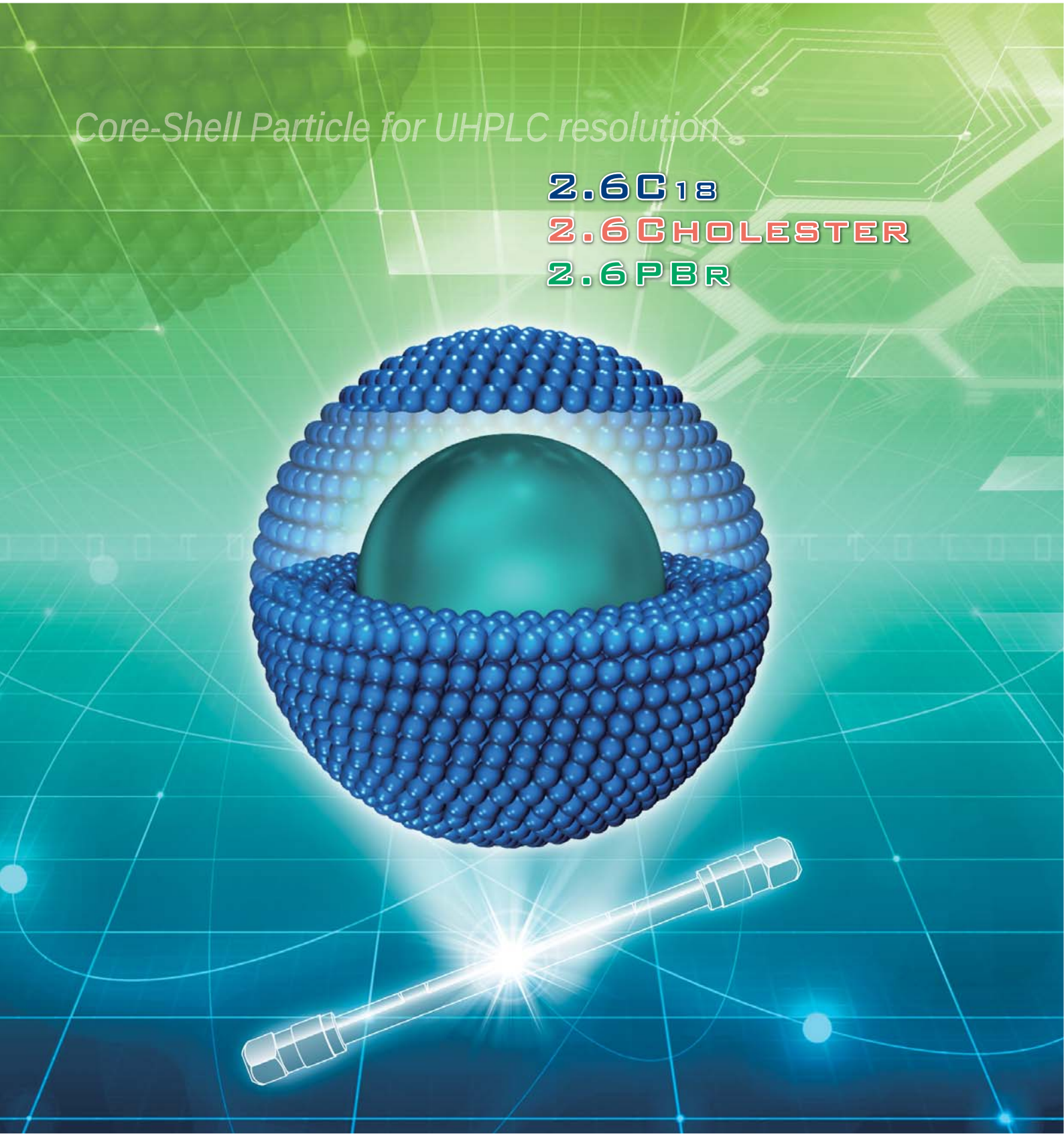
COSMOCORE

COSMOCORE

Core-Shell Particle for UHPLC resolution

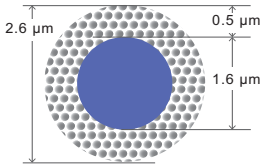
2.6C18
2.6CHOLESTER
2.6PBR



COSMOCORE Series

About Core-Shell Particles

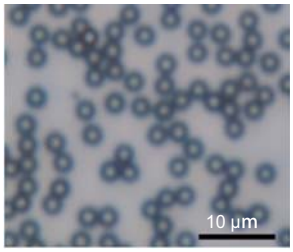
Core-shell particles consist of a nonporous core inside a porous shell. By using these core-shell particles, one can achieve sharper peaks compared to fully porous silica gel particles of the same diameter.



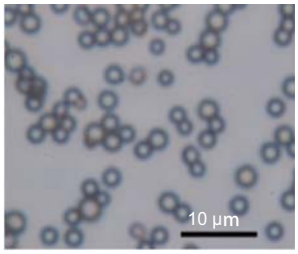
Schematic diagram of a silica particle

Uniform Particle Size Distribution Compared to 1.7 µm Particles

Compared to fully porous particles, core-shell particles have a more uniform particle diameter, therefore core-shell particles can be packed in the column more uniformly to minimize sample diffusion.



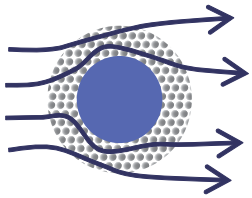
COSMOCORE 2.6C18 (200x)



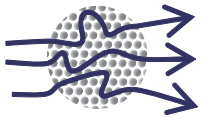
Fully porous 1.7 µm particles (200x)

Mass Transfer Equivalent to Fully Porous sub-2 µm Particles

Mass transfer refers to the time it takes for a sample molecule to enter and leave a particle. In general, lower mass transfer time corresponds to less diffusion and sharper peaks. Even though COSMOCORE 2.6C18 has a larger particle diameter than fully porous sub-2 µm particles, the mass transfer characteristics are similar.



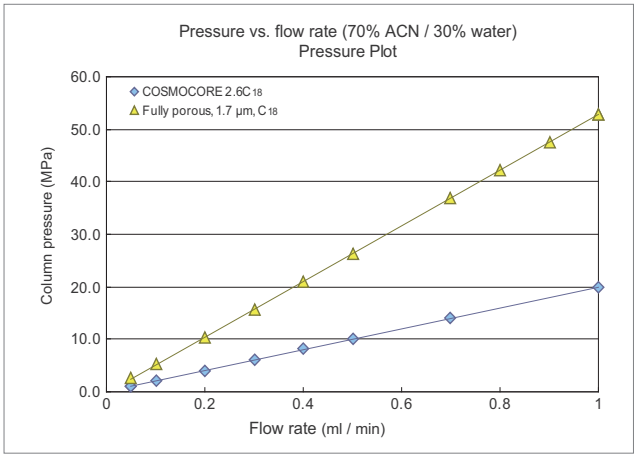
COSMOCORE 2.6C18

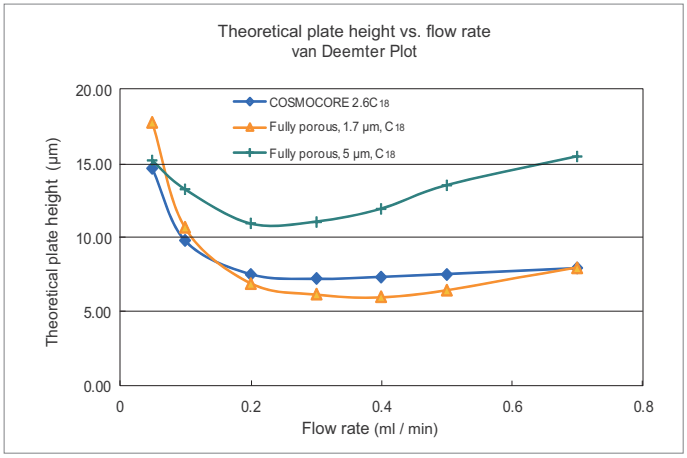


Fully porous sub-2 µm particle

Reduced Back Pressure and Faster Analyses

COSMOCORE 2.6C18 delivers performance equivalent to sub-2 µm particles at faster flow rate and analysis time while maintaining a lower back pressure. COSMOCORE can also be used in longer column size to gain additional resolution.



