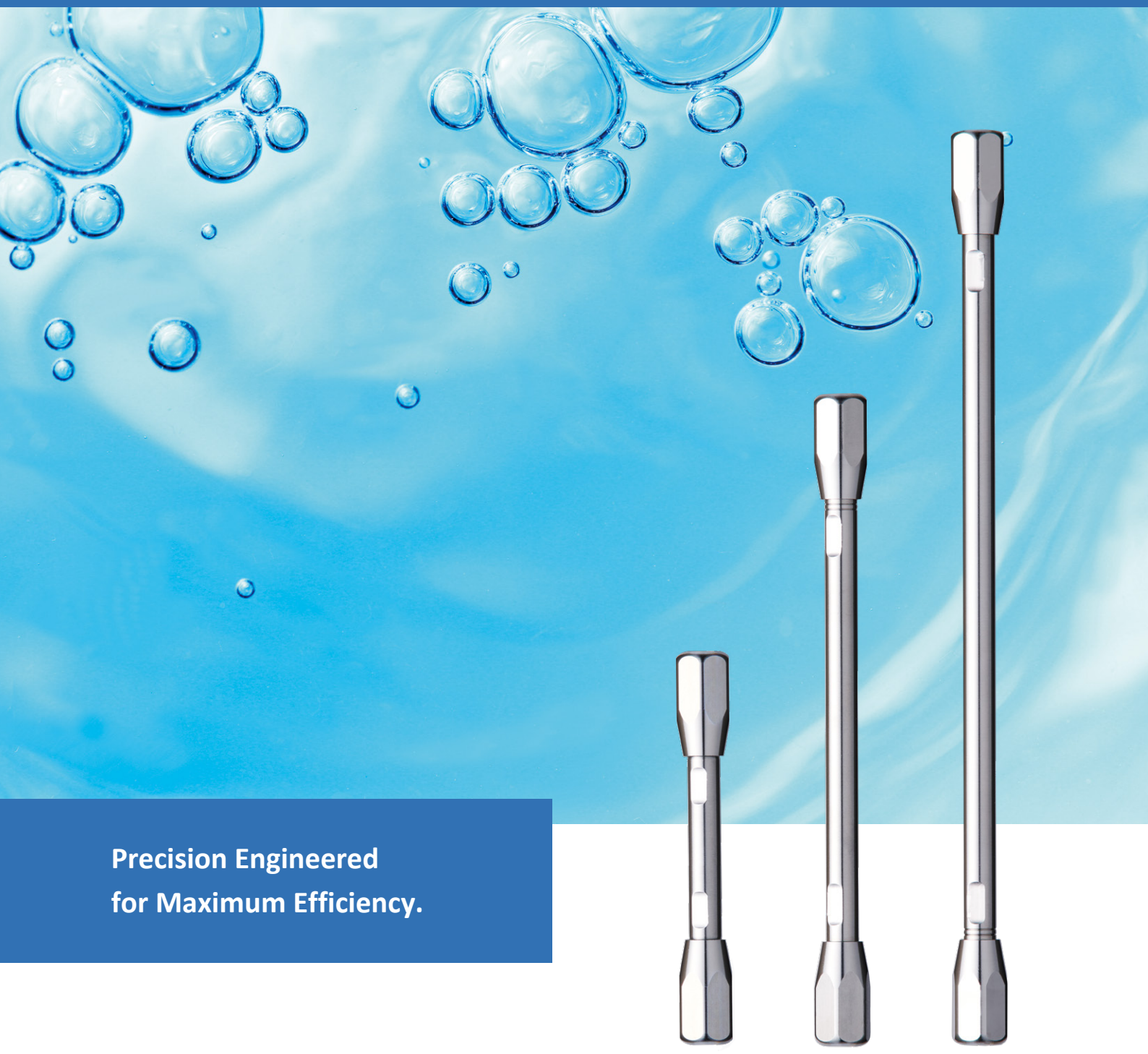
GL Sciences

HPLC, LC/MS Columns

InertCore Core-Shell HPLC Column

High-Performance Core-Shell Columns for UHPLC and HPLC

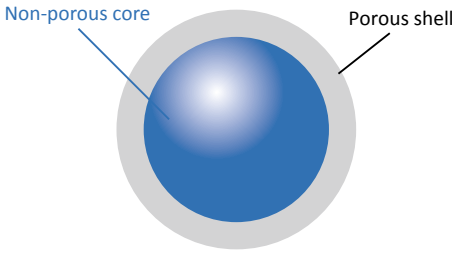


Precision Engineered
for Maximum Efficiency.

