

SEC Columns

• Inertsil® Diol	072
• Inertsil® WP300 Diol	074

Inertsil® Diol

Physical Properties

- Silica : 3 Series High Purity Silica Gel
- Particle Size : 3 μm, 5 μm
- Surface Area : 450 m²/g
- Pore Size : 100 Å (10 nm)
- Pore Volume : 1.05 mL/g
- Bonded Phase : Diol Groups (Dihydroxypropyl Groups)
- End-capping : None
- Carbon Loading : 20 %
- USP Code : L20
- pH Range : 2 ~ 7.5



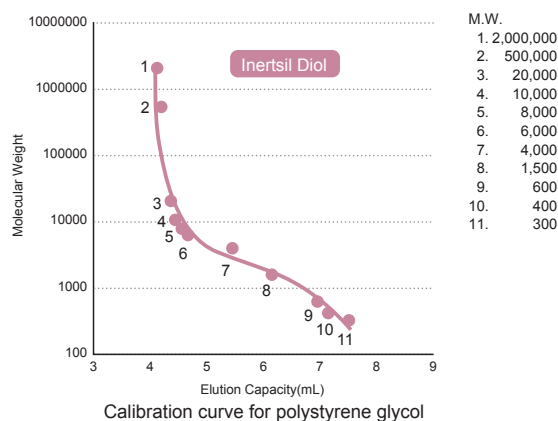
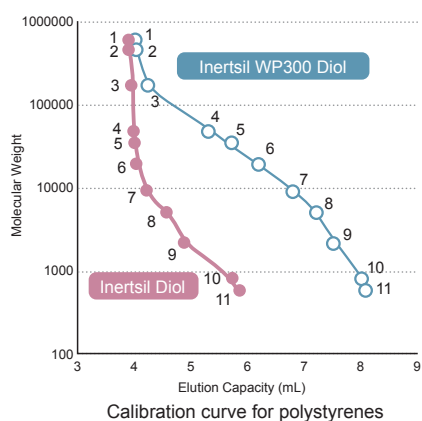
Inertsil Diol, dihydroxypropyl groups chemical bonded onto silica gel, can be used for water group SEC(GFC) or organic solvents SEC(GPC). (Figure 1).

As features of the packing material, it can analyze with several columns in series since 20 Mpa as the maximum operating pressure, and it is higher than polymer base columns.

Figure 2 shows an example of polystyrene analysis with Inertsil Diol and Inertsil WP300 Diol in series. With coupling 2 columns in different pore size in series, it can be used for broader range of molecular weight compared with figure 1 calibration curve.

General internal diameter of SEC columns are 7-8 mm. But even if 4.6 mm I.D. column, it can obtain calibration curve with smaller elution volume rather than 7.6 mm I.D. column. Therefore it can be analyzed with saving solvent, environment conservation, and low cost.

Figure1 : Calibration curve for aqueous and organic SEC analysis



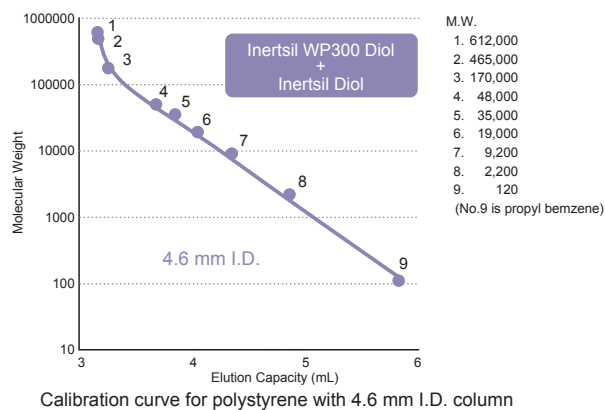
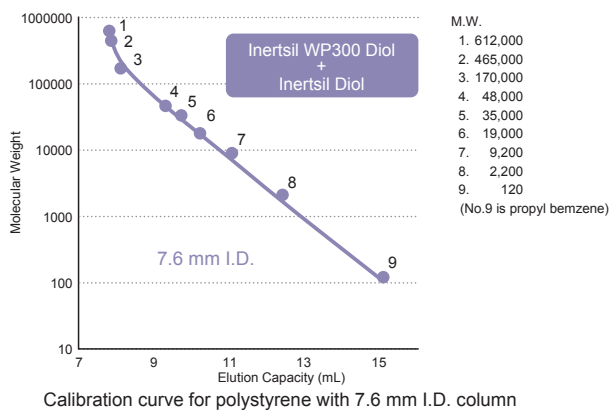
Conditions

