

# High-Speed Separation

# Inertsil ODS-3 2um

## Base Silica Physical Properties and Chemical Modification

Base Silica:	High Purity Silica Gel 99.999%
Surface Area:	450 m <sup>2</sup> /g
Pore Size:	100A
Pore Volume:	1.05 mL/g
Bonded Phase:	Octadecyl Groups
Carbon Loading:	15%
Endcapped:	Yes
Column Sizes:	50 × 2.1 mm I.D. 50 × 3.0 mm I.D.
Maximum Operating Pressure:	50 MPa
Guaranteed Theoretical Plates:	160,000/m (GLS Standard Column Performance Test)

***ISO14001: Save Energy and Resources!!!  
Reduce Amount of Eluent with Smaller ID Inertsil Columns!!!***

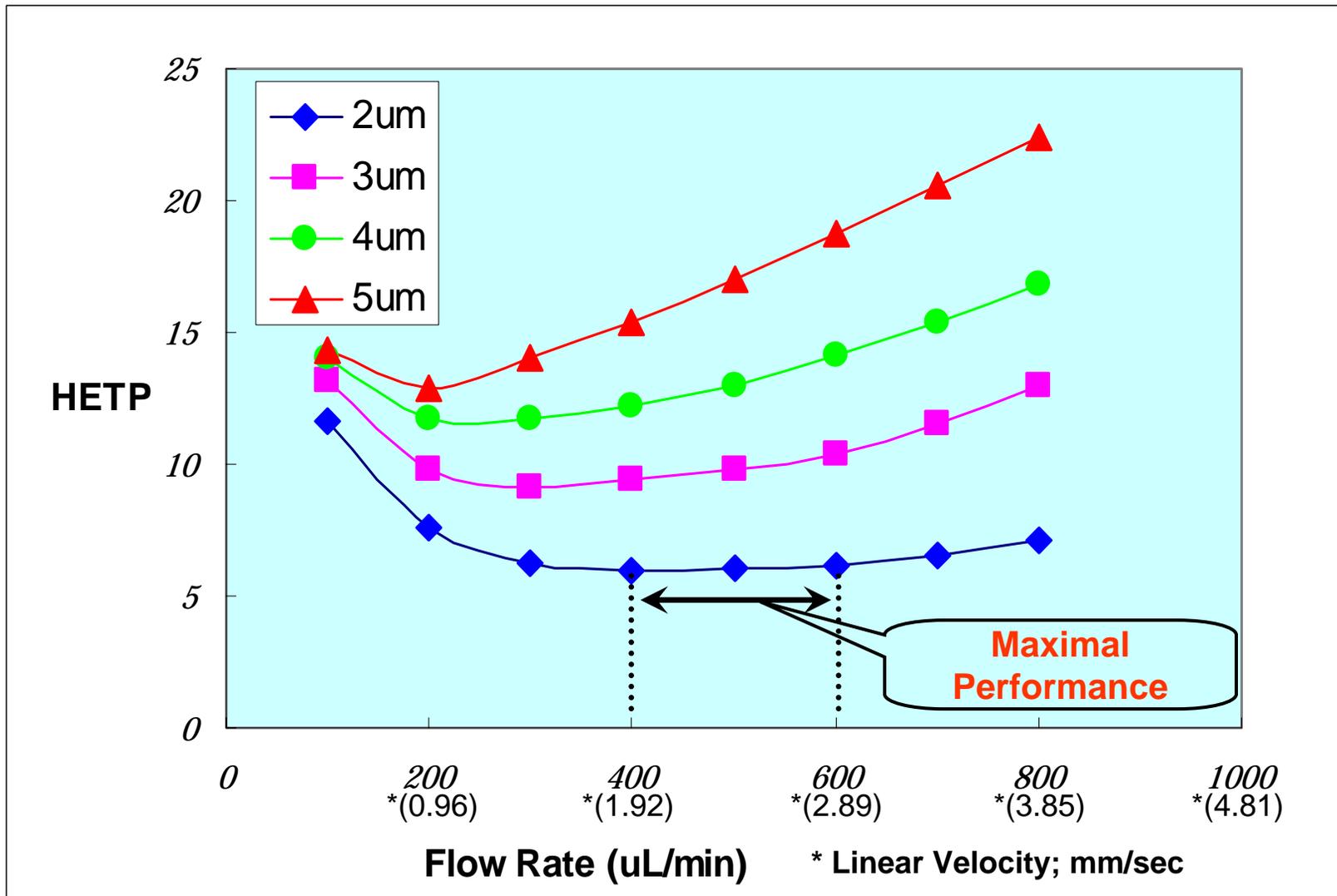


# Features of Inertsil ODS-3 2um

- **Advanced classification technologies for sizing silica gels realized an ideal balance between theoretical plate number and column back pressure enabling ultrafast throughput analysis in the existing multi-purpose HPLC system.**
  - **Fine particles are thoroughly eliminated and proper mesh size is employed, which result in less column clogging problems.**