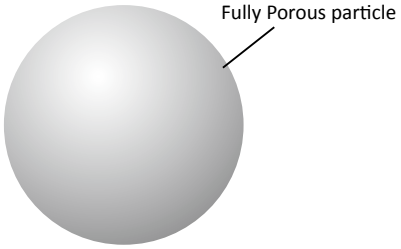
Core-Shell Technology for Enhanced Column Efficiency

In core-shell particles, analyte molecules pass through a thin porous shell surrounding a solid non-porous core. This structure significantly reduces diffusion within the particle compared to fully porous particles, resulting in sharper peaks and higher theoretical plate numbers.

Core-Shell particles

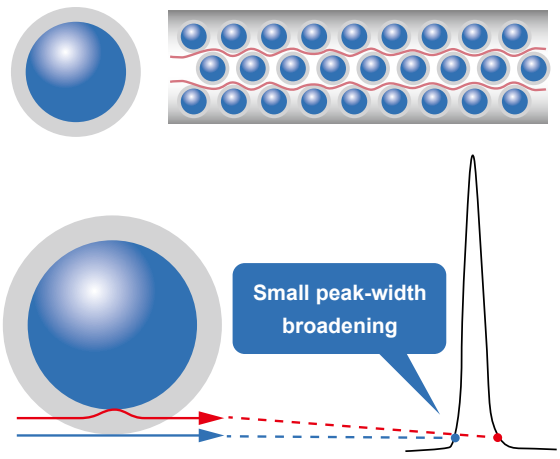


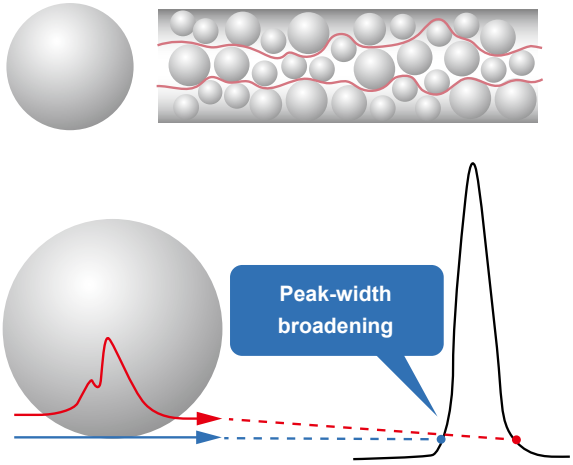
Conventional fully porous particles



Advantages of Core-Shell Packing Material

- Excellent particle size distribution minimizes multiple-path diffusion, enhancing efficiency and peak sharpness.
- A 2.6 µm core-shell particle delivers a comparable number of theoretical plates to that of a sub-2 µm fully porous particle, but with the backpressure of a 3 µm fully porous column.
- The number of theoretical plates is increased by minimizing diffusion within the particle.





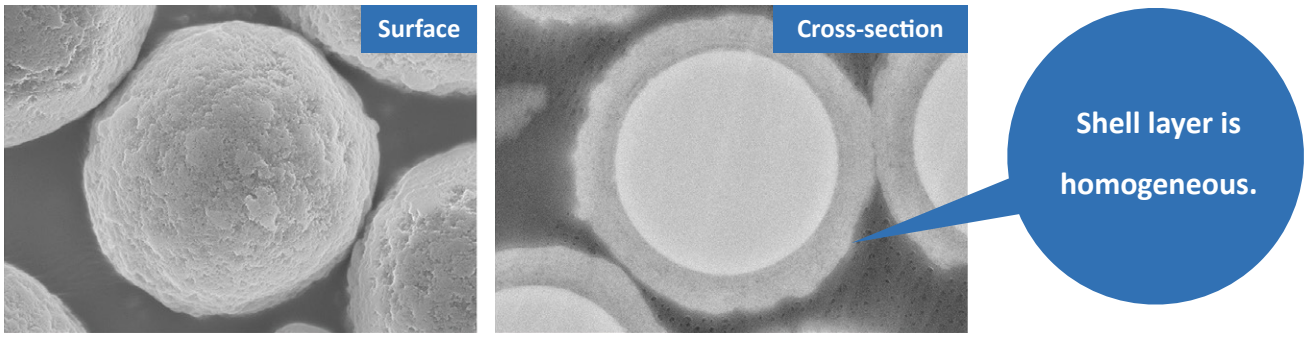
Superior Reproducibility

InertCore columns are subjected to rigorous in-house quality control, from raw silica synthesis to final inspection, ensuring outstanding batch-to-batch reproducibility through consistently uniform shell layers.