Column : Inertsil WP300 Diol (5 μm, 250 × 7.6 mm I.D.)
 Eluent : THF
 Flow Rate : 1.0 mL/min
 Col. Temp. : 40 °C
 Detection : UV 254 nm

Conditions

Column : Inertsil Diol (5 μm, 250 × 7.6 mm I.D.)
 Eluent : H₂O
 Flow Rate : 1.0 mL/min
 Col. Temp. : 40 °C
 Detection : RI (Cell Temp. 35 °C)

Figure2 : Calibration curve for small I.D. SEC columns



Conditions

Column : Inertsil WP300 Diol (5 μm, 250 × 7.6 mm I.D.) + Inertsil Diol (5 μm, 250 × 7.6 mm I.D.)
 Eluent : THF
 Flow Rate : 1.0 mL/min
 Col. Temp. : 35 °C
 Detection : UV 254 nm

Conditions

Column : Inertsil WP300 Diol (5 μm, 250 × 4.6 mm I.D.) + Inertsil Diol (5 μm, 250 × 4.6 mm I.D.)
 Eluent : THF
 Flow Rate : 0.3 mL/min
 Col. Temp. : 35 °C
 Detection : UV 254 nm

Analytical Columns

Particle Size: 3 µm	Length \ I.D. (mm)	1.0	1.5		
	33	5020-86531	5020-86541		
	50	5020-86532	5020-86542		
	75	5020-86533	5020-86543		
	100	5020-86534	5020-86544		
	150	5020-86535	5020-86545		
	250	5020-86536	5020-86546		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-05411	5020-05421	5020-05431	5020-05441
	50	5020-05412	5020-05422	5020-05432	5020-05442
	75	5020-05413	5020-05423	5020-05433	5020-05443
	100	5020-05414	5020-05424	5020-05434	5020-05444
	150	5020-05415	5020-05425	5020-05435	5020-05445
	250	5020-05416	5020-05426	5020-05436	5020-05446
Particle Size: 5 µm	Length \ I.D. (mm)	1.0	1.5		
	33	5020-86511	5020-86521		
	50	5020-86512	5020-86522		
	75	5020-86513	5020-86523		
	100	5020-86514	5020-86524		
	150	5020-86515	5020-86525		
	250	5020-86516	5020-86526		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-05611	5020-05621	5020-05631	5020-05641
	50	5020-05612	5020-05622	5020-05632	5020-05642
	75	5020-05613	5020-05623	5020-05633	5020-05643
	100	5020-05614	5020-05624	5020-05634	5020-05644
	150	5020-05615	5020-05625	5020-05635	5020-05645
	250	5020-05616	5020-05626	5020-05636	5020-05646
	Length \ I.D. (mm)	6.0	7.6	10	
	50	5020-05652	5020-05662	5020-86552	
	100	5020-05654	5020-05664	5020-86554	
	150	5020-05655	5020-05665	5020-86555	
	250	5020-05656	5020-05666	5020-86556	

* End-fittings are 1/16" Waters-compatible.

* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-19223	5020-19222	5020-19273	5020-19272
1.5, 2.1		1.5	5020-19323	5020-19322	5020-19373	5020-19372
2.1, 3.0		3.0	5020-19123	5020-19122	5020-19173	5020-19172
4.0, 4.6		4.0	5020-19023	5020-19022	5020-19073	5020-19072
2.1, 3.0	20	3.0	5020-19523	5020-19522	5020-19573	5020-19572
4.0, 4.6		4.0	5020-19423	5020-19422	5020-19473	5020-19472
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.

* For maximum operating pressure information, please refer to page 46.

* For the guard column I.D. over 6.0 mm. Please refer to page 115.

