

Selectivity of COSMOSIL Packing Materials

Packing Material	3C ₁₈ -EB	C ₁₈ -MS-II	C ₁₈ -AR-II	PAQ	C ₂₂ -AR-II	C ₈ -MS	C ₈ -MS	Cholester	πNAP	PYE	NPE	HILIC	Sugar-D	Protein-R
Silica Gel	High Purity Porous Spherical Silica													
(μm) (μm)	2.5	3	5	15										
Average Pore Size	approx. 120 Å													approx. 300 Å
Specific Surface Area	approx. 300 m ² /g													approx. 150 m ² /g
Bonded Phase	Octadecyl Group	Octadecyl Group	Dococyl Group	Octyl Group	Butyl Group	Cholesteryl Group	Naphthylethyl Group	Pyrenylethyl Group	Nitrophenylethyl Group	Triazole	Secondary/Tertiary Amine	Octadecyl Group		
Bonding Type	Monomeric	Polymeric			Monomeric								Polymeric	
Main Interaction	Hydrophobic Interaction				Hydrophobic Interaction	Hydrophobic Interaction	Hydrophobic Interaction	Hydrophobic Interaction	Hydrophobic Interaction	Hydrophobic Interaction	Hydrophilic Interaction	Hydrophobic Interaction		
End-capping Treatment	Near-perfect Treatment													
Carbon Load	approx. 14.5%	approx. 16%	approx. 11%	approx. 11%	approx. 19%	approx. 10%	approx. 7%	approx. 20%	approx. 11%	approx. 18%	approx. 9%			
Features	Excellent for Basic compounds	Multi-purpose C ₁₈ Column	Strong acid resistance For acid compounds	For hydrophilic compounds Compatible with 100% water based mobile phase				High molecular shape selectivity	Stronger π-π interaction	Strongest π-π interaction	Dipole-dipole interaction	For highly polar analysis Unique anion-exchange mechanism	For accurate analysis High durability	High recovery rate Acid-resistant

COSMOSIL Application Search

- Over 7,000 applications
- Easy to search

COSMOSIL Application Data

Column: COSMOSIL C₁₈-MS-II
 Column size: 3.0mm I.D. x 75mm
 Flow rate: 1.0 ml/min
 Mobile phase: Acetonitrile/H₂O = 70/30
 Pressure: 10.9MPa

Column: COSMOSIL C18-MS-II
 Column size: 3.0mm I.D. x 75mm
 Flow rate: 1.0 ml/min
 Mobile phase: Acetonitrile/ H₂O = 70/30
 Pressure: 10.9MPa

Pressure Unit Conversion Chart

MPa	kgf/cm ²	psi	bar
1	10.197	145.0	10

COSMOSIL Column Size

Particle Size 5 μm, 15 μm	Length (mm)										
	10	20	30	50	75	100	125	150	250	500	
1.0	+	+	+	++	+	++	+	+	+	+	
2.0	+	+	++	++	+	++	+	++	++	+	
3.0	+	+	+	+	+	++	+	++	++	+	
4.6	+	+	++	++	+	++	+	++	++	+	
6.0	+	+	+	+	+	+	+	++	++	+	
8.0	+	+	+	+	+	+	+	+	+	+	
10.0	+	+	+	++	+	+	+	++	++	+	
20.0	+	+	+	++	+	+	+	++	++	+	
28.0	+	+	+	+	+	+	+	+	++	+	
50.0	+	+	+	+	+	+	+	+	++	++	

++ Catalog Listed Size
 + Inquire Price and Lead Time
 In addition to the original column sizes listed above, other sizes may be available.
 Please contact us at info.intl@nacalai.com for more information.

Inner Diameter of Column (scale down and up)

Inner Diameter (mm I.D.)	1.0	2.0	3.0	4.6	10	20	28	50
Flow Rate (ml/min)	0.05	0.2	0.4	1	5	19	37	70
Detector Cell - Injector	for Semi-micro		for Analytical				for Preparative	
Inner Diameter of Pipe (mm)	0.05	0.1	0.2-0.3				1	
Application	LC-MS solvent saving	Solvent saving with standard system	Standard	Preparative (small scale)	Preparative (medium scale)	Preparative (large scale)	Preparative (Super large scale)	
Surface Ratio with 4.6 mm I.D.	0.05	0.19	0.43	1.00	4.73	18.90	37.05	118.15
Particle Size (μm)	2.5, 3 or 5			3 or 5		5		15 or more

Preparation of Mobile Phase

1) Organic Solvent / Aqueous Mixed Mobile Phase

(e.g.) Methanol : Water = 70 : 30 1L

Prepare mobile phase by volume ratio.