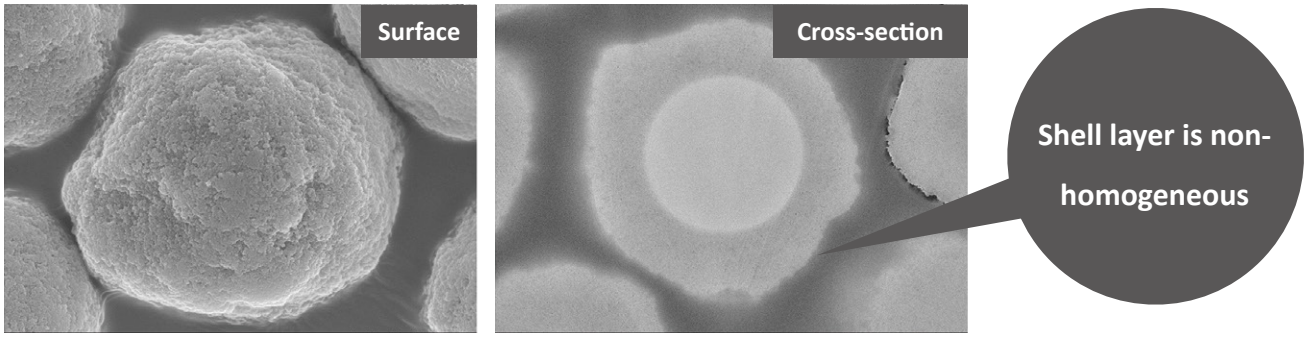
InertCore delivers exceptional batch-to-batch consistency, outperforming other core-shell columns in reproducibility.

SEM image

InertCore

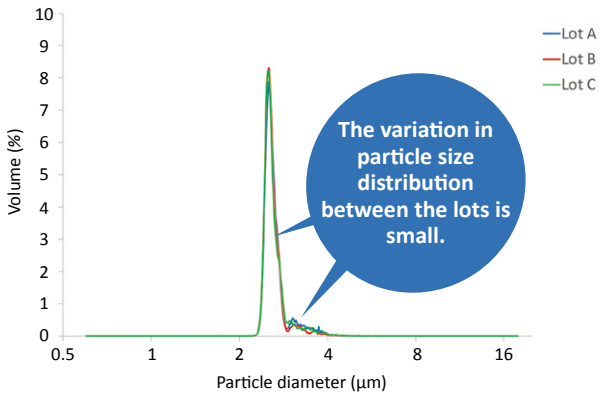


Brand A

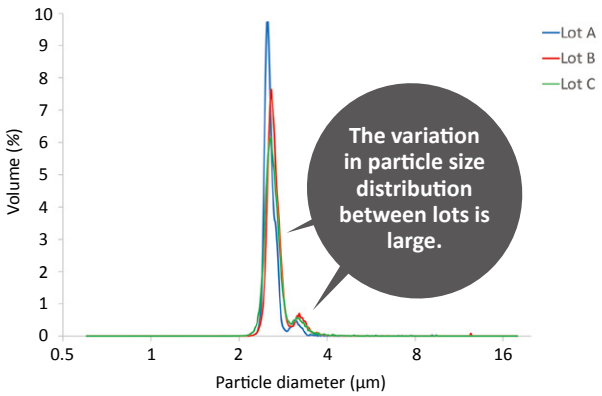


Particle size distribution

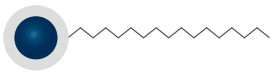
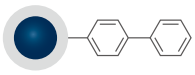
InertCore



Brand A



Specifications

Column	InertCore Plus C18	InertCore C8	InertCore Biphenyl
			
Base Material	Core-shell type silica gel	Core-shell type silica gel	Core-shell type silica gel
Particle Size	2.6 µm	2.6 µm	2.6 µm
Solid Core Size	2.0 µm	2.0 µm	2.0 µm
Surface Area*	200 m^2/g	200 m^2/g	200 m^2/g
Pore Size	90 Å (9 nm)	90 Å (9 nm)	90 Å (9 nm)
Functional Group	Octadecyl (C18)	Octyl (C8)	Biphenyl
End-capping	Yes	Yes	Yes
Carbon Loading*	15%	10%	10%
Recommended pH Range	1–10	1.5–9	1.5–8.5
USP Code	L1	L7	L11
Max Pressure	100 MPa (2.1 mm I.D.) 60 MPa (3.0 / 4.6 mm I.D.)	100 MPa (2.1 mm I.D.) 60 MPa (3.0 / 4.6 mm I.D.)	100 MPa (2.1 mm I.D.) 60 MPa (3.0 / 4.6 mm I.D.)