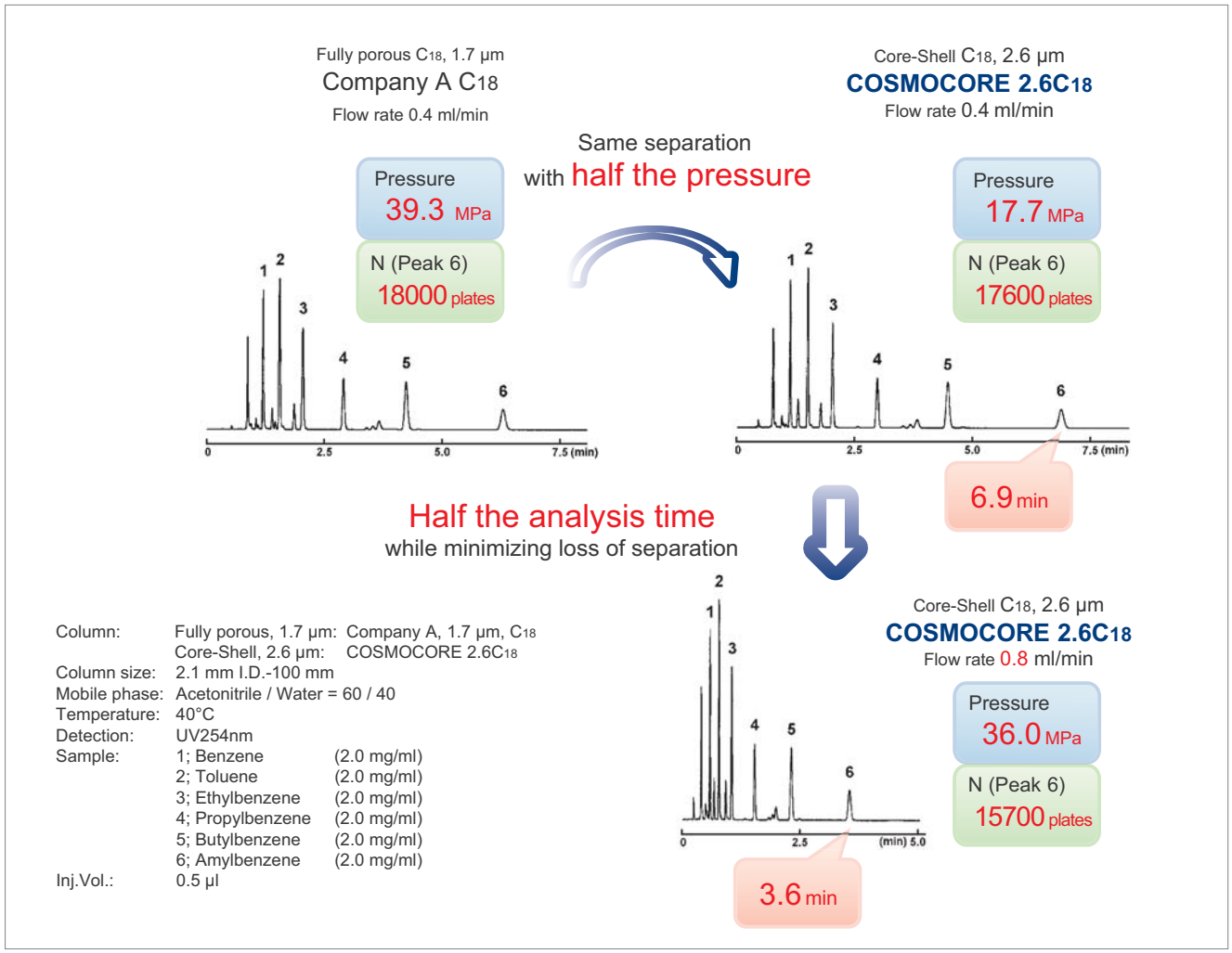


Column size: 2.1 mm I.D. - 50 mm, Mobile phase: Acetonitrile / Water = 70 / 30, Temperature: 40°C, Sample: Amylbenzene

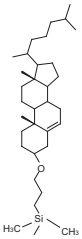
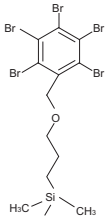
Same performance and lower back pressure compared to sub-2 µm particles

- **Reduced Back Pressure**

COSMOCORE 2.6C18 maintains the same performance as sub-2 µm particles with half the back pressure.



Specifications

	2.6C18	2.6Cholester	2.6PBr
Silica gel	Core-shell type silica		
Average particle size	2.6 µm		
Core average diameter	1.6 µm		
Average pore size	approx. 90 Å		
Specific surface area	approx. 150 m^2/g		
Stationary phase	 Octadecyl group	 Cholesteryl Group	 Pentabromobenzyl Group
Main interaction	Hydrophobic interaction	Hydrophobic interaction Molecular shape selectivity	Hydrophobic interaction Dispersion force
Endcapping treatment	Yes		
Usable pH range	1.5-10	2-7.5	
Maximum puressure	60MPa		
Page	P4	P8	P11

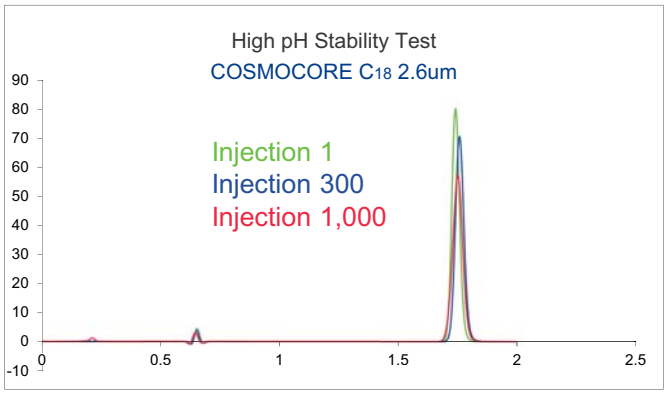
COSMOCORE 2.6C18

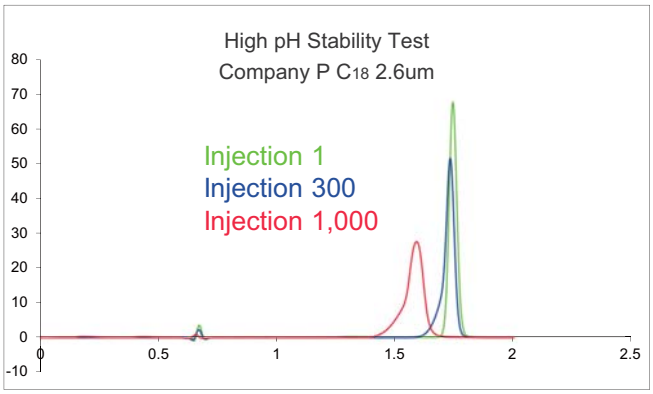
Features

- ***Ultra-high performance LC results with conventional HPLC equipment***
- ***Same number of theoretical plates as sub-2 µm columns with half the back pressure***
- ***Increased loading capacity***
- ***Excellent pH stability (1.5-10)***

Excellent pH Stability

Under accelerated pH 10.4, 40°C stability test, COSMOCORE C18 shows superior stability compared with other core-shell C18 phases.





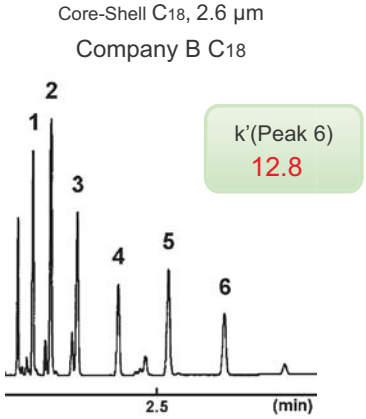
Column size: 2.1 mm x 100 mm, Mobile phase: 0.35% Ammonium hydroxide/ Acetonitrile = 90/10 (pH 10.4), Sample: Caffeine 0.05 mg/ml, Injection volume: 1µl
Flow rate: 0.4 ml/min., Temperature: 40 °C

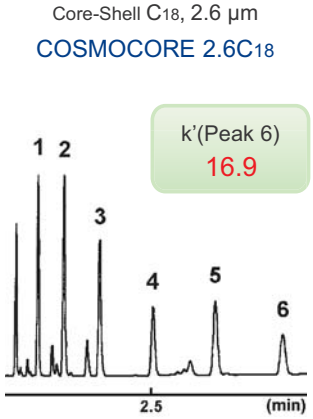
Higher Retention and Loading Capacity than Competitors' Core-Shell Columns

- **Retention**

COSMOCORE 2.6C18 features high retention and better separation compared to other core-shell columns.