  - **Customers who are currently using Inertsil ODS-3 5um, 4um or 3um in their analyses can now simply readily achieve High- Speed Separation without changing the analytical conditions.**
  - **A newly-developed column joint is used to minimize the dead-volume, which is an ideal design for ultrafast throughput analyses, resulting in high/sharp peak shapes for those fast eluted samples.**
- \* Maximal performance can be obtained at the following flow rate:**

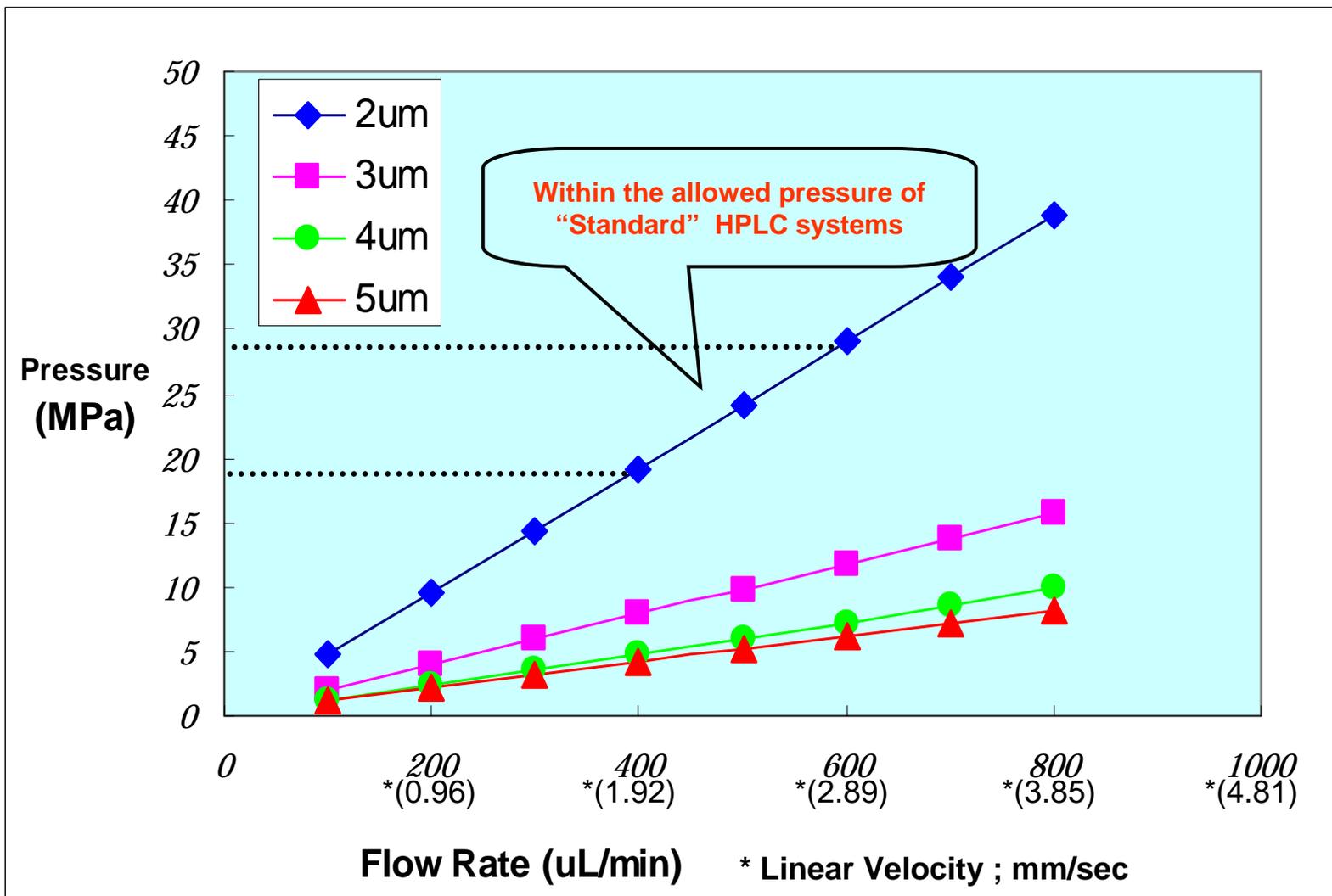
<b>2.1mmI.D.:</b>	<b>From 0.4 to 0.6 mL/min</b>
<b>3.0mmI.D.:</b>	<b>From 0.8 to 1.2 mL/min</b>