- Measure 700 ml of methanol in a measuring cylinder.
- Measure 300 ml of distilled water in a measuring cylinder.
- Mix 1 and 2 thoroughly and degas.

Attention; The better approach is to prepare the mobile phase gravimetrically rather than volumetrically. Following is example of preparation.

Composition table for mobile phase 1L (Methanol : water)

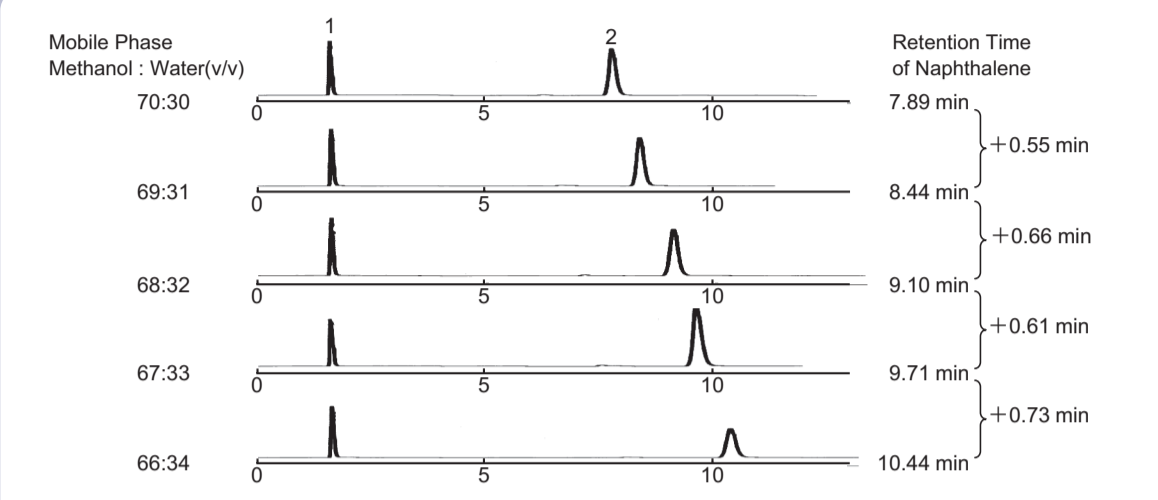
Methanol / Water	Methanol (g)	Distilled Water (g)
90 : 10 (v/v)	711.9	99.8
80 : 20 (v/v)	632.8	199.6
70 : 30 (v/v)	553.7	299.5
60 : 40 (v/v)	474.6	399.3
50 : 50 (v/v)	395.5	499.1
40 : 60 (v/v)	316.4	598.9
30 : 70 (v/v)	237.3	698.7
20 : 80 (v/v)	158.2	798.6
10 : 90 (v/v)	79.1	898.4

Composition table for mobile phase 1L (Acetonitrile : water)

Acetonitrile / Water	Acetonitrile (g)	Distilled Water (g)
90 : 10 (v/v)	707.4	99.8
80 : 20 (v/v)	628.8	199.6
70 : 30 (v/v)	550.2	299.5
60 : 40 (v/v)	471.6	399.3
50 : 50 (v/v)	393	499.1
40 : 60 (v/v)	314.4	598.9
30 : 70 (v/v)	235.8	698.7
20 : 80 (v/v)	157.2	798.6
10 : 90 (v/v)	78.6	898.4

Caution : Methanol and acetonitrile are hazardous substances. Always process in a laboratory hood and wear an eye protection and a mask.

(Reference) Influence of organic solvent composition in mobile phase on the retention time