Column size:	2.1 mm I.D.-50 mm	
Mobile phase:	A: Acetonitrile / Water = 50 / 50	
	B: Acetonitrile / Water = 70 / 30	
	B conc. 0→100% (0-4 min), 100% (4-5 min)	
Flow rate:	0.4 ml/min	
Temperature:	40°C	
Detection:	UV254nm	
Sample:	1; Benzene	(2.0 mg/ml)
	2; Toluene	(2.0 mg/ml)
	3; Ethylbenzene	(2.0 mg/ml)
	4; Propylbenzene	(2.0 mg/ml)
	5; Butylbenzene	(2.0 mg/ml)
	6; Amylbenzene	(2.0 mg/ml)
Inj.Vol.:	0.5 µl	



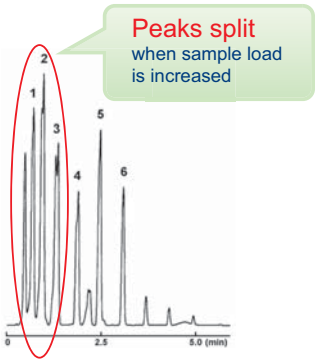


• Higher Loading Capacity

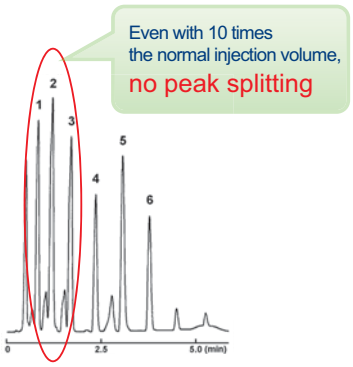
In general, core-shell particles have less surface area and less bonded phase than fully porous particles. COSMOCORE 2.6C18, however, with a large amount of bonded phase, exhibits both high retention and high loading capacity. When injecting 5-10 times more sample volumes in trace component analysis, COSMOCORE minimizes peak splitting due to sample overloading.

Column size: 2.1 mm I.D.-50 mm
Mobile phase: A: Acetonitrile / Water = 50 / 50
B: Acetonitrile / Water = 80 / 20
B conc. 0→100% (0 - 4 min), 100% (4 - 5 min)
Flow rate: 0.4 ml/min
Temperature: 40°C
Detection: UV254nm
Sample: 1; Benzene (2.0 mg/ml)
2; Toluene (2.0 mg/ml)
3; Ethylbenzene (2.0 mg/ml)
4; Propylbenzene (2.0 mg/ml)
5; Butylbenzene (2.0 mg/ml
6; Amylbenzene (2.0 mg/ml)
Inj.Vol.: 5 µl

Core-Shell C18, 2.6 µm
Company B C18



Core-Shell C18, 2.6 µm
COSMOCORE 2.6C18



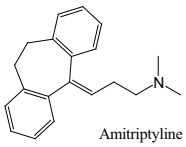
Sharp Peaks with Many Types of Compounds

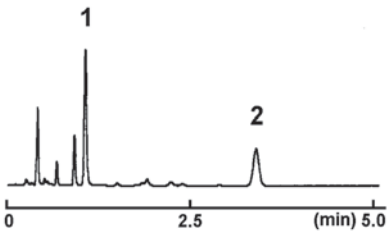
COSMOCORE 2.6C18 features a special end capping treatment that effectively shields residual silanol groups, yielding sharp peaks for basic compounds and metal coordination complexes.

Basic Compounds

• Amitriptyline

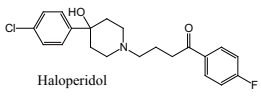
Column size: 2.1 mm I.D.- 50 mm
Mobile phase: Acetonitrile / 20mmol/l Phosphoric Buffer(pH7.0) = 60 / 40
Temperature: 40ºC
Flow rate: 0.4 ml/min
Detection: UV254nm
Sample: 1; Amitriptyline (0.2 mg/ml)
2; Amylbenzene I.S. (2.0 mg/ml)
Inj.Vol.: 0.5 µl

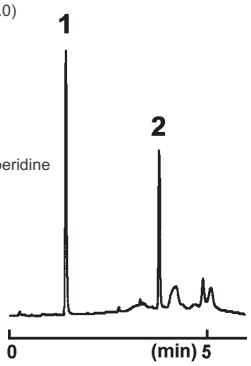




• Haloperidol

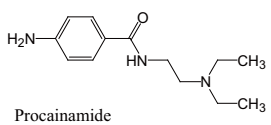
Column size: 2.1 mm I.D. - 50 mm
Mobile phase: A; Acetonitrile/ 20mmol/l Phosphate buffer(pH7.0) = 10/90
B; Acetonitrile/ 20mmol/l Phosphate buffer(pH7.0) = 50/50
B conc. 0→100%(0→3min), 100%(3-5min)
Flow rate: 0.4 ml/min
Temperature: 40ºC
Detection: UV220nm
Sample: 1; 4-(4-Chlorophenyl)-4-hydroxypiperidine (0.1 mg/ml)
2; Haloperidol (0.1 mg/ml)
Inj. Vol: 0.5 µl

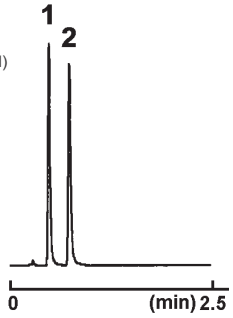




• Procainamide

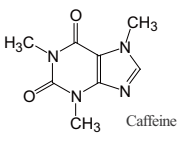
Column size: 2.1 mm I.D. - 50 mm
Mobile phase: Acetonitrile/ 20mmol/l Phosphate buffer(pH7.0) = 10/90
Flow rate: 0.4 ml/min
Temperature: 40ºC
Detection: UV270nm
Sample: 1; Procainamide (0.05 mg/ml)
2; N-Acetylprocainamide (0.05 mg/ml)
Inj. Vol: 0.5 µl

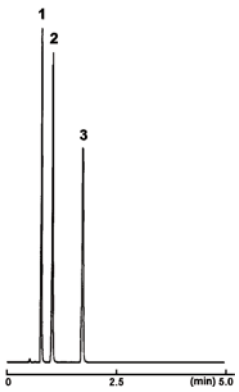




• Caffeine

Column size: 2.1 mm I.D. - 100 mm
Mobile phase: Acetonitrile/ H2O = 10/90
Flow rate: 0.4 ml/min
Temperature: 40ºC
Detection: UV275nm
Sample: 1; Theobromine (0.05 mg/ml)
2; Theophylline (0.05 mg/ml)
3; Caffeine (0.05 mg/ml)
Inj.Vol.: 1.0 µl

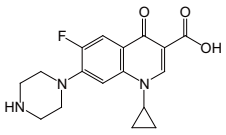




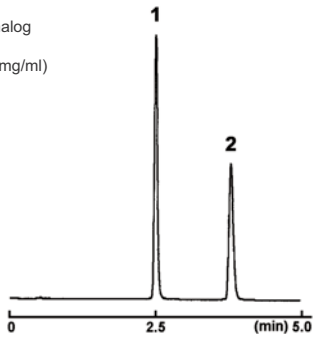
Sharp Peaks with Many Types of Compounds (Continued)

- **Ciprofloxacin**

Column size: 2.1 mm I.D. - 100 mm
Mobile phase: Acetonitrile/20mmol/l Phosphate buffer(pH2.5) = 10/90
Flow rate: 0.4 ml/min
Temperature: 40ºC
Detection: UV278nm
Sample: 1; Ciprofloxacin
Ethylenediamine Analog
(0.05 mg/ml)
2; Ciprofloxacin (0.05 mg/ml)
Inj. Vol: 0.5 µl



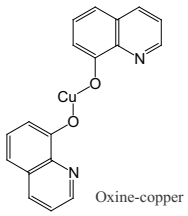
Ciprofloxacin



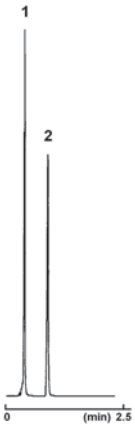
Metal Coordination Complexes

- **Oxine-C opper**

Column size: 2.1 mm I.D.-50 mm
Mobile phase: Acetonitrile / 20mmol/l Phosphoric Acid
= 10 / 90
Temperature: 40°C
Flow rate: 0.4 ml/min
Detection: UV254nm
Sample: 1; Oxine-copper (0.003 mg/ml)
2; Caffeine (I.S.) (0.3 mg/ml)
Inj.Vol.: 0.5 µl



Oxine-copper

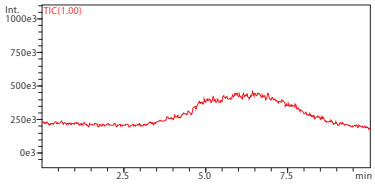


Low Bleed - Suitable for LC-MS

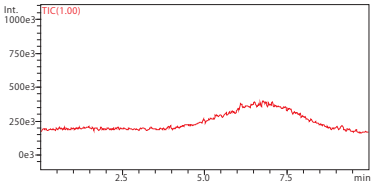
COSMOCORE 2.6C18 has low column bleed and consequently low MS noise level.