# Van Deemter Plot of HETP vs Flow Rate



Column : 50 × 2.1mm I.D., Eluent : CH<sub>3</sub>CN/H<sub>2</sub>O, Temp. : 40C

# Pressure vs Flow Rate



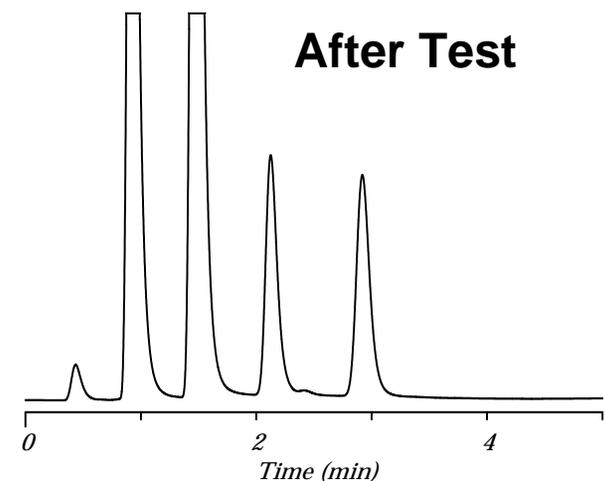
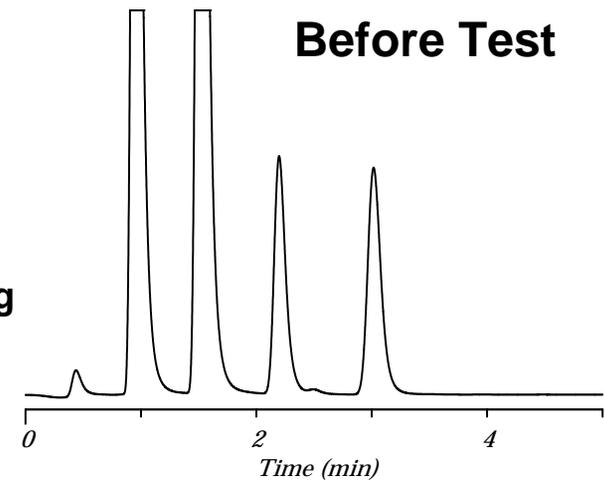
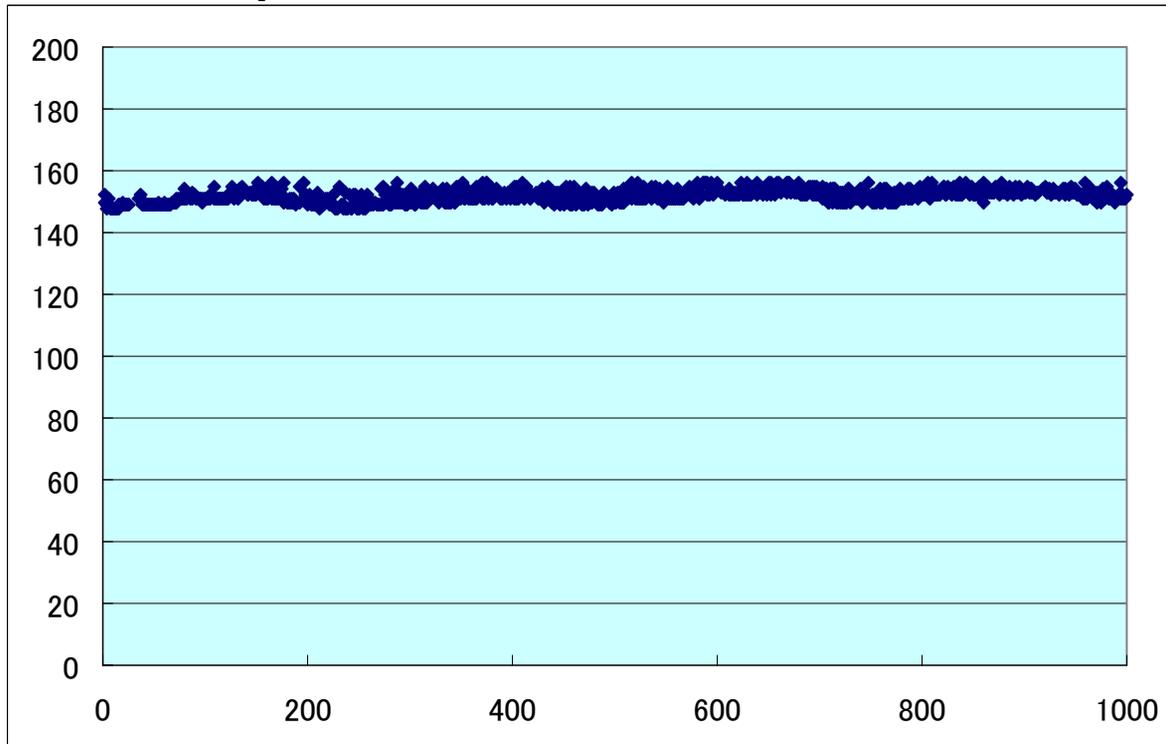
Column : 50 × 2.1mm I.D., Eluent : CH<sub>3</sub>CN/H<sub>2</sub>O, Temp. : 40C

# Durability Test - Pressure Durability -

Confirmed no column clogging or no increase of column back pressure after a 1,000 times injection of pretreated 5uL serum.

Pretreated serum: Using an human serum supernatant, which was centrifuged mixed with commercially available human serum adding equal volumes of methanol.