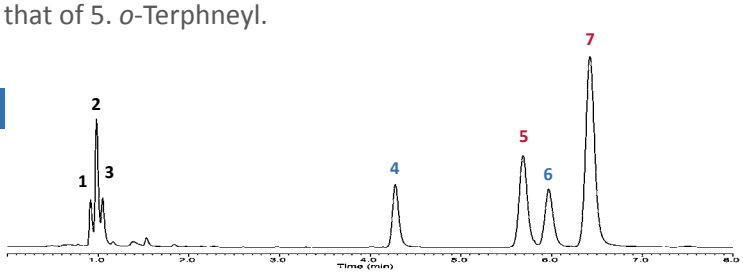
*Value calculated for the porous layer only (core excluded).

Versatile Phase Selection for Optimized Separation

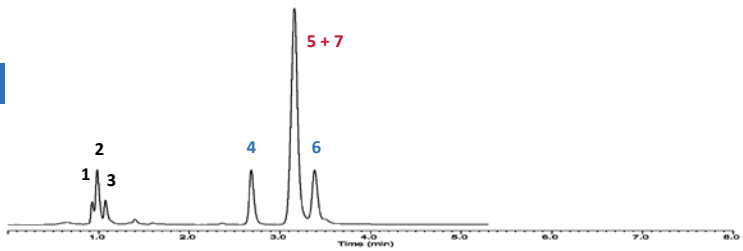
InertCore columns are available in **C18**, **C8**, and **Biphenyl** phases, allowing users to fine-tune retention and selectivity.

The comparative chromatograms highlight the differences in hydrophobic interaction and steric selectivity among these phases. Increasing the hydrophobicity of the column lengthens tha elution time of 6. *n*-Amylbenzene from that of 4. *n*-Butylbenzene. Increasing the steric selectivity of the column lengthens the elution time of 7. Triphenylene from that of 5. *o*-Terphneyl.

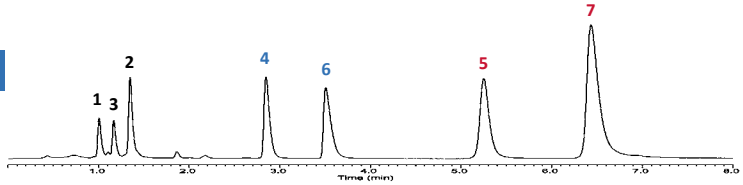
InertCore Plus C18



InertCore C8



InertCore Biphenyl



Conditions
Column : 2.6 µm, 100 x 2.1 mm I.D.
Eluent : A) CH_3OH B) H_2O
A/B = 80/20, v/v
Flow Rate : 0.2 mL/min
Col. Temp. : 40 °C
Detection : UV 254 nm
Analytes : 1. Uracil
2. Caffeine
3. Phenol
4. *n*-Butylbenzene
5. *o*-Terphenyl
6. *n*-Amylbenzene
7. Triphenylene