Column size: 2.1 mm I.D.-50 mm
Mobile phase: A: 0.1% Formic Acid
B: Acetonitrile
B conc.
5→100% (0 - 5 min), 100% (5 -10 min),
100→5% (10 - 11 min), 5% (11 - 17 min)
Flow rate: 0.2 ml/min
Temperature: 40°C
Detection: MS (TIC (+), MW 50-1000)

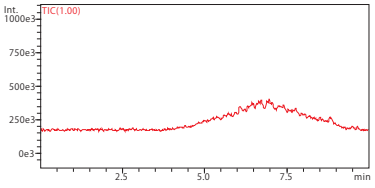
without Column



Core-Shell C18, 2.6 µm
COSMOCORE 2.6C18



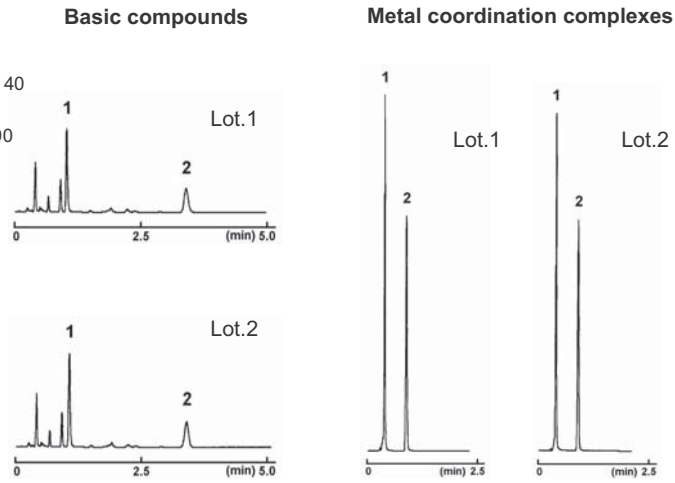
Core-Shell C18, 2.6 µm
Company B C18



Differences between Lots

COSMOCORE 2.6C18 has great lot-to-lot reproducibility.

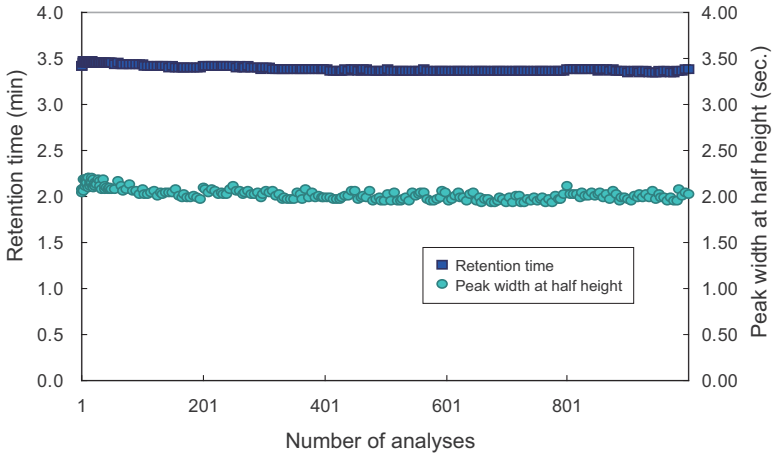
Column: COSMOCORE 2.6C18 (Lot.1 / Lot.2)
Column size: 2.1 mm I.D. - 50 mm
Mobile phase: **Basic compounds**
Acetonitrile / 20mmol/l Phosphate Buffer(pH7.0) = 60 / 40
Metal coordination complexes
Acetonitrile / 20mmol/l Phosphoric Acid = 10 / 90
Flow rate: 0.4 ml/min
Temperature: 40°C
Detection: UV254nm
Sample: **Basic compounds**
1; Amitriptyline (0.2 mg/ml)
2; Amylbenzene (2.0 mg/ml)
Metal coordination complexes
1; Oxine-copper (0.003 mg/ml)
2; Caffeine (0.3 mg/ml)
Inj. Vol.: 0.5 µl



Durability Test

COSMOCORE 2.6C18 exhibits high durability. Even after analyzing amitriptyline 1000 times, there is no significant deterioration in retention or peak shape.

<Durability test: 1000 consecutive analyses>



Test conditions
Column: COSMOCORE 2.6C18
Column size: 2.1 mm I.D. - 50 mm
Mobile phase: A: 0.1% TFA/Water
B: 0.1% TFA/Acetonitrile
B conc.
5→90%(0-3 min), 90→3%(3-3.01 min),
5%(3.01-6 min)
Flow rate: 0.4 ml/min
Temperature: 40°C
Detection: UV236nm
Sample: Amitriptyline (0.2 mg/ml)
Inj. Vol: 1.0 µl

COSMOCORE 2.6Cholester

- ***Cholesterol-bonded reversed-phase core-shell column***
- ***Usable under the same conditions as C_{18} columns***
- ***Better selectivity for cis-trans isomers, polyphenols, and natural products***

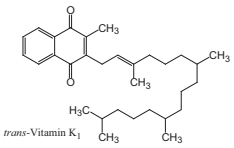
Comparison with C_{18}

COSMOCORE 2.6Cholester offers improved separation for cis-trans isomers than C18 under typical reversed-phase mobile phase.

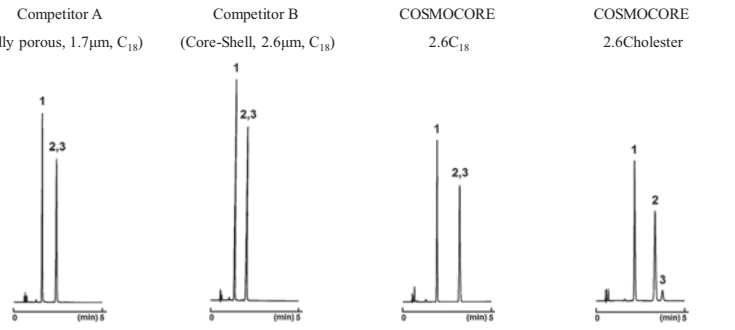
COSMOCORE Application Data

Column:
Column size: 2.1mmI.D.-100mm
Mobile phase: Methanol
Flow rate: 0.4 ml/min
Temperature: 40°C
Detection: UV280nm

Sample: 1; Vitamin K_2 (0.50mg/ml)
2; *trans*-Vitamin K_1 (0.50mg/ml)
3; *cis*-Vitamin K_1
Inj. Vol: 0.5µl



trans-Vitamin K_1



NACALAI TESQUE, INC

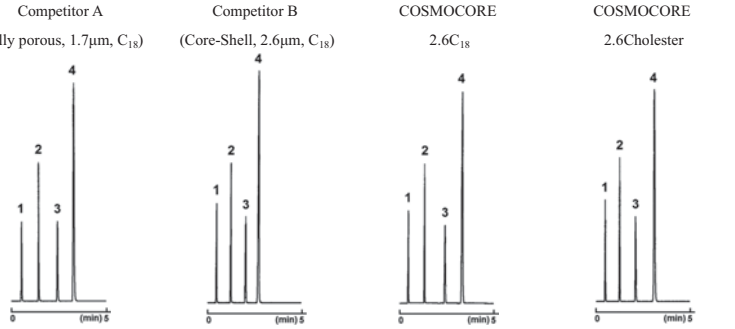
Separation Properties

COSMOCORE 2.6Cholester has about the same hydrophobicity as C_{18}. It is not necessary to change the analytical conditions when replacing C_{18} Columns with COSMOCORE 2.6Cholester.

COSMOCORE Application Data

Column:
Column size: 2.1mmI.D.-100mm
Mobile phase: Acetonitrile/ H_2O = 50/50
Flow rate: 0.4 ml/min
Temperature: 40°C
Detection: UV254nm

Sample: 1; Uracil
2; Methyl Benzoate
3; Toluene
4; Naphthalene
Inj. Vol: 0.25µl



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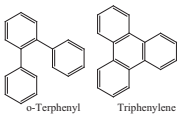
Molecular Shape Selectivity

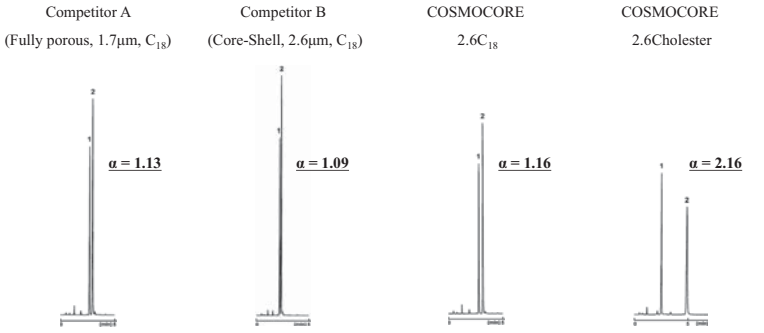
COSMOCORE 2.6Cholester has excellent shape slectivity due to its structural rigidity. COSMOCORE 2.6Cholester retains planar triphenylene longer than non planar o-terphenyl.

