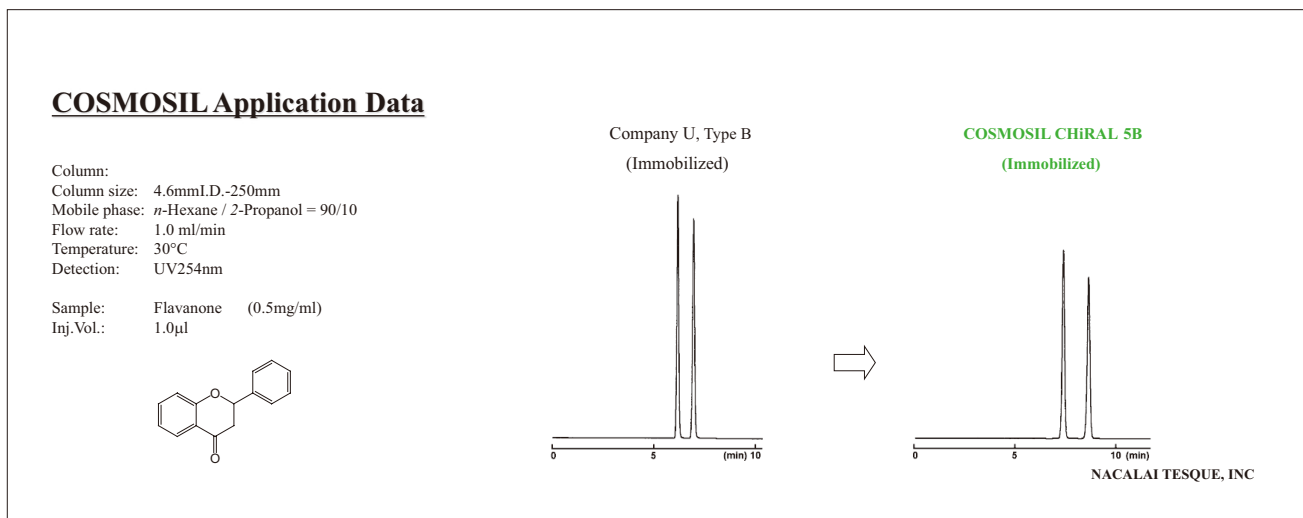
## Equivalent Separation to Competitors' Columns

The COSMOSIL CHiRAL 5 series (5 µm particles) is equivalent to other companies' immobilized polysaccharide derivative-based chiral columns.

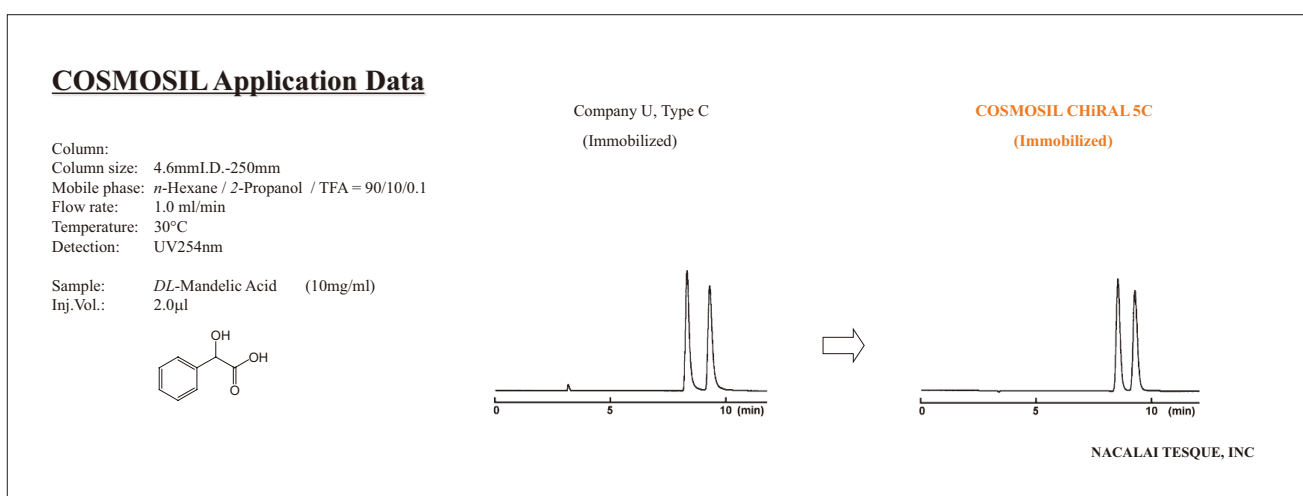
### ■ Chiral selector: Amylose tris (3,5-dimethylphenyl carbamate) [Type A]