Reversed Phase Columns

HILIC Columns

Normal Phase Columns

SEC Columns

Ion Exchange Columns

Application Specific Columns

Guard Columns

Preparative Columns

Capillary Columns

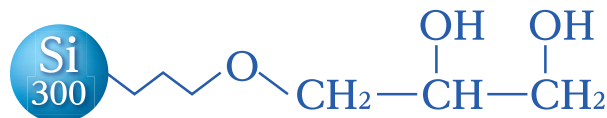
Applications

Cat. No. Index

Inertsil® WP300 Diol

Physical Properties

- Silica : WP300 Series High Purity Silica Gel
- Particle Size : 5 μm
- Surface Area : 150 m²/g
- Pore Size : 300 Å (30 nm)
- Pore Volume : 1.05 mL/g
- Bonded Phase : Diol Groups (Dihydroxypropyl Groups)
- End-capping : None
- Carbon Loading : 9 %
- USP Code : L20, L33
- pH Range : 2 ~ 7.5



Inertsil WP300 Diol has dihydroxypropyl group bonded to silica gel with pore size 300 Å and is capable of analyzing large molecules. Like Inertsil Diol, Inertsil WP300 Diol can be used for both aqueous SEC (Size Exclusion Chromatography) and organic SEC. Also, as a diol column, Inertsil WP300 Diol can be used in both normal phase and reversed phase mode.

As the pore size of silica gel is wider than that of Inertsil Diol, Inertsil WP300 Diol is capable of separating compounds with a broader range of molecular weight than Inertsil Diol. (Figure 1.)

Figure 1 : Calibration curve and analysis of polystyrenes

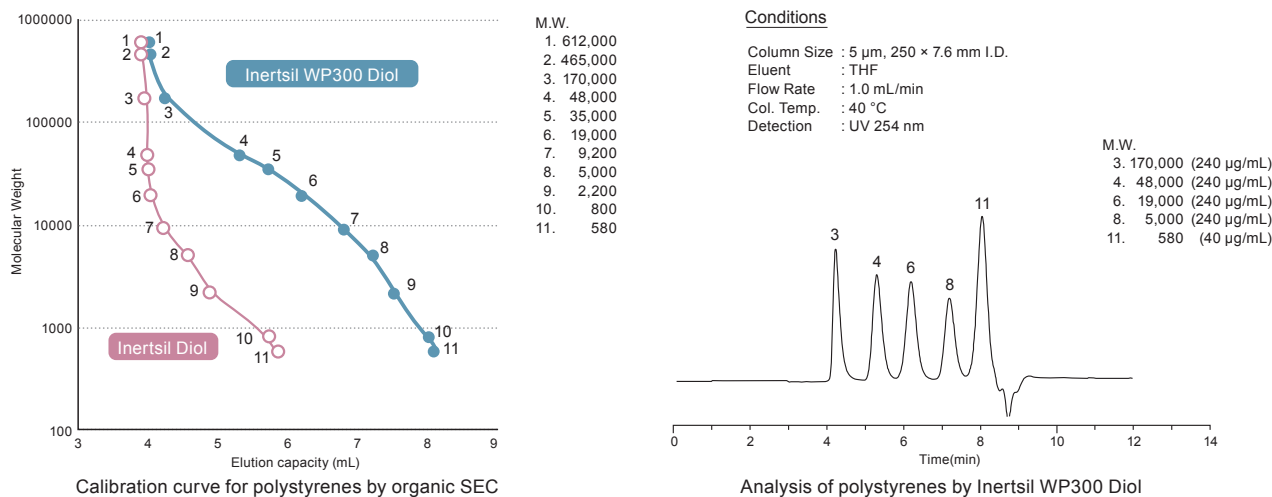
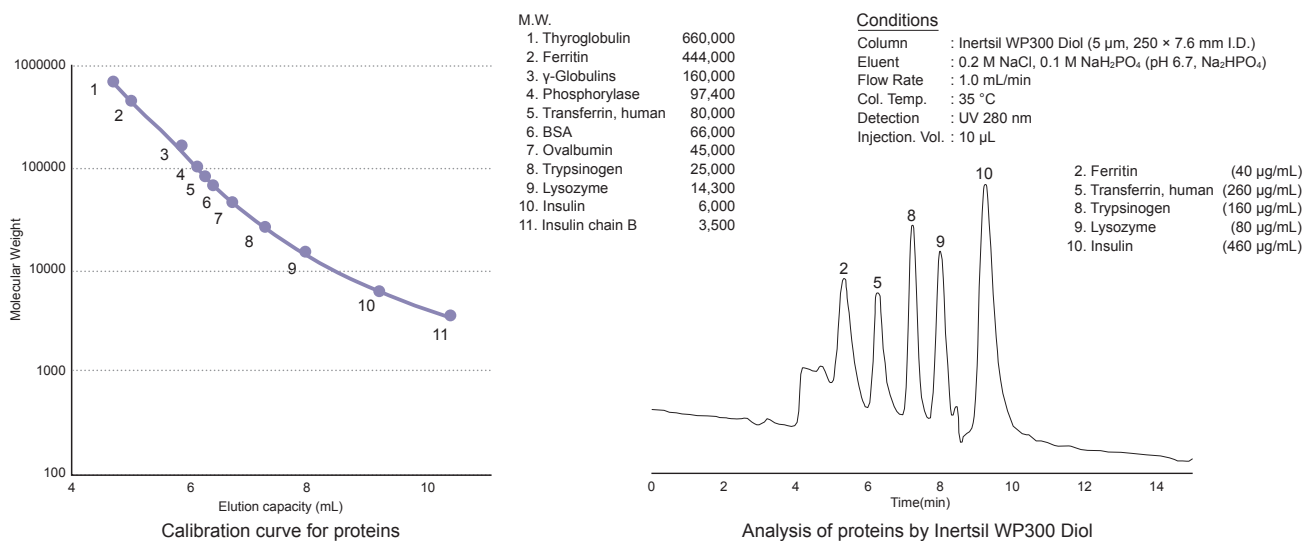