COSMOCORE Application Data

Column:
Column size: 2.1mmI.D.-100mm
Mobile phase: Acetonitrile/ H_2O = 70/30
Flow rate: 0.4 ml/min
Temperature: 40°C
Detection: UV254nm

Sample: 1; *o*-Terphenyl (0.25mg/ml)
2; Triphenylene (0.05mg/ml)
Inj. Vol: 0.5µl





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Applications

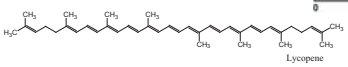
● Separation of Natural Compounds (Tomato components)

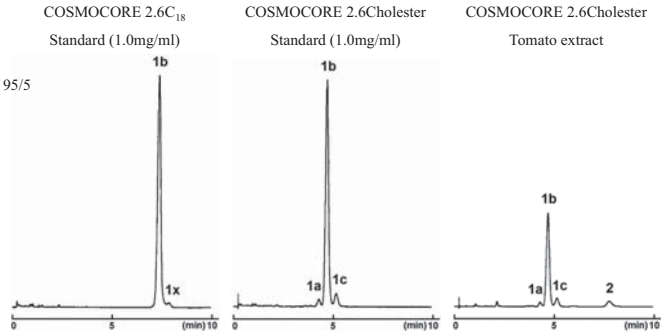
Lycopene exists in many cis-trans isomers. COSMOCORE 2.6Cholester separates these compounds better than C_{18}.

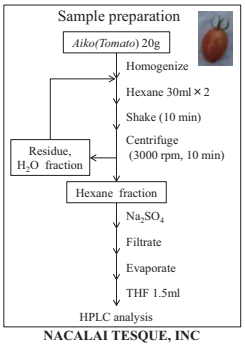
COSMOCORE Application Data

Column:
Column size: 3.0mmI.D.-50mm
Mobile phase: (2.6C_{18}) Acetonitrile/ H_2O = 95/5
(2.6Cholester) Acetonitrile
Flow rate: 1.0 ml/min
Temperature: 40°C
Detection: UV470nm

Sample: 1; Lycopene
2; β-Carotene
Inj. Vol: 0.5µl







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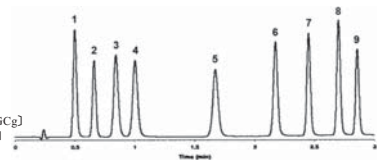
● Separation of Catechin

COSMOCORE Application Data

Column: COSMOCORE 2.6Cholester
Column size: 2.1mmI.D.-50mm
Mobile phase: A; Acetonitrile/ 0.1% H_3PO_4 = 10/90
B; Acetonitrile/ 0.1% H_3PO_4 = 40/60
B conc. 0→100% 3min Linear gradient
Flow rate: 0.6 ml/min
Temperature: 30°C
Detection: UV280nm
Sample:
1; (-)-Gallocatechin[(-)-GC]
2; Caffeine
3; (-)-Epigallocatechin[(-)-EGC]
4; (-)-Catechin[(-)-C]
5; (-)-Epicatechin[(-)-EC]
6; (-)-Epigallocatechin Gallate[(-)-EGCg]
7; (-)-Gallocatechin Gallate[(-)-GCg]
8; (-)-Epicatechin Gallate[(-)-ECg]
9; (-)-Catechin Gallate[(-)-Cg]



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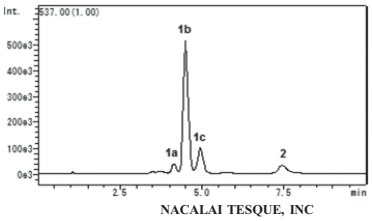
Data courtesy of a customer

● Apply to LC/MS

COSMOCORE Application Data

Column: COSMOCORE 2.6Cholester
Column size: 3.0mmI.D.-50mm
Mobile phase: Acetonitrile
Flow rate: 1.0 ml/min
Temperature: 40°C
Detection: APCI-MS,
Positive, SIM

Sample: Tomato extract
1; Lycopene
2; β-Carotene
Inj. Vol: 0.5µl



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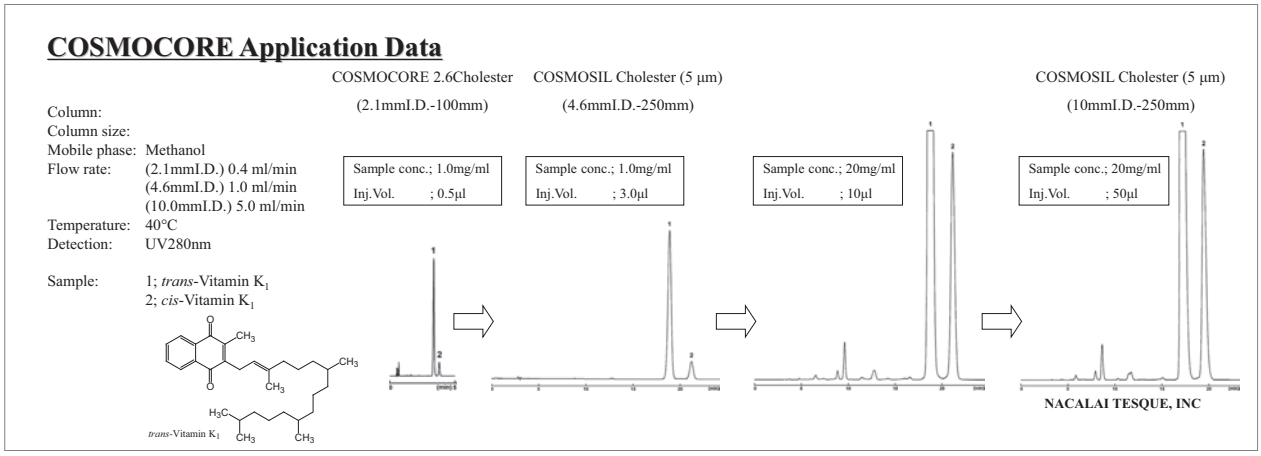
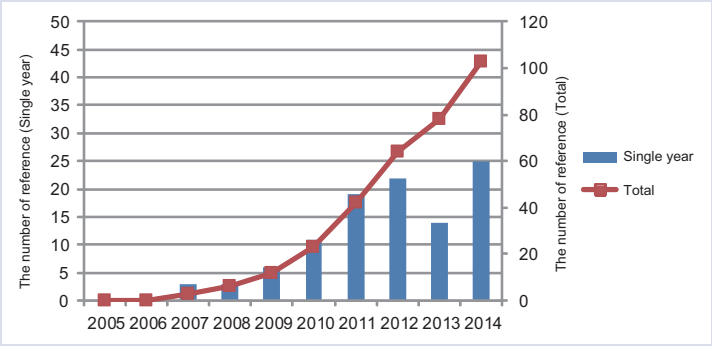
Scaling Up from Analytical to Preparative Separation

COSMOCORE 2.6Cholester has the same functional group as the fully-porous COSMOSIL Cholester 5 µm silica packing material. Therefore, the separation pattern in COSMOCORE 2.6Cholester is maintained when scaling up to preparative separation with 5 µm COSMOSIL Cholester.



References to COSMOSIL Cholesterol-Bonded Stationary Phase

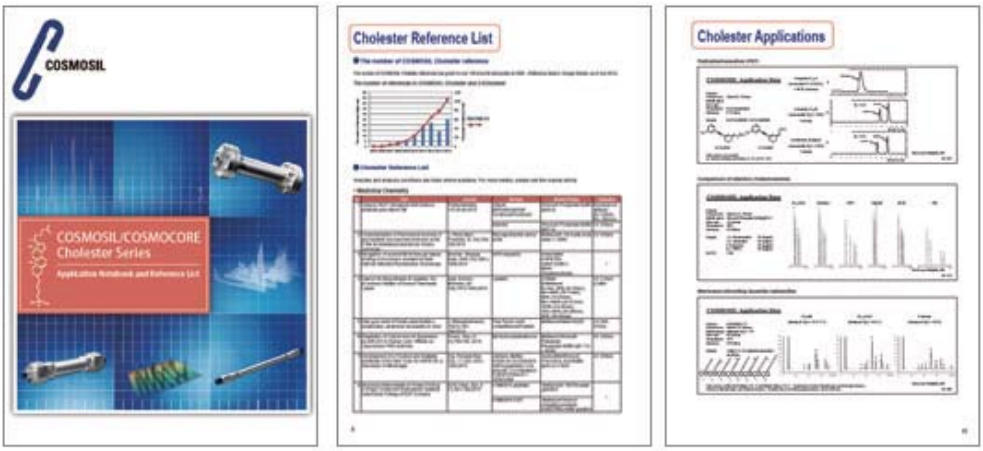


The number of COSMOSIL Cholester references has grown to over 100 since its introduction in 2005.
(Reference Search: Google Scholar, as of July 2014)

Figure 1: The number of references to COSMOSIL Cholester and 2.5Cholester

Cholester Series Application Notebook and Reference List

Cholester is a silica-based reversed-phase column using cholesterol as the bonded phase. It has similar hydrophobicity to C_{18} (ODS) and, with superior stereoselectivity, it is suitable for compounds with similar hydrophobicity but slightly different molecular shape. Designed for ease of use, Cholester can be used under solvent and other analytical conditions identical to ODS.
This application notebook includes over 80 applications and 88 literature references, and it features our fully porous and core-shell packing materials.