### ■ Chiral selector: Cellulose tris (3,5-dimethylphenyl carbamate) [Type B]



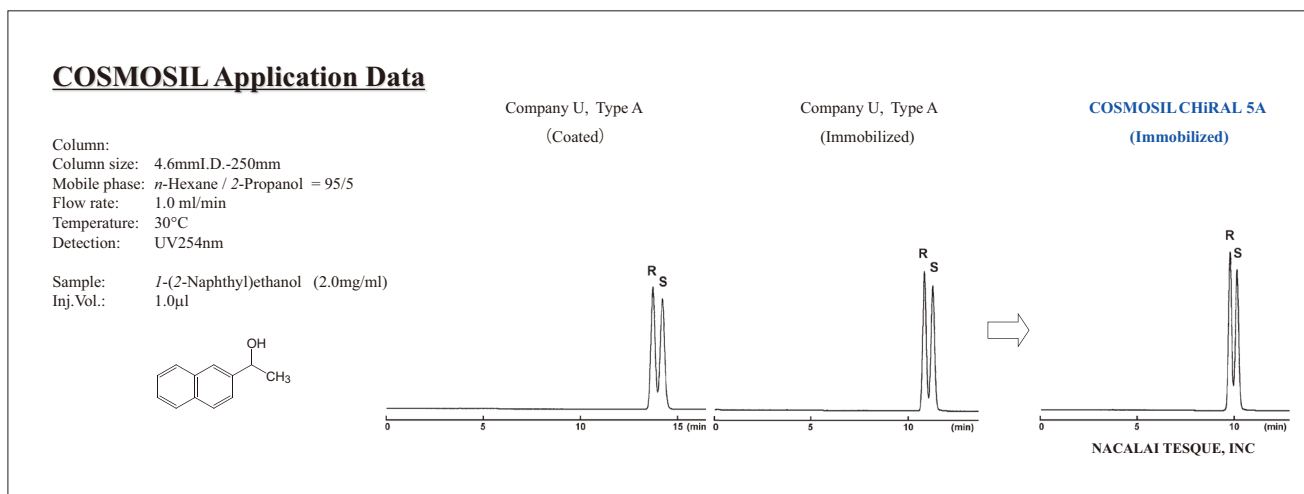
### ■ Chiral selector: Cellulose tris (3,5-dichlorophenyl carbamate) [Type C]