Hydrophobicity
C18 >> Biphenyl ≒ C8

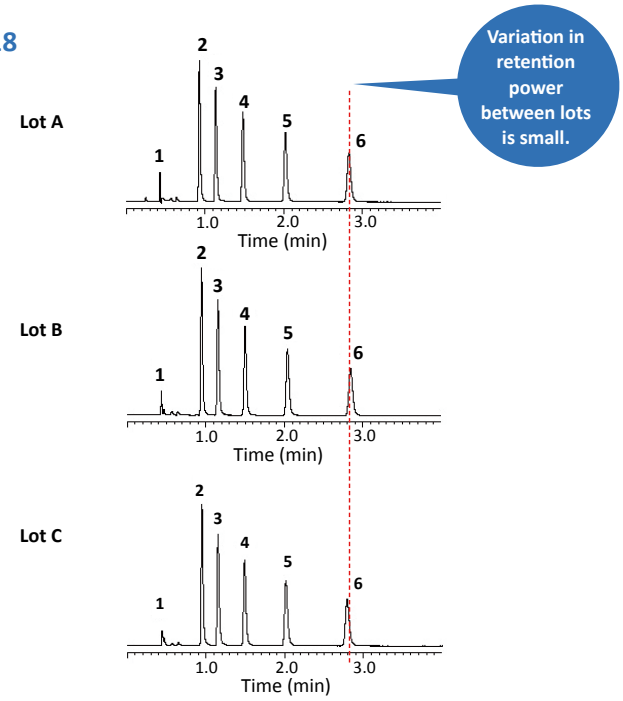
Steric Selectivity
Biphenyl > C18 > C8

Engineered for Stability and Consistency

Exceptional Retention Time Stability

InertCore Column exhibits remarkably stable retention times across multiple lots, as demonstrated by the hydrophobic retention test. This ensures reliable quantification and method transfer without the need for repeated revalidation, even when switching to a new column lot.

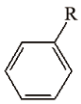
InertCore Plus C18



Hydrophobic retention test

Conditions

Column : 2.6 µm, 100 × 2.1 mm I.D.
Eluent : CH_3OH/H_2O = 80/20, v/v
Flow Rate : 0.4 mL/min
Col. Temp. : 40 °C
Detection : UV 254 nm
Inj. Vol. : 0.2 µL
Analytes : 1. Uracil
2. Toluene
3. Ethylbenzene
4. Propylbenzene
5. n-Butylbenzene
6. n-Amylbenzene

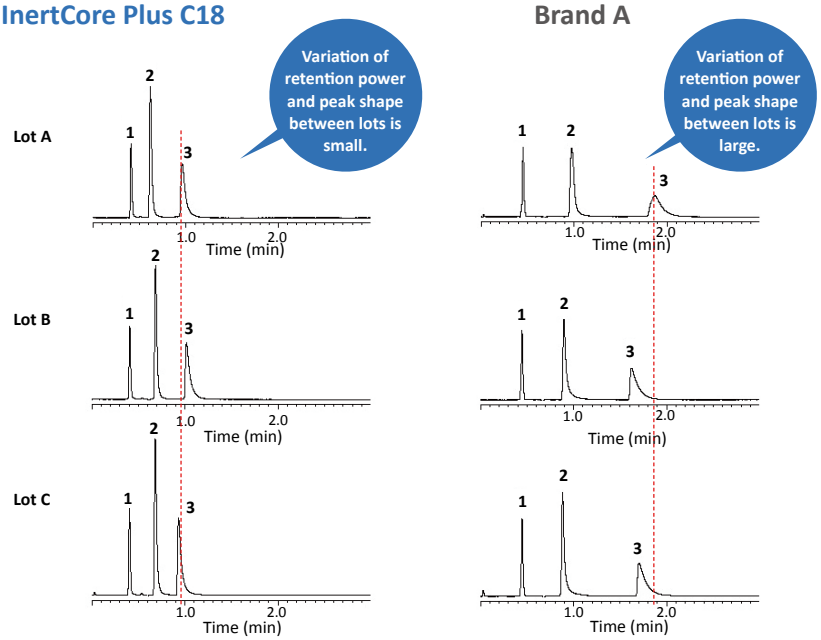


R: 2. Toluene — CH_3
3. Ethylbenzene — CH_2CH_3
4. Propylbenzene — $CH_2CH_2CH_3$
5. n-Butylbenzene — $CH_2CH_2CH_2CH_3$
6. n-Amylbenzene — $CH_2CH_2CH_2CH_2CH_3$

Consistent Peak Shape for Basic Compounds Across Lots

InertCore Plus C18 maintains excellent peak symmetry for strongly basic compounds across multiple production lots. The consistent surface treatment and high-quality bonding ensure minimal variation in peak shape and retention behavior, providing confidence in reproducibility and robustness for routine analyses.

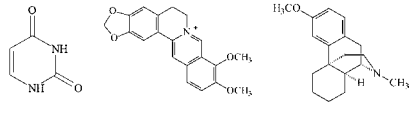
InertCore Plus C18 **Brand A**



Strongly basic compounds adsorption test

Conditions

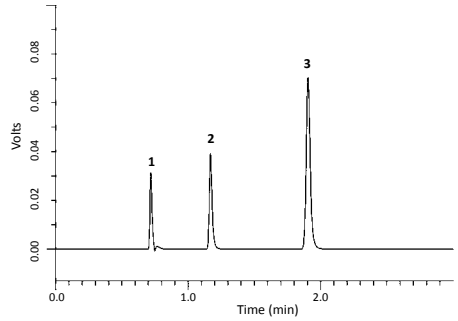
Column : 2.6 µm, 100 × 2.1 mm I.D.
Eluent : A) CH_3CN
B) 25 mM K_2HPO_4 (pH 7.0, KH_2PO_4)
A/B = 40/60, v/v
Flow Rate : 0.4 mL/min
Col. Temp. : 40 °C
Detection : UV 220 nm
Inj. Vol. : 0.2 µL
Analytes : 1. Uracil
2. Berberine chloride
3. Dextromethorphan