Figure 2 : Calibration curve and analysis of proteins



Analytical Columns

Particle Size: 5 µm	Length \ I.D. (mm)	1.0	1.5	2.1	3.0	4.0	4.6
	33	5020-85911	5020-85921	5020-05911	5020-05921	5020-05931	5020-05941
	50	5020-85912	5020-85922	5020-05912	5020-05922	5020-05932	5020-05942
	75	5020-85913	5020-85923	5020-05913	5020-05923	5020-05933	5020-05943
	100	5020-85914	5020-85924	5020-05914	5020-05924	5020-05934	5020-05944
	150	5020-85915	5020-85925	5020-05915	5020-05925	5020-05935	5020-05945
	250	5020-85916	5020-85926	5020-05916	5020-05926	5020-05936	5020-05946
	Length \ I.D. (mm)	6.0	7.6	10			
	50	5020-05980	5020-05985	5020-85932			
	100	5020-05981	5020-05986	5020-85934			
150	5020-05982	5020-05987	5020-85935				
250	5020-05983	5020-05988	5020-85936				

* End-fittings are 1/16" Waters-compatible.

* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)
			Particle Size	Particle Size
			5 µm	5 µm
1.0	10	1.0	5020-19231	5020-19281
1.5, 2.1		1.5	5020-19331	5020-19381
2.1, 3.0		3.0	5020-19131	5020-19181
4.0, 4.6		4.0	5020-19031	5020-19081
2.1, 3.0	20	3.0	5020-19531	5020-19581
4.0, 4.6		4.0	5020-19431	5020-19481
Holder for Cartridge Guard Column E			For 10 mm Length	5020-08500
			For 20 mm Length	5020-08550

* End-fittings are 1/16" Waters-compatible.

* For maximum operating pressure information, please refer to page 46.

* For the guard column I.D. over 6.0 mm. Please refer to page 115.