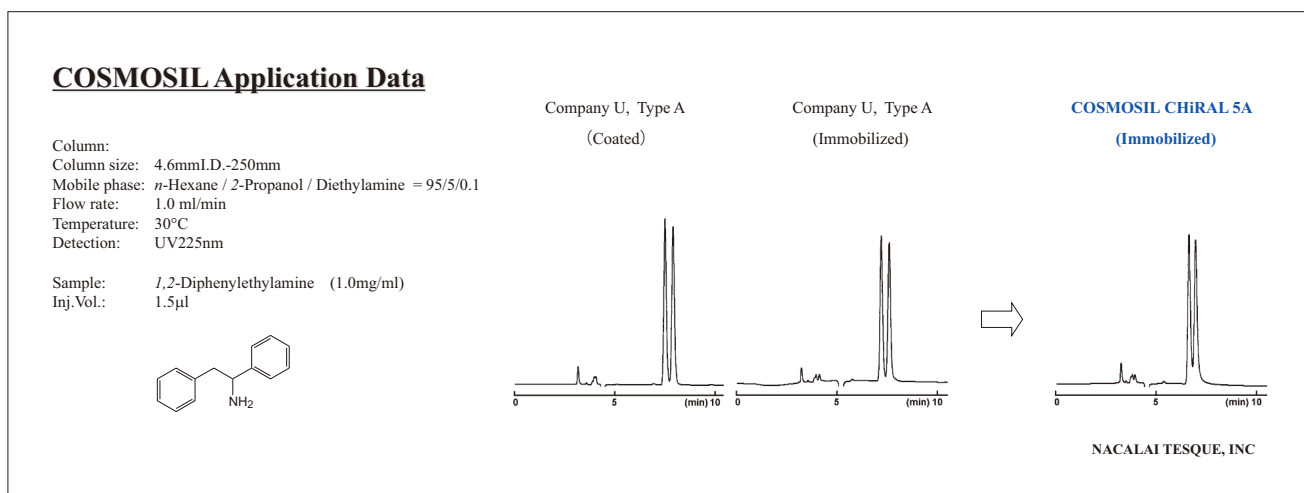
## Same Selectivity with Identical Chiral Selectors

The same chiral selector will yield similar separation patterns. In general, Enantiomers that can be separated on a coated selector can also be separated on an immobilized selector, and those that cannot be separated on one will not be separated on the other.

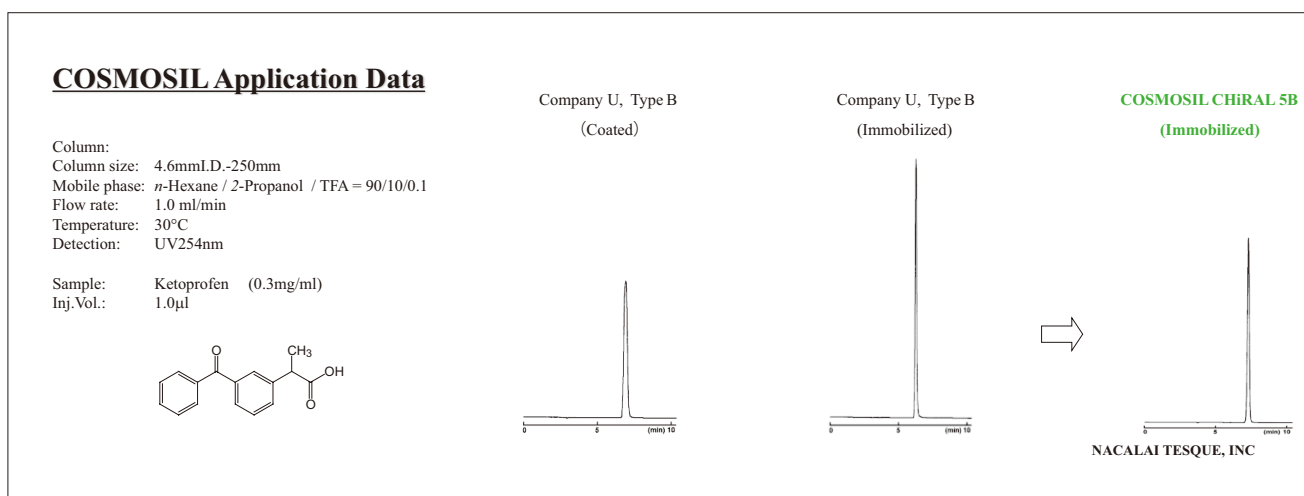
### Chiral selector: Amylose tris (3,5-dimethylphenyl carbamate) [Type A]