1:Uracil (Neutrality) 2:Berberine chloride (Basicity) 3:Dextromethorphan (Basicity)

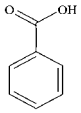
High Durability

InertCore demonstrates excellent durability, maintaining retention time, Theoretical plates number, and peak symmetry even after 2,000 consecutive injections.

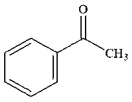


Conditions

Column	: InertCore Plus C18 2.6 µm, 100 × 4.6 mmI.D.	
Eluent	: CH_3CN/0.1 % H_3PO_4 in H_2O = 40/60, v/v	
Flow Rate	: 1.0 mL/min	
Col. Temp.	: 40 °C	
Detection	: UV 254 nm	
Inj. Vol.	: 10 µL	
Analytes	: 1. Uracil	1 mg/L
	2. Benzoic acid	20 mg/L
	3. Acetophenone	5 mg/L



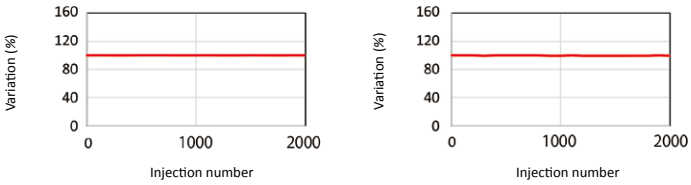
2. Benzoic acid



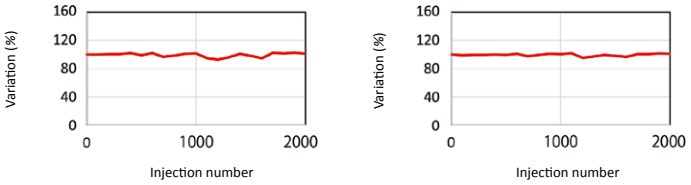
3. Acetophenone

Performance is maintained even after 2000 injections.

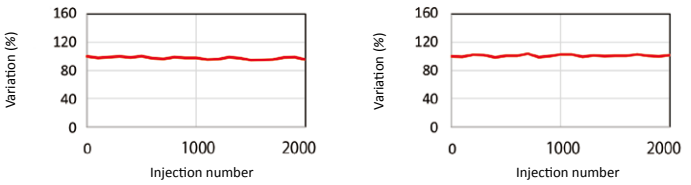
Retention time



Theoretical plates



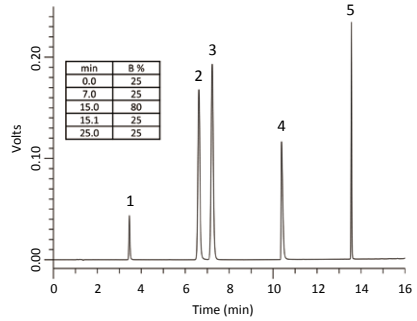
Symmetry factor



Compatible with Both Conventional HPLC and UHPLC Systems

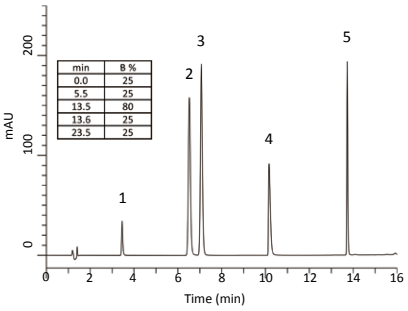
InertCore delivers comparable performance across different HPLC platforms, achieving sharp, symmetrical peaks under identical conditions.