COSMOCORE 2.6PBr

- ***Separate hydrophilic compounds under reversed-phase conditions***
- ***Retain hydrophilic compounds longer than C_{18}***
- ***Greater sample loading capacity than HILIC***
- ***High performance similar to sub-2 µm particles with lower back pressure***

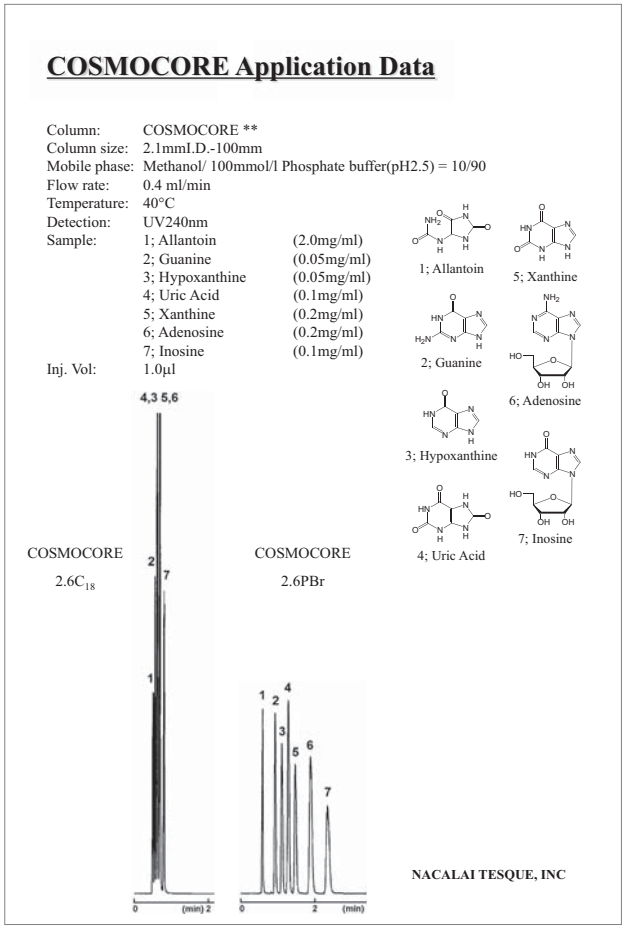
Suitable Samples

- Hydrophilic compounds
- Nucleic acids and derivatives
- Surfactants
- Glycosides
- Peptides

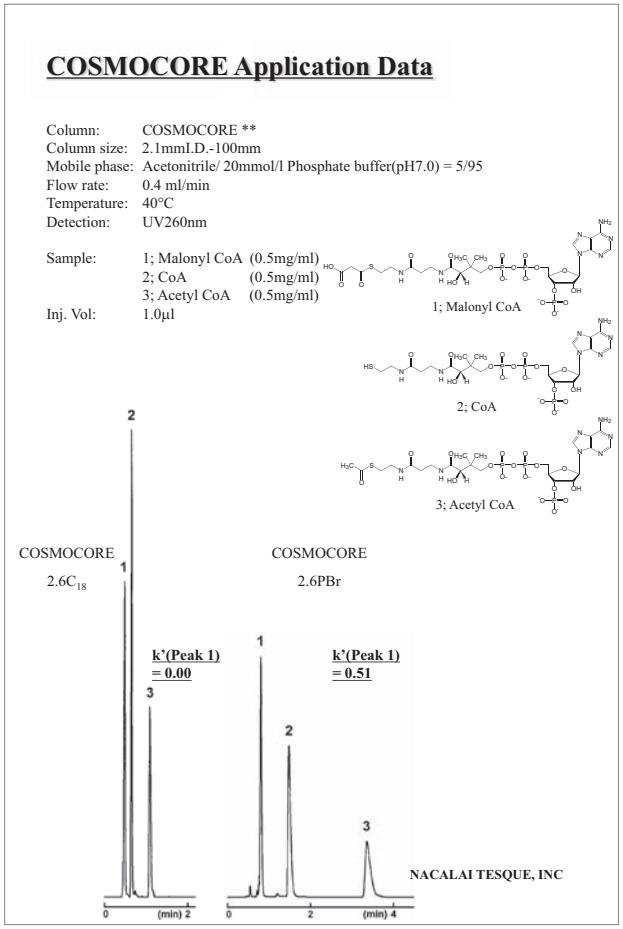
Separation of Hydrophilic Compounds (low retention on C_{18})

COSMOSIL PBr retains hydrophilic compounds stronger than C_{18} columns under the same reversed-phase conditions.

● Nucleic Acid Metabolites



● Malonyl CoA, CoA, Acetyl CoA



Separation of Hydrophilic Compounds (low retention on C_{18}) (continued)

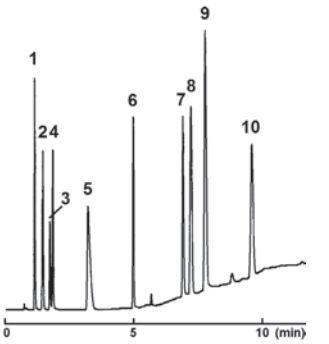
● **Water-Soluble Vitamins**

COSMOCORE Application Data

Column: COSMOCORE 2.6PBr
Column size: 2.1mmI.D.-150mm
Mobile phase: A; 20mmol/l Phosphate buffer(pH2.5)
B; Methanol/ 20mmol/l Phosphate buffer(pH2.5) = 60/40
B conc. 0% (0-1min), 0→80% (1→5min), 80→100% (5→9min)
Flow rate: 0.4 ml/min
Temperature: 40°C
Detection: UV220nm

Sample:				
	1; Vitamin B_1 [Thiamine]	(0.25mg/ml)	6; Vitamin B_5 [Pantothenic Acid]	(2.0mg/ml)
	2; Vitamin C [Ascorbic Acid]	(1.0mg/ml)	7; Vitamin B_9 [Folic Acid]	(0.2mg/ml)
	3; Vitamin B_3 [Nicotinic Acid]	(0.04mg/ml)	8; Vitamin B_7 [Biotin]	(3.0mg/ml)
	4; Vitamin B_3 [Nicotinamide]	(0.06mg/ml)	9; Vitamin B_{12} [Cyanocobalamin]	(0.25mg/ml)
	5; Vitamin B_6 [Pyridoxine]	(0.25mg/ml)	10; Vitamin B_2 [Riboflavin]	(0.2mg/ml)

Inj. Vol: 1.25µl



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Separation of Hydrophilic Compounds (compounds with similar hydrophobicity)

COSMOCORE 2.6PBr can separate compounds with similar hydrophobicity, utilizing several kinds of molecular interactions, including dispersion force generated by the bromine atoms.

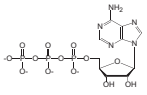
● **ATP, ADP, AMP**

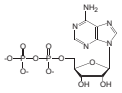
COSMOCORE Application Data

Column: COSMOCORE **
Column size: 2.1mmI.D.-100mm
Mobile phase: 20mmol/l Phosphate buffer(pH7.0)
Flow rate: 0.4 ml/min
Temperature: 40°C
Detection: UV260nm

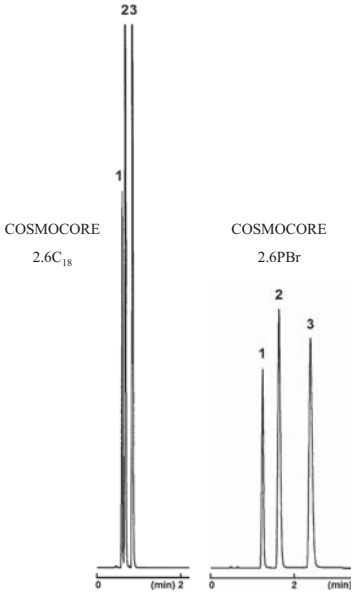
Sample:		
	1; ATP	(0.5mg/ml)
	2; ADP	(0.8mg/ml)
	3; AMP	(0.8mg/ml)

Inj. Vol: 0.5µl


1; ATP


2; ADP


3; AMP



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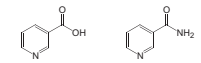
● **Vitamin B3 (Nicotinic Acid, Nicotinamide)**