### Chiral selector: Amylose tris (3,5-dimethylphenyl carbamate) [Type A]

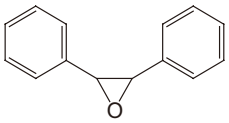

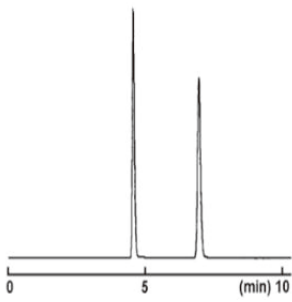
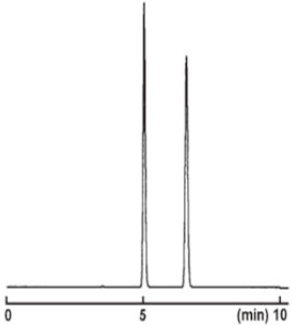
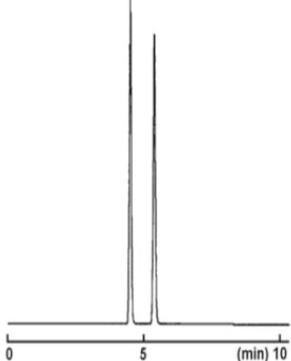
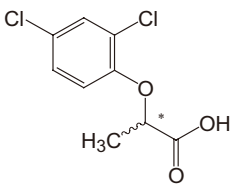

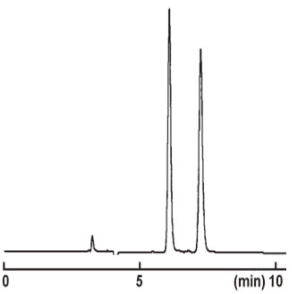

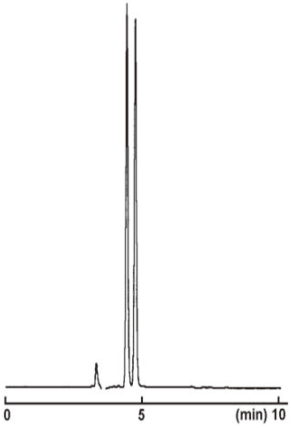
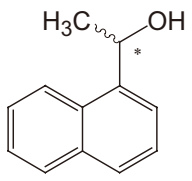
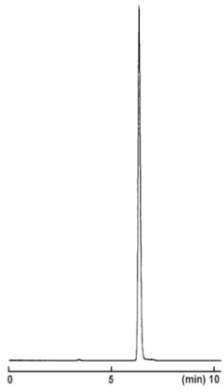

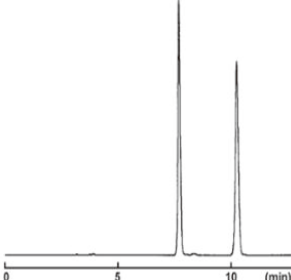
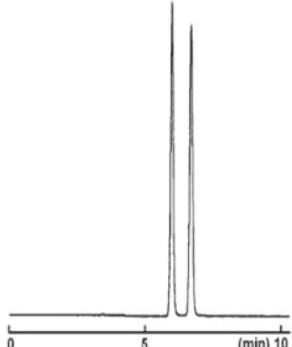
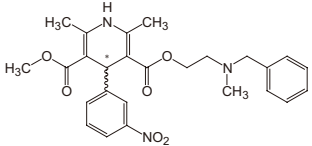
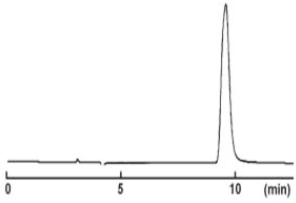
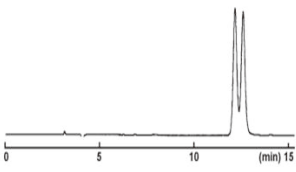

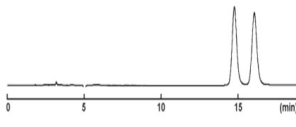


### Chiral selector: Cellulose tris (3,5-dimethylphenyl carbamate) [Type B]



## Column Selection

COSMOSIL CHiRAL offers 3 different chiral selectors that, together, have a high probability of separating your sample. Of 28 samples in our test, 27 pairs of enantiomers were fully separated. For samples that do not separate easily with any column, please adjust the type and concentration of solvents in your mobile phase.