When UHPLC is used



Pressure: 22.0 MPa (including all plumbing, etc.)
Resolution (value) between peak 2 and peak 3: 3.65

When general purpose HPLC is used



Pressure: 19.0 MPa (including all plumbing, etc.)
Resolution (value) between peak 2 and peak 3: 3.29

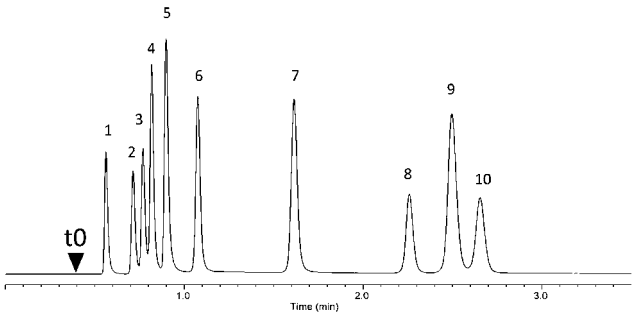
Conditions

Column	: InertCore Plus C18 2.6 µm, 150 × 4.6 mm I.D.	
Eluent	: A) 10 mM KH_2PO_4 in H_2O (pH 2.0, H_3PO_4) B) CH_3CN	
Flow Rate	: 1.0 mL/min	
Col. Temp.	: 40 °C	
Detection	: PDA	
Inj. Vol.	: 2 µL	
Analytes	: 1. Benzoic acid	3. Acetophenone
	2. Ethyl p-Hydroxybenzoate (100 mg/L each in 50 % MeOH)	4. Amitriptyline
		5. Indomethacin

*To eliminate the effect of system volume, plumbing size, etc. A general purpose HPLC system is optimized.

Application

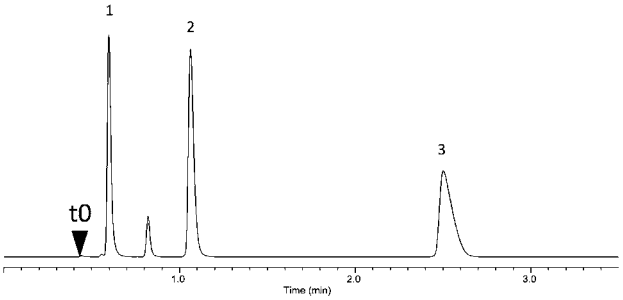
Nucleotide



Conditions

Column	: InertCore Biphenyl 2.6 µm, 100 x 2.1 mm I.D.
Eluent	: 10 mM $HCOONH_4$ + 0.1 % HCOOH in H_2O
Flow Rate	: 0.4 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm
Inj. Vol.	: 0.5 µL
Analytes	: 1. Cytosine 5. Uracil 8. Thymine 2. Cytidine 6. Uridine 9. Adenosine 3. Guanine 7. Guanosine 10. 5-Methyluridine 4. Adenine (Nucleobase 25 mg/L each, Nucleoside 50 mg/L each)

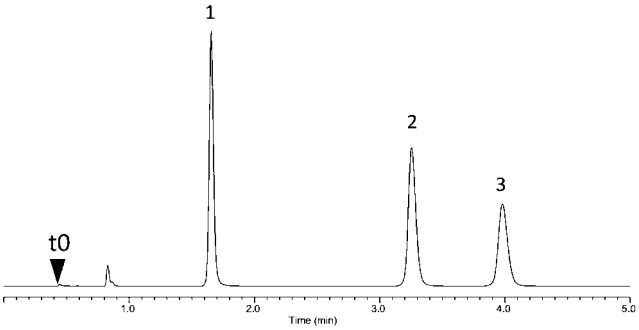
Cyclic Nucleotide cGAMP



Conditions

Column	: InertCore Biphenyl 2.6µm, 100 x 2.1 mm I.D.
Eluent	: 10 mM $HCOONH_4$ in H_2O
Flow Rate	: 0.4 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm
Inj. Vol.	: 1 µL
Analytes	: 1. cGMP 2. cAMP 3. 2,3-cGAMP 100 mg/L

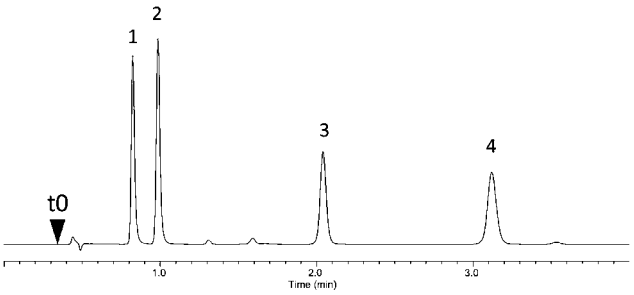
Guanine-based Antiviral Drugs



Conditions

Column	: InertCore Biphenyl 2.6 µm, 100 x 2.1 mm I.D.
Eluent	: 10 mM $HCOONH_4$ in H_2O
Flow Rate	: 0.4 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm
Inj. Vol.	: 0.5 µL
Analytes	: 1. Ganciclovir 2. Aciclovir 3. Penciclovir (100 mg/L each)