Reversed Phase Columns

HILIC Columns

Normal Phase Columns

SEC Columns

Ion Exchange Columns

Application Specific Columns

Guard Columns

Preparative Columns

Capillary Columns

Applications

Cat. No. Index



Ion Exchange Columns

• Inertsil® AX	078
• Inertsil® CX	080

Inertsil® AX

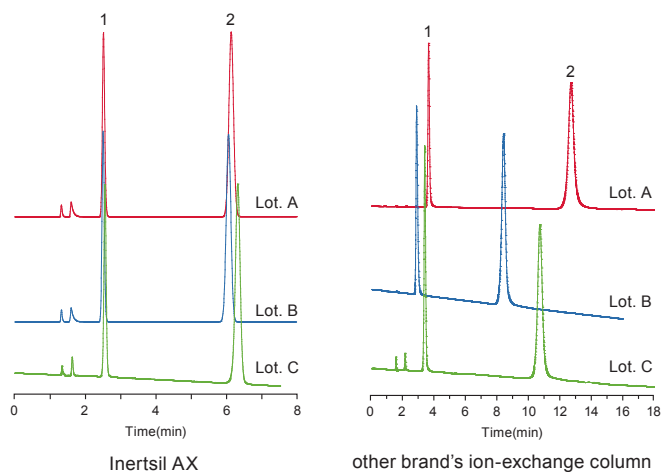
Physical Properties

- Silica : 3 Series High Purity Silica Gel
- Particle Size : 5 μm
- Surface Area : 450 m^2/g
- Pore Size : 100 \AA (10 nm)
- Pore Volume : 1.05 mL/g
- Bonded Phase : Diethylaminopropyl Groups
- End-capping : None
- Carbon Loading : 17 %
- AEC : 0.4 meq/g
- USP Code : -
- pH Range : 2 ~ 7.5



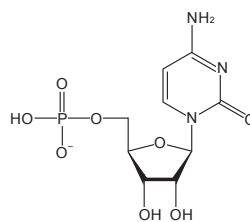
Inertsil AX has diethylamino groups bonded to silica gel by an alkyl chain. The diethylamino groups offer anionic functions required for anion exchange chromatography. It is mainly used for analyses of acidic compounds. Conventional ion-exchange columns used to show inconsistent results from lot to lot. However, Inertsil AX is manufactured under strict quality control in order to offer excellent lot-to-lot reproducibility. The retentivity of Inertsil AX is influenced by the concentration of buffer. The retention time can be adjusted by the concentration of buffer (Refer to Fig. 2).

Figure 1 : Comparison of lot-to-lot reproducibility with other brands

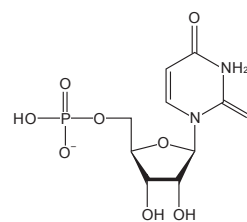


Conditions

Column Size : 5 μm , 150 \times 4.6 mm I.D.
 Eluent : 60 mM KH_2PO_4 (pH 3.0, H_3PO_4)
 Flow Rate : 1.0 mL/min
 Col. Temp. : 40 $^\circ\text{C}$
 Detection : UV 254 nm
 Injection Vol. : 1 μL
 Sample : 1. Cytidine 5'-monophosphate (CMP)
 2. Uridine 5'-monophosphate (UMP)

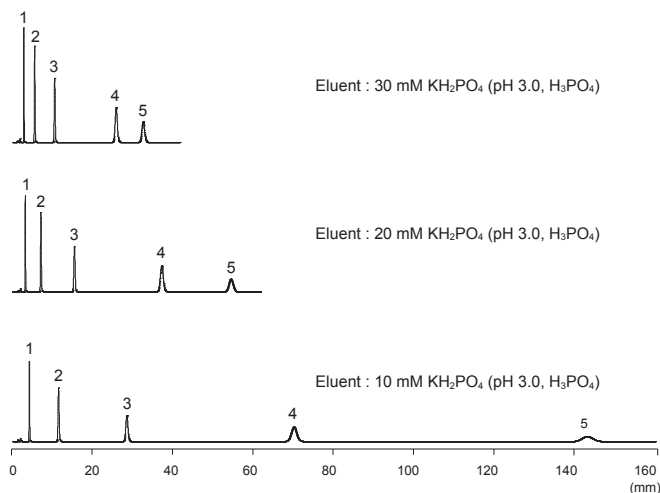


Cytidine 5'-monophosphate (CMP)



Uridine 5'-monophosphate (UMP)

Figure 2 : Effect of buffer concentration in eluent



Conditions

Column : Inertsil AX (5 μm , 150 \times 4.6 mm I.D.)
 Flow Rate : 1.0 mL/min
 Col. Temp. : 40 $^\circ\text{C}$
 Detection : UV 254 nm
 Injection Vol. : 10 μL
 Sample : 1. Cytidine 5'-monophosphate (CMP)
 2. Adenine 5'-monophosphate (AMP)
 3. Uridine 5'-monophosphate (UMP)
 4. Guanosine 5'-monophosphate (GMP)
 5. Xanthosine 5'-monophosphate (XMP)