Sample, mobile phase	COSMOSIL CHiRAL A	COSMOSIL CHiRAL B	COSMOSIL CHiRAL C
<p><i>trans</i>-Stillbene oxide</p>  <p>Hexane / 2-Propanol = 90 / 10</p>	<p>Complete Separation </p> 	<p>Complete Separation</p> 	<p>Complete Separation</p> 
<p>2-(2,4-Dichlorophenoxy) propionic acid</p>  <p>Hexane / 2-Propanol / TFA = 95 / 5 / 0.1</p>	<p>Complete Separation </p> 	<p>Complete Separation</p> 	<p>Complete Separation</p> 
<p>1-(1-Naphthyl)ethanol</p>  <p>Hexane / 2-Propanol = 90 / 10</p>		<p>Complete Separation </p> 	<p>Complete Separation</p> 
<p>Nicardipine</p>  <p>Hexane / 2-Propanol / Diethylamine = 90 / 10 / 0.1</p>			<p>Complete Separation </p> 
Chiral selector hit rate*(n = 28)	<b>60.7%</b>	<b>67.9%</b>	<b>71.4%</b>

\* Complete separation (hit) is defined as the two enantiomer peaks having resolution ( $R_s$ ) greater than or equal to 1.5. The best separation for each sample is marked with double rings.

## Application Data

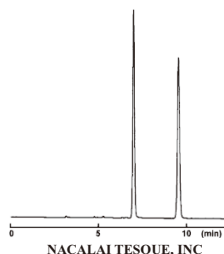
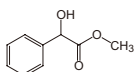
### Neutral Compounds

#### Methyl *DL*-Mandelate

##### COSMOSIL Application Data

Column: COSMOSIL CHiRAL 3B  
Column size: 4.6mmI.D.-250mm  
Mobile phase: *n*-Hexane / 2-Propanol = 90/10  
Flow rate: 1.0 ml/min  
Temperature: 30°C  
Detection: UV220nm

Sample: Methyl *DL*-Mandelate (1.0mg/ml)  
Inj.Vol.: 0.75µl



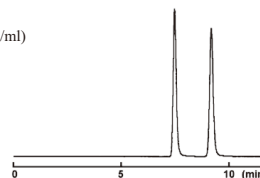
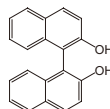
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#### 1,1'-Bi-2-naphthol

##### COSMOSIL Application Data

Column: COSMOSIL CHiRAL 3C  
Column size: 4.6mmI.D.-250mm  
Mobile phase: *n*-Hexane / 2-Propanol = 90/10  
Flow rate: 1.0 ml/min  
Temperature: 30°C  
Detection: UV335nm

Sample: 1,1'-Bi-2-naphthol (0.5mg/ml)  
Inj.Vol.: 1.5µl



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### Acidic Compounds

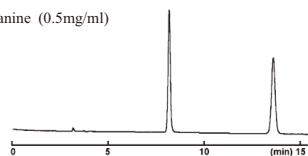
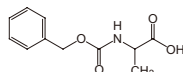
To prevent tailing and lack of detection, add an appropriate acid to the mobile phase (about 0.1%).

#### *N*-Carbobenzoxy-*DL*-alanine

##### COSMOSIL Application Data

Column: COSMOSIL CHiRAL 3B  
Column size: 4.6mmI.D.-250mm  
Mobile phase: *n*-Hexane / 2-Propanol / TFA = 90/10/0.1  
Flow rate: 1.0 ml/min  
Temperature: 30°C  
Detection: UV210nm

Sample: *N*-Carbobenzoxy-*DL*-alanine (0.5mg/ml)  
Inj.Vol.: 0.75µl



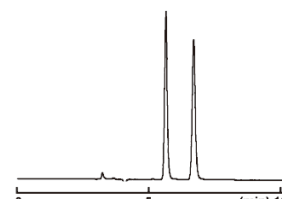
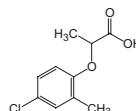
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#### Mecoprop