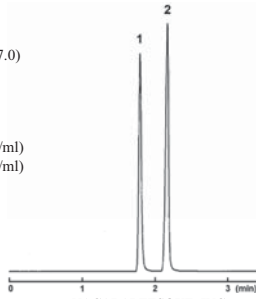
COSMOCORE Application Data

Column: COSMOCORE 2.6PBr
Column size: 2.1mmI.D.-150mm
Mobile phase: 10mmol/l Phosphate buffer(pH7.0)
Flow rate: 0.4 ml/min
Temperature: 40°C
Detection: UV260nm

Sample:		
	1; Nicotinic Acid	(0.4mg/ml)
	2; Nicotinamide	(0.6mg/ml)

Inj. Vol: 0.5µl


1; Nicotinic Acid 2; Nicotinamide



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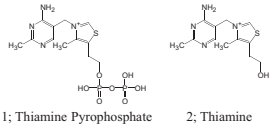
● **Thiamine Pyrophosphate, Thiamine**

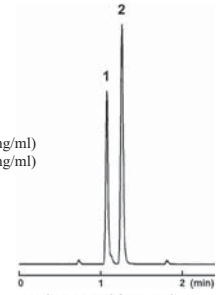
COSMOCORE Application Data

Column: COSMOCORE 2.6PBr
Column size: 2.1mmI.D.-150mm
Mobile phase: 100mmol/l Phosphate buffer(pH2.5)
Flow rate: 0.4 ml/min
Temperature: 40°C
Detection: UV245nm

Sample:		
	1; Thiamine Pyrophosphate	(0.4mg/ml)
	2; Thiamine	(0.4mg/ml)

Inj. Vol: 0.5µl


1; Thiamine Pyrophosphate 2; Thiamine



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Separation of Hydrophilic Compounds (Glycosides)

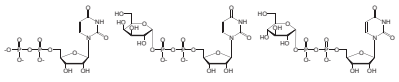
Glycosides with identical aglycones but different glycosyl groups can also be separated.

● **UDP Glycosides**

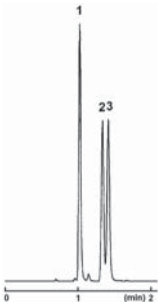
COSMOCORE Application Data

Column: COSMOCORE 2.6PBr
Column size: 2.1mmI.D.-150mm
Mobile phase: 100mmol/l Phosphate buffer(pH7.0)
Flow rate: 0.4 ml/min
Temperature: 40°C
Detection: UV260nm

Sample: 1; UDP (0.8mg/ml)
2; UDP-Galactose (0.8mg/ml)
3; UDP-Glucose (0.8mg/ml)
Inj. Vol: 0.5µl



1; UDP 2; UDP-Galactose 3; UDP-Glucose



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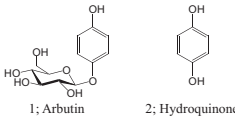
● **Arbutin and Hydroquinone**

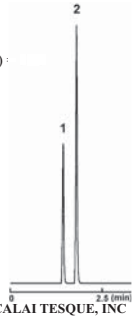
COSMOCORE Application Data

Column: COSMOCORE **
Column size: 2.1mmI.D.-100mm
Mobile phase: Acetonitrile/ 20mmol/l Phosphate buffer(pH2.5)
Flow rate: 0.4 ml/min
Temperature: 40°C
Detection: UV290nm

Sample: 1; Arbutin (1.33mg/ml)
2; Hydroquinone (0.67mg/ml)
Inj. Vol: 0.75µl



1; Arbutin 2; Hydroquinone



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Separation Mechanism

▶ **Dispersion force (instantaneous dipole–induced dipole force)**

London dispersion force is a weak intermolecular force that results from dipoles temporarily induced by random unsymmetrical electron positions in two adjacent atoms, also known as instantaneous dipole–induced dipole force. It is present in all molecules regardless of polarity. Compounds with high polarizability have stronger dispersion force.

▶ **Compounds with stronger dispersion force**

- Larger and heavier molecules
- Molecules with larger and heavier atoms (e.g. from weakest to strongest in halogens, F_2, Cl_2, Br_2, and I_2)
- Molecules with delocalized electrons and resonance (e.g. aromatic compounds)

COSMOSIL PBr column is packed with pentabromobenzyl-bonded silica that enables separation by dispersion force interaction.

Difference between Methanol and Acetonitrile Mobile Phase

Comparison of Separation Ability

Acetonitrile is frequently used in HPLC to reduce backpressure. However, the π electrons in acetonitrile interfere with the dispersion force interaction between the sample and the stationary phase. Therefore, we recommend using methanol as the organic solvent.

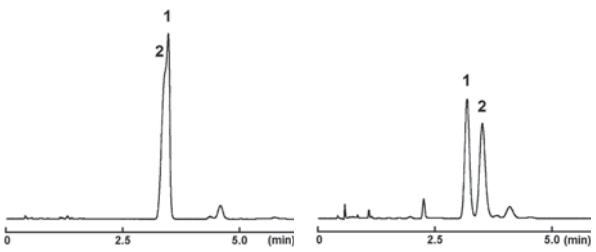
COSMOCORE Application Data

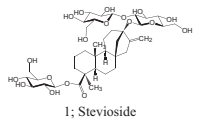
Column: COSMOCORE 2.6PBr
Column size: 2.1mmI.D.-100mm
Mobile phase: **
Flow rate: 0.4 ml/min
Temperature: 40°C
Detection: UV210nm

Sample: 1; Stevioside (5.0mg/ml)
2; Rebaudioside A
Inj. Vol: 1.0µl

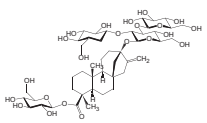
Acetonitrile/ H_2O = 30/70

Methanol/ H_2O = 75/25





1; Stevioside



2; Rebaudioside A

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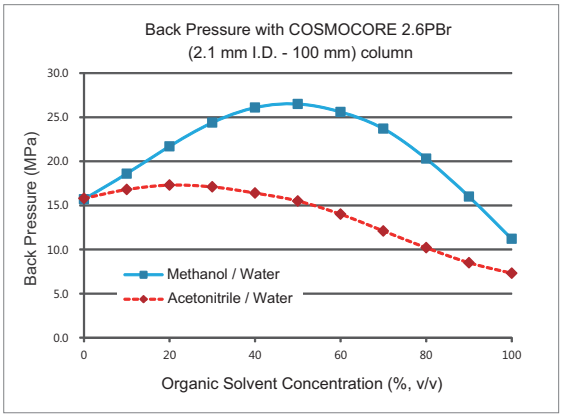
Difference of Methanol and Acetonitrile Mobile Phase (continued)

Comparison of Pressure

In general, methanol/water mobile phases exhibit significantly higher pressure than acetonitrile/water. However, the pressure never exceeded 30 MPa in our test of a 2.1 mm x 100 mm column. Since COSMOCORE 2.6PBr can withstand 60 MPa, methanol-based mobile phases are usable even with UHPLC.



Column： COSMOCORE 2.6PBr（2.1mmI.D.-100mm）
Mobile Phase： See graph
Temperature： 40°C
Flow rate： 0.4 ml/min

Comparison to HILIC

Both columns are suitable for analysis of hydrophilic compounds, but they have different properties.

	PBr	HILIC
Separation Mode	Reversed Phase	Hydrophilic Interaction (HILIC)
Features	• Simple mobile phase conditions compared to HILIC. • Strong eluent: organic (methanol) Weak eluent: water • Low peak distortion with water-based samples; usable with large injection volumes of dilute samples. • Some hydrophilic compounds are not retained well.	• Retains hydrophilic compounds that would not be retained by C_{18} columns. • Strong eluent: water Weak eluent: organic (acetonitrile) • Peak distortion occurs with large volumes of samples dissolved in water.

Instrument Settings and Compatibility

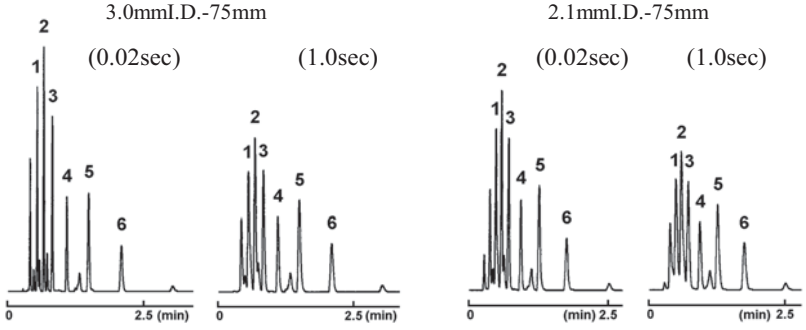
● When Using with a Conventional (non-UHPLC) Instrument

COSMOCORE 2.6C_{18} is designed for use with UHPLC instruments. In addition, due to its low backpressure, it can be used with conventional instruments. However, it is necessary to change the following settings.