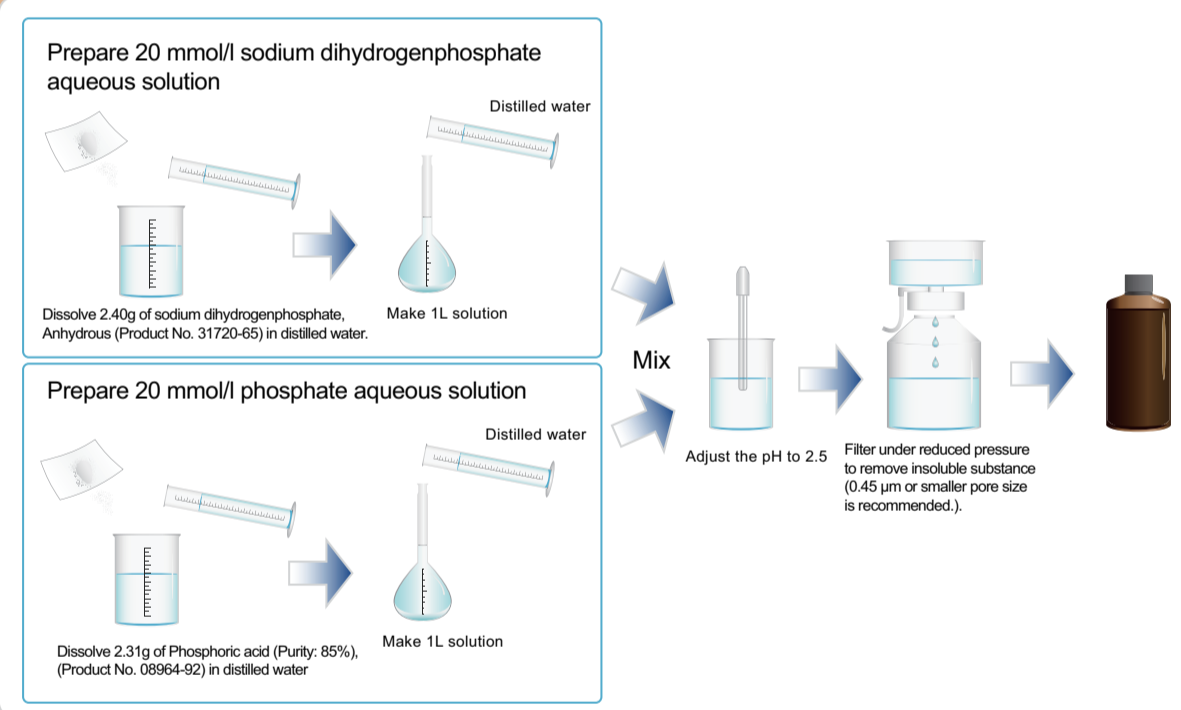


Special attention should be paid to measure correct amount of organic solvent as retention time is significantly changed by 1% different composition.

Column: 5C₁₈-MS-II 4.6 mm I.D. x 150 mm
 Flow rate: 1.0 ml/min
 Detection: 254nm 0.16AUFS
 Temperature: 30°C
 Sample: 1. Uracil, 2. Naphthalene

2) Organic Solvent / Buffer Mixed Mobile Phase

(e.g.1) Preparation of 20 mmol/l phosphate buffer (pH2.5)



Phosphate Buffer Solution (pH 2.5) (5x) (Product No. 08969-71) (Ready to use) is available from Nacalai Tesque.

(e.g.2) Preparation of 20 mmol/l phosphate buffer (pH7.0)

- Preparation of 20 mmol/l sodium dihydrogenphosphate aqueous solution (Dissolve 2.40 g of sodium dihydrogenphosphate, Anhydrous (Product No. 31720-65) in distilled water to make 1L solution.)
 - Prepare 20 mmol/l di-sodium hydrogenphosphate aqueous solution (Dissolve 2.84 g of di-Sodium Hydrogenphosphate, (Product No. 31801-05) in distilled water to make 1L solution.)
 - Adjust the pH to 7 by mixing 1 with 2.
 - Filter under reduced pressure to remove insoluble substance (0.45 μm or smaller pore size is recommended.). Attention; Filter solids from the solution to prevent clogging to pump and columns.
 - When mix with organic solvent, mix by volume ratio. Attention; The solid may precipitate after mixing.
- Phosphate Buffer Solution (pH 7.0) (5x) (Product No. 08968-81) (Ready to use) is available from Nacalai Tesque.

(e.g.3) Preparation of 5 mmol/l Sodium 1-hexanesulfonate, 20 mmol/l phosphate buffer (pH2.5)

- Prepare 5 mmol/l Sodium 1-hexanesulfonate, 20 mmol/l phosphate buffer (pH2.5) aqueous solution (Dissolve 10 ml of Sodium 1-hexanesulfonate (0.5 M solution) (Product No. 31532-06) and 2.40 g of sodium dihydrogenphosphate, Anhydrous (Product No. 31720-65) in distilled water to make 1L solution.)
- Prepare 5 mmol/l Sodium 1-hexanesulfonate, 20 mmol/l phosphate aqueous solution (Dissolve 10 ml of sodium 1-hexanesulfonate (0.5 M solution) (Product No. 31532-06) 2.31g of phosphoric acid (Purity: 85%), (Product No. 08964-92) in distilled water to make 1L solution.)
- Adjust the pH to 2.5 by mixing 1 with 2.
- Filter under reduced pressure to remove insoluble substance (0.45 μm or smaller pore size is recommended.). Attention; Filter solids from the solution to prevent clogging to pump and columns.
- When mix with organic solvent, mix by volume ratio. Attention; The solid may precipitate after mixing.