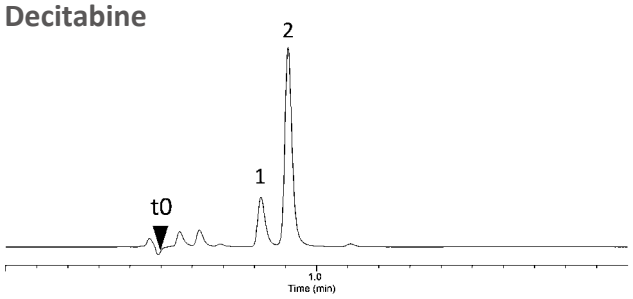
Nucleoside-based Antiviral Drugs



Conditions

Column	: InertCore Biphenyl 2.6 µm, 100 x 2.1 mm I.D.
Eluent	: 10 mM $HCOONH_4$ in H_2O
Flow Rate	: 0.4 mL/min
Col. Temp.	: 40 °C
Detection	: UV 220 nm
Inj. Vol.	: 1 µL
Analytes	: 1. Ribavirin 2. Cytarabine 3. Gemcitabine 4. Lamivudine (100 mg/L each)

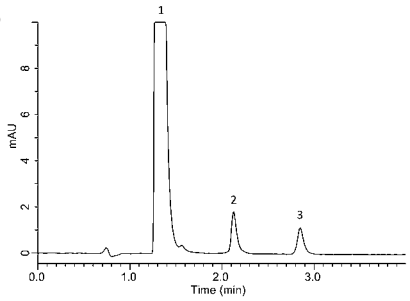
Decitabine



Conditions

Column	: InertCore Biphenyl 2.6 µm, 100 x 2.1 mm I.D.
Eluent	: 10 mM $HCOONH_4$ in H_2O
Flow Rate	: 0.4 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm
Inj. Vol.	: 0.5 µL
Analytes	: 1. 5-Aza-2'-deoxycytidine (Decitabine) 2. Cytidine (100 mg/L each)

Aldehydes



Conditions

Column	: InertCore Plus C18 2.6 µm, 150 x 4.6 mm I.D.
Eluent	: A) CH_3CN B) H_2O A/B = 50/50, v/v
Flow Rate	: 1.5 mL/min
Col. Temp.	: 40 °C
Detection	: UV 360 nm
Inj. Vol.	: 10 µL
Analytes	: Reference Standard 1. DNPH 2. DNPH-Formaldehyde 3. DNPH-Acetaldehyde (50 µg/L each in CH_3CN)

Analytical Column

Description	Particle Size (µm)	Length / Inner Diameter (mm)	2.1	3.0	4.6
InertCore Plus C18	2.6	50	5020-17510	5020-17515	5020-17520
		75	5020-17513	5020-17518	5020-17523
		100	5020-17511	5020-17516	5020-17521
		150	5020-17512	5020-17517	5020-17522

Guard Column

Description	Particle Size (µm)	Inner Diameter (mm)	Length (mm)	Cat. No
InertCore Plus C18	2.6	2.1	20	5020-17506
		3.0	20	5020-17507
		4.6	20	5020-17508

Analytical Column

Description	Particle Size (µm)	Length / Inner Diameter (mm)	2.1	3.0	4.6
InertCore C8	2.6	50	5020-17527	5020-17531	5020-17535
		75	5020-17528	5020-17532	5020-17536
		100	5020-17529	5020-17533	5020-17537
		150	5020-17530	5020-17534	5020-17538

Guard Column

Description	Particle Size (µm)	Inner Diameter (mm)	Length (mm)	Cat. No
InertCore C8	2.6	2.1	20	5020-17524
		3.0	20	5020-17525
		4.6	20	5020-17526

Analytical Column

Description	Particle Size (µm)	Length / Inner Diameter (mm)	2.1	3.0	4.6
InertCore Biphenyl	2.6	50	5020-17542	5020-17546	5020-17550
		75	5020-17543	5020-17547	5020-17551
		100	5020-17544	5020-17548	5020-17552
		150	5020-17545	5020-17549	5020-17553

Guard Column

Description	Particle Size (µm)	Inner Diameter (mm)	Length (mm)	Cat. No
InertCore Biphenyl	2.6	2.1	20	5020-17539
		3.0	20	5020-17540
		4.6	20	5020-17541

Note) The type of fitting connections used is Parker type (UP type).

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