1. Detector Response Time

Because UHPLC analyses are done at high flow rates, a slow response time can adversely affect peak shape. We recommend setting the response time to 0.1 sec or less.

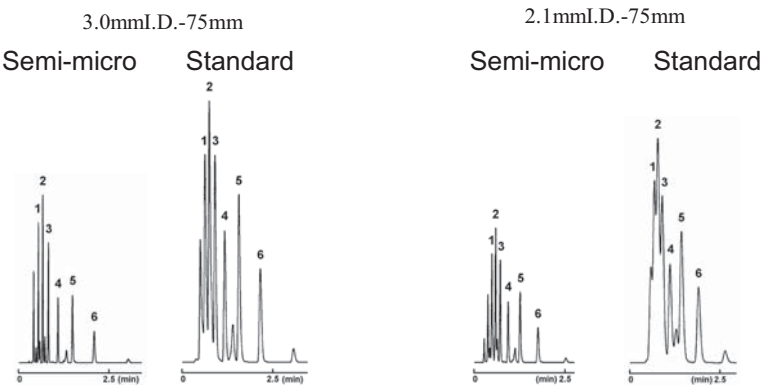
Column:	COSMOCORE 2.6C_{18}	
Column size:		
Mobile phase:	Acetonitrile/ Water = 70 /30	
Flow rate:	3.0mmI.D.-75mm	1.0 ml/min
	2.1mmI.D.-50mm	0.4ml/min
Temperature:	40°C	
	UV254nm	
Sample:	1; Benzene	(2.0mg/ml)
	2; Toluene	(2.0mg/ml)
	3; Ethylbenzene	(2.0mg/ml)
	4; Propylbenzene	(2.0mg/ml)
	5; Butylbenzene	(2.0mg/ml)
	6; Amylbenzene	(2.0mg/ml)
Inj.Vol.:	3.0mmI.D.-75mm	1.0µl
	2.1mmI.D.-50mm	0.5µl



2. Other Instrument Parameters

UHPLC is more vulnerable to the effects of dead volume than conventional chromatography. When using a 2.1 mm I.D. column, please use a semi-micro detector cell, injector, and piping (0.1 mm).

Column:	COSMOCORE 2.6C_{18}	
Column size:		
Mobile phase:	Acetonitrile/ Water = 70/30	
Flow rate:	3.0mmI.D.-75mm	1.0 ml/min
	2.1mmI.D.-50mm	0.4ml/min
Temperature:	40°C	
Detection:	UV254nm	
Sample:	1; Benzene	(2.0mg/ml)
	2; Toluene	(2.0mg/ml)
	3; Ethylbenzene	(2.0mg/ml)
	4; Propylbenzene	(2.0mg/ml)
	5; Butylbenzene	(2.0mg/ml)
	6; Amylbenzene	(2.0mg/ml)
Inj.Vol.:	3.0mmI.D.-75mm	1.0µl
	2.1mmI.D.-50mm	0.5µl



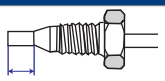
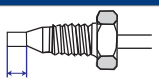
• Fittings and Adapters

COSMOCORE columns use the same connectors as Waters UPLC® (UHPLC) columns. This is different from our conventional COSMOSIL columns, which use the conventional Waters HPLC-compatible connectors. (UPLC® is a registered trademark of Waters Corporation.)

1. Differences between End Fitting

Connection type		Column	
		HPLC (COSMOSIL)	UHPLC (COSMOCORE)
Instrument	HPLC	No adapter required	Adapter required
	UHPLC	Adapter required	No adapter required

HPLC: Conventional Waters-compatible connector
UHPLC: Waters UPLC®-compatible connector

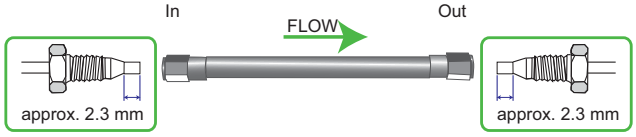
	HPLC	UHPLC
Connector shape	 approx. 3.3 mm	 approx. 2.3 mm

The length of tubing that extends from the ferrule differs from HPLC to UHPLC.

2. COSMOCORE-Compatible Fittings

1) UHPLC Instrument Fittings

No adapter needed; just connect as-is.

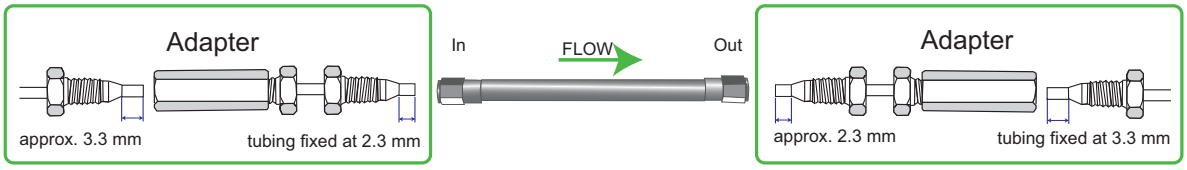


2) HPLC Instrument Fittings

An adapter or movable (high-pressure) fitting is required to connect the fittings to the column. See the examples for different fittings below.

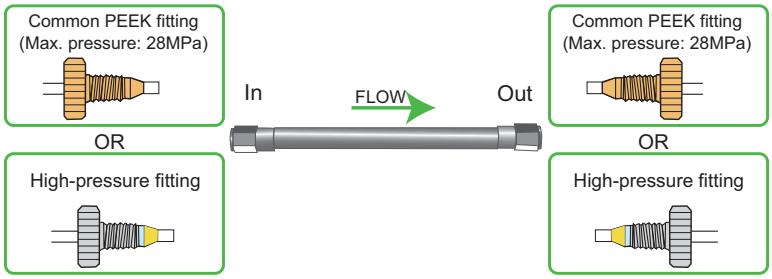
• SUS Ferrules (HPLC) Fixed on the Tubing

The column can be connected by using an adapter (SUS union + tubing fixed to UHPLC length).



• PEEK Fittings

PEEK fittings do not fix the length of tubing at the end, so they can be used with both types of column. However, please be cautious of their pressure tolerance.



ORDERING INFORMATION

COSMOCORE Series

Column Size (mm I.D. x mm)	2.6C18 Product No.	2.6Cholester Product No.	2.6PBr Product No.
2.1 x 30	12632-31	12858-91	13692-21
2.1 x 50	12631-41	12859-81	13693-11
2.1 x 75	12630-51	12860-41	13694-01
2.1 x 100	12614-71	12861-31	13695-91
2.1 x 150	12612-91	12862-21	13697-71
3.0 x 30	12611-01	12863-11	13698-61
3.0 x 50	12609-51	12864-01	13699-51
3.0 x 75	12608-61	12866-81	13700-01
3.0 x 100	12607-71	12867-71	13701-91
3.0 x 150	12602-21	12868-61	13703-71

Column Size (mm I.D. x mm)	2.6C18 Product No.	2.6Cholester Product No.	2.6PBr Product No.
4.6 x 30	12601-31	12869–51	13705-51
4.6 x 50	12600-41	12870–11	13712-51
4.6 x 75	12599-91	12871–01	13714-31
4.6 x 100	12598-01	12872–91	13715-21
4.6 x 150	12597-11	12873–81	13719-81
4.6 x 250	12596-21	12875–61	13734-71

- COSMOCORE`s connector is the same type as Waters UPLC® Columns.
- Other sizes may be available.
- These phases are also available as fully porous particles. For more information, please see *http://www.nacalai.co.jp/URL/?P=TOP*

Adapter List

Name	Description	Product Number	PKG Size
Low & Zero Dead Volume Union	Material: SUS Bore diameter: 0.35 mm	P0402	1 PKG
COSMOSIL Column Connecting Tube (0.1 mm I.D.)	I.D.: 0.1 mm	12570-41	1 PKG
COSMOSIL Column Connecting Tube (0.25 mm I.D.)	I.D.: 0.25 mm	37843-69	1 PKG

UHPLC-Compatible Prefilter

Product Name	In	Out	Contents	Product Number	PKG Size
U-Fil UHPLC-compatible prefilter	UHPLC	UHPLC	Filter: 0.5 µm	12571-31	1 PKG
	HPLC	UHPLC	Tubing connecting diameter: 1/16	12572-21	1 PKG
U-Fil replacement filter	-	-	Filter: 0.5 µm, Material: SUS316L	28150	5 units / Pack

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NACALAI TESQUE, INC.
Nijo Karasuma, Nakagyo-ku, Kyoto 604-0855 JAPAN
TEL : +81-(0)75-251-1730
FAX : +81-(0)75-251-1763
Website : www.nacalai.com
E-mail : info.intl@nacalai.com