Analytical Columns

Particle Size: 5 µm	Length \ I.D. (mm)		1.0		1.5					
	33		5020-80111	5020-80121						
	50		5020-80112	5020-80122						
	75		5020-80113	5020-80123						
	100		5020-80114	5020-80124						
	150		5020-80115	5020-80125						
	250		5020-80116	5020-80126						
	Length \ I.D. (mm)		2.1		3.0		4.0		4.6	
	33		5020-07211	5020-07221		5020-07231		5020-07241		
	50		5020-07212	5020-07222		5020-07232		5020-07242		
	75		5020-07213	5020-07223		5020-07233		5020-07243		
	100		5020-07214	5020-07224		5020-07234		5020-07244		
	150		5020-07215	5020-07225		5020-07235		5020-07245		
	250		5020-07216	5020-07226		5020-07236		5020-07246		

* End-fittings are 1/16" Waters-compatible.

* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			5 µm		5 µm	
1.0	10	1.0	5020-19233		5020-19283	
1.5, 2.1		1.5	5020-19333		5020-19383	
2.1, 3.0		3.0	5020-19133		5020-19183	
4.0, 4.6		4.0	5020-19033		5020-19083	
2.1, 3.0	20	3.0	5020-19533		5020-19583	
4.0, 4.6		4.0	5020-19433		5020-19483	
Holder for Cartridge Guard Column E			For 10 mm Length		5020-08500	
			For 20 mm Length		5020-08550	

* End-fittings are 1/16" Waters-compatible.

* For maximum operating pressure information, please refer to page 46.

Reversed Phase Columns

HILIC Columns

Normal Phase Columns

SEC Columns

Ion Exchange Columns

Application Specific Columns

Guard Columns

Preparative Columns

Capillary Columns

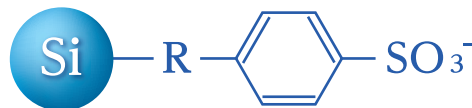
Applications

Cat. No. Index

Inertsil® CX

Physical Properties

- Silica : 3 Series High Purity Silica Gel
- Particle Size : 5 µm
- Surface Area : 450 m²/g
- Pore Size : 100 Å (10 nm)
- Pore Volume : 1.05 mL/g
- Bonded Phase : Benzenesulfonyl Groups
- End-capping : None
- Carbon Loading : 14 %
- CEC : 0.5 meq/g
- USP Code : L9
- pH Range : 2 ~ 7.5



Inertsil CX has benzenesulfonyl groups bonded to silica gel by an alkyl chain. The sulfony groups at the end of the structure offer cationic functions required for the cation exchange chromatography. It is mainly used for analyses of basic compounds. Inertsil CX is manufactured under strict quality control in order to offer excellent lot-to-lot reproducibility as the same as Inertsil AX. Inertsil CX has high ion exchange capacity and provides high retentivity and selectivity. Therefore, it is also suited for analyzing amino acids and nucleobases shown in Fig. 2 and Fig. 3