The pressure fluctuation of the column

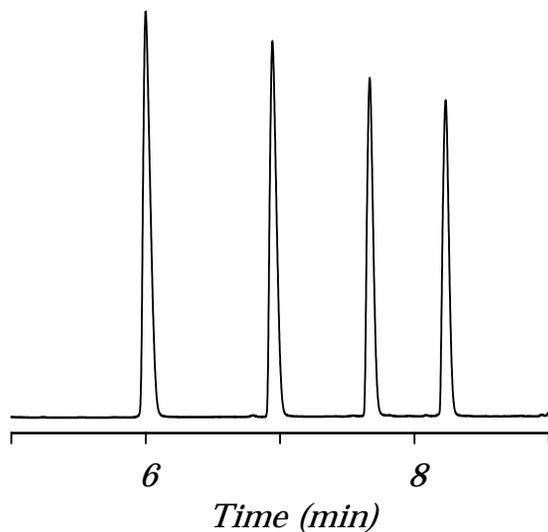


# Durability Test - Pressure Durability -

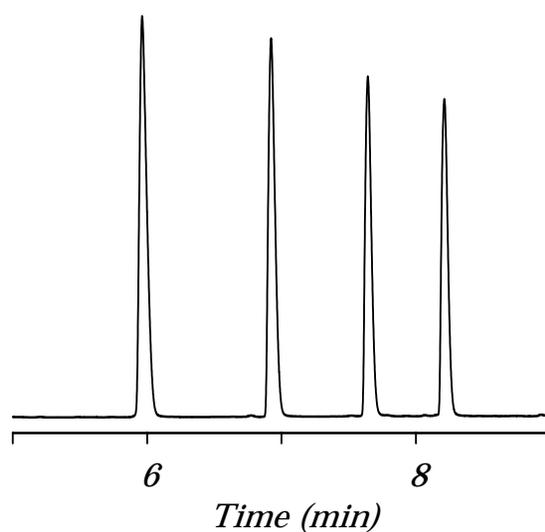
- The analytical condition was purposely set to have the maximum pressure reach at 50MPa.
- The test was repeatedly conducted and observed no variation in retention and peak shape.
- Instead of an isocratic, a gradient condition was employed since it generates more pressure fluctuation resulting in more rigorous durability test.

## Analytical Conditions

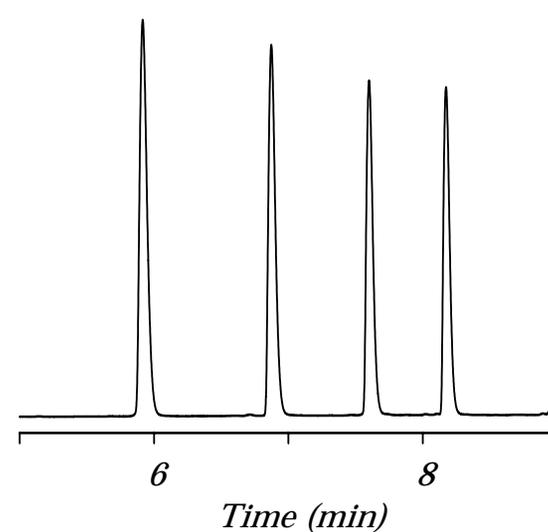
Mobile Phase: Water100% → 10min → Methanol100%  
Flow Rate: 0.5 mL/min  
Maximum Pressure: 50MPa (At Water/Methanol =50/50)  
Sample: Alkylphenol



**1<sup>st</sup> Injection**



**After 100 Injections**



**After 500 Injections**

# Comparison Chart of Sub-micron columns

Column Size: 50 × 2.1 mm I.D  
 Mobile Phase: CH<sub>3</sub>CN/H<sub>2</sub>O=50/50

Brand Name	Particle Size (um)	Basic Performance at 0.6 mL/min			
		Ret. Time	Theoretical Plates of Numbers	Pressure	*N/Mpa
Inertsil ODS-3	2	1.12 min	8,320	29.3 Mpa	284
Acquity UPLC (Waters)	< 2	0.69 min	9,500	42.0 Mpa	226
XDB-C18 (Agilent)	< 2	0.81 min	8,961	39.3 Mpa	228
UltraHT ProC18 (YMC)	≥ 2	0.90 min	6,859	26.3 Mpa	261
XR-ODS (Shimadzu)	≥ 2	0.87 min	4,411	22.2 Mpa	199