##### COSMOSIL Application Data

Column: COSMOSIL CHiRAL 3A  
Column size: 4.6mmI.D.-250mm  
Mobile phase: *n*-Hexane / 2-Propanol / TFA = 95/5/0.1  
Flow rate: 1.0 ml/min  
Temperature: 30°C  
Detection: UV230nm

Sample: Mecoprop (0.5mg/ml)  
Inj.Vol.: 0.5µl



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### Basic Compounds

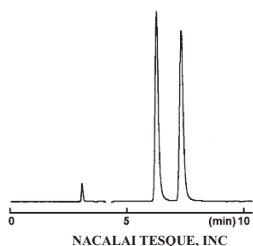
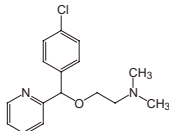
To prevent tailing and lack of detection, add an appropriate base to the mobile phase (about 0.1%).

#### Carbinoxamine

##### COSMOSIL Application Data

Column: COSMOSIL CHiRAL 3A  
Column size: 4.6mmI.D.-250mm  
Mobile phase: *n*-Hexane / 2-Propanol / Diethylamine = 90/10/0.1  
Flow rate: 1.0 ml/min  
Temperature: 30°C  
Detection: UV225nm

Sample: Carbinoxamine (1.0mg/ml)  
Inj.Vol.: 0.5µl



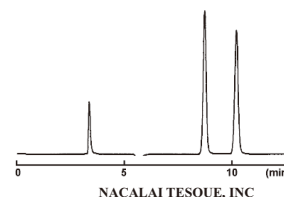
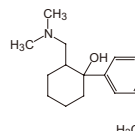
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#### Tramadol

##### COSMOSIL Application Data

Column: COSMOSIL CHiRAL 3C  
Column size: 4.6mmI.D.-250mm  
Mobile phase: *n*-Hexane / 2-Propanol / Diethylamine = 95/5/0.1  
Flow rate: 1.0 ml/min  
Temperature: 30°C  
Detection: UV225nm