Figure 1 : Comparison of lot-to-lot reproducibility with other brands

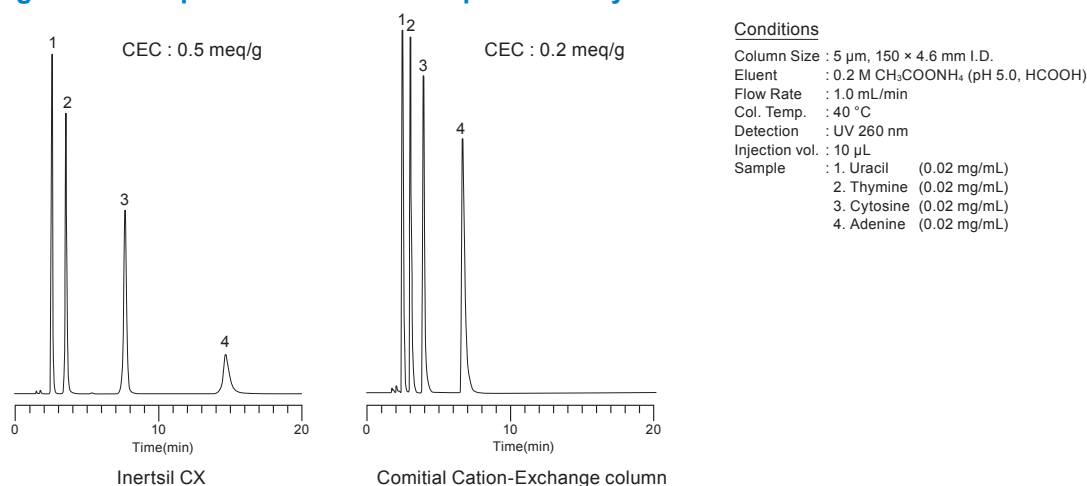


Figure 2 : Biogenic Amine Analysis

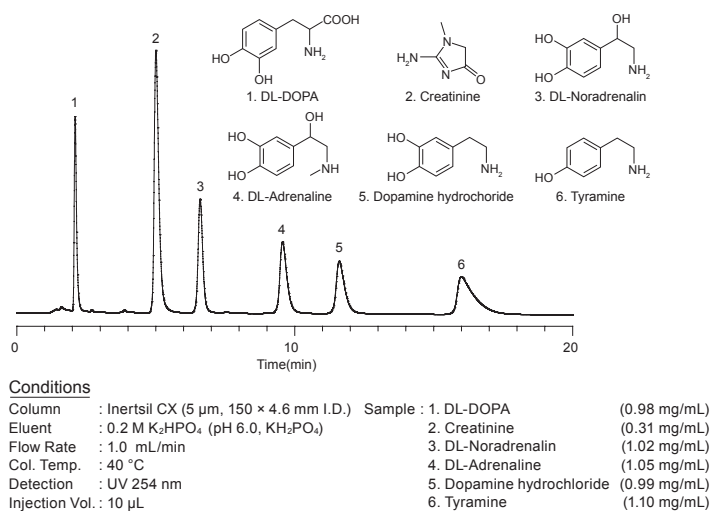
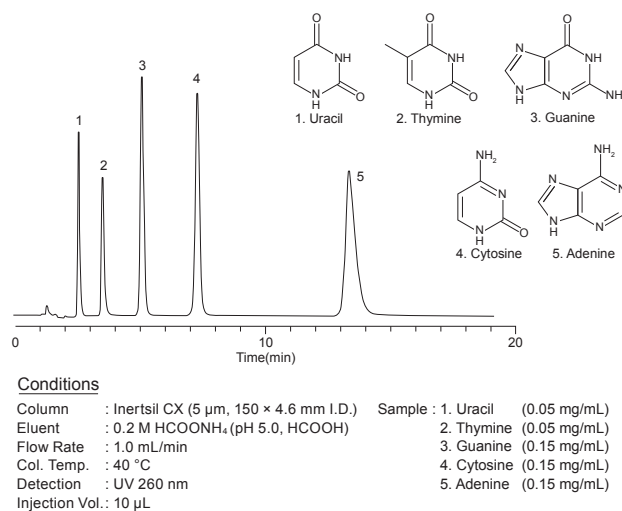


Figure 3 : Nucleoside Analysis



Analytical Columns

Particle Size: 5 µm	Length \ I.D. (mm)	1.0	1.5		
	33	5020-80011	5020-80021		
	50	5020-80012	5020-80022		
	75	5020-80013	5020-80023		
	100	5020-80014	5020-80024		
	150	5020-80015	5020-80025		
	250	5020-80016	5020-80026		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-07111	5020-07121	5020-07131	5020-07141
	50	5020-07112	5020-07122	5020-07132	5020-07142
75	5020-07113	5020-07123	5020-07133	5020-07143	
100	5020-07114	5020-07124	5020-07134	5020-07144	
150	5020-07115	5020-07125	5020-07135	5020-07145	
250	5020-07116	5020-07126	5020-07136	5020-07146	

* End-fittings are 1/16" Waters-compatible.

* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)
			Particle Size	Particle Size
			5 µm	5 µm
1.0	10	1.0	5020-19234	5020-19284
1.5, 2.1		1.5	5020-19334	5020-19384
2.1, 3.0		3.0	5020-19134	5020-19184
4.0, 4.6		4.0	5020-19034	5020-19084
2.1, 3.0	20	3.0	5020-19534	5020-19584
4.0, 4.6		4.0	5020-19434	5020-19484
Holder for Cartridge Guard Column E			For 10 mm Length	5020-08500
			For 20 mm Length	5020-08550

* End-fittings are 1/16" Waters-compatible.

* For maximum operating pressure information, please refer to page 46.

Reversed Phase Columns

HILIC Columns

Normal Phase Columns

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Application Specific Columns

Guard Columns

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