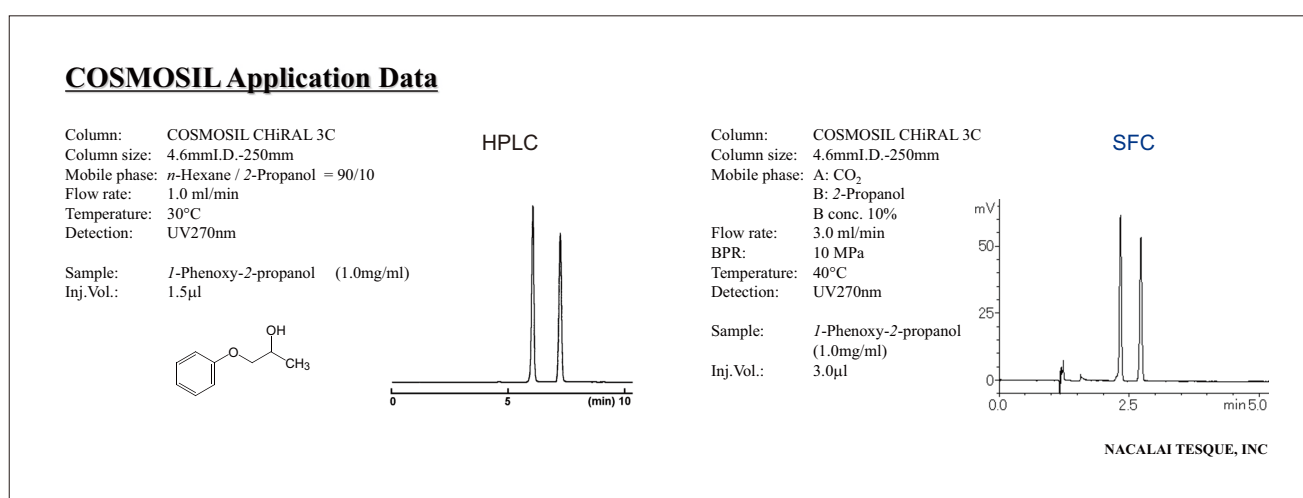
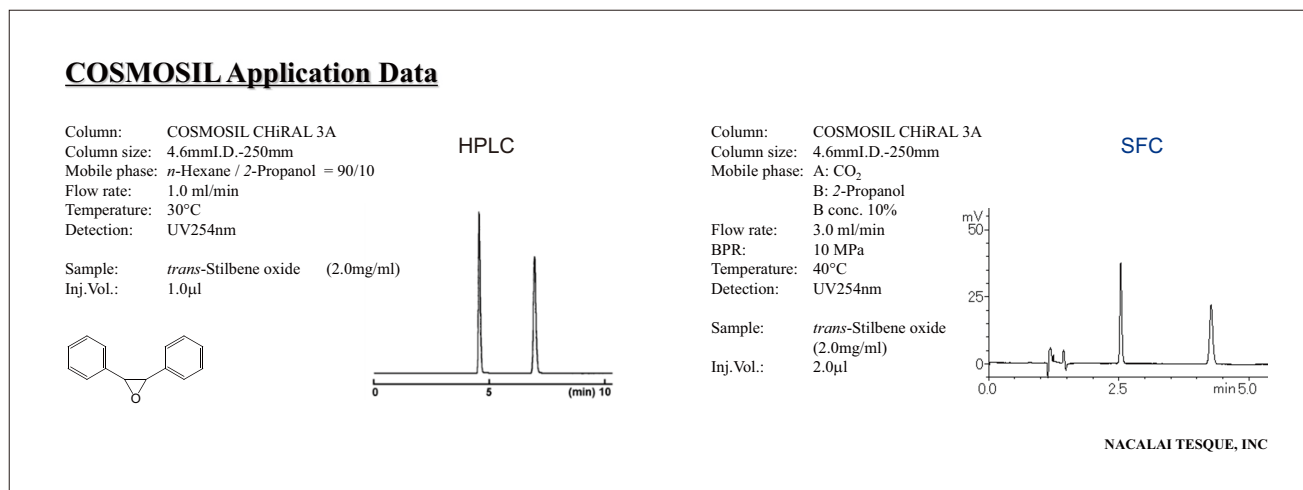
Sample: Tramadol (1.0mg/ml)  
Inj.Vol.: 1.0µl



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## Compatible with SFC

COSMOSIL CHIRAL columns are compatible with SFC and exhibit similar performance compared to HPLC.



## Ordering Information

### COSMOSIL CHIRAL 3 Packed Columns

- Analytical Columns (Particle Size: 3 µm)

Product Name	Column Size I.D. x Length (mm)	Product Number
COSMOSIL CHIRAL 3A	4.6 x 150	15778-51
	4.6 x 250	15779-41
COSMOSIL CHIRAL 3B	4.6 x 150	15783-71
	4.6 x 250	15784-61
COSMOSIL CHIRAL 3C	4.6 x 150	15788-21
	4.6 x 250	15789-11

### COSMOSIL CHIRAL 5 Packed Columns

- Analytical / Preparative Columns (Particle Size: 5 µm)

Product Name	Column Size I.D. x Length (mm)	Product Number
COSMOSIL CHIRAL 5A	4.6 x 250	15780-01
	10.0 x 250	15781-91
	20.0 x 250	15782-81
COSMOSIL CHIRAL 5B	4.6 x 250	15785-51
	10.0 x 250	15786-41
	20.0 x 250	15787-31
COSMOSIL CHIRAL 5C	4.6 x 250	15790-71
	10.0 x 250	15791-61
	20.0 x 250	15792-51

\* For 10 mm and 20 mm I.D. columns, please inquire about delivery time.

For research use only, not intended for diagnostic or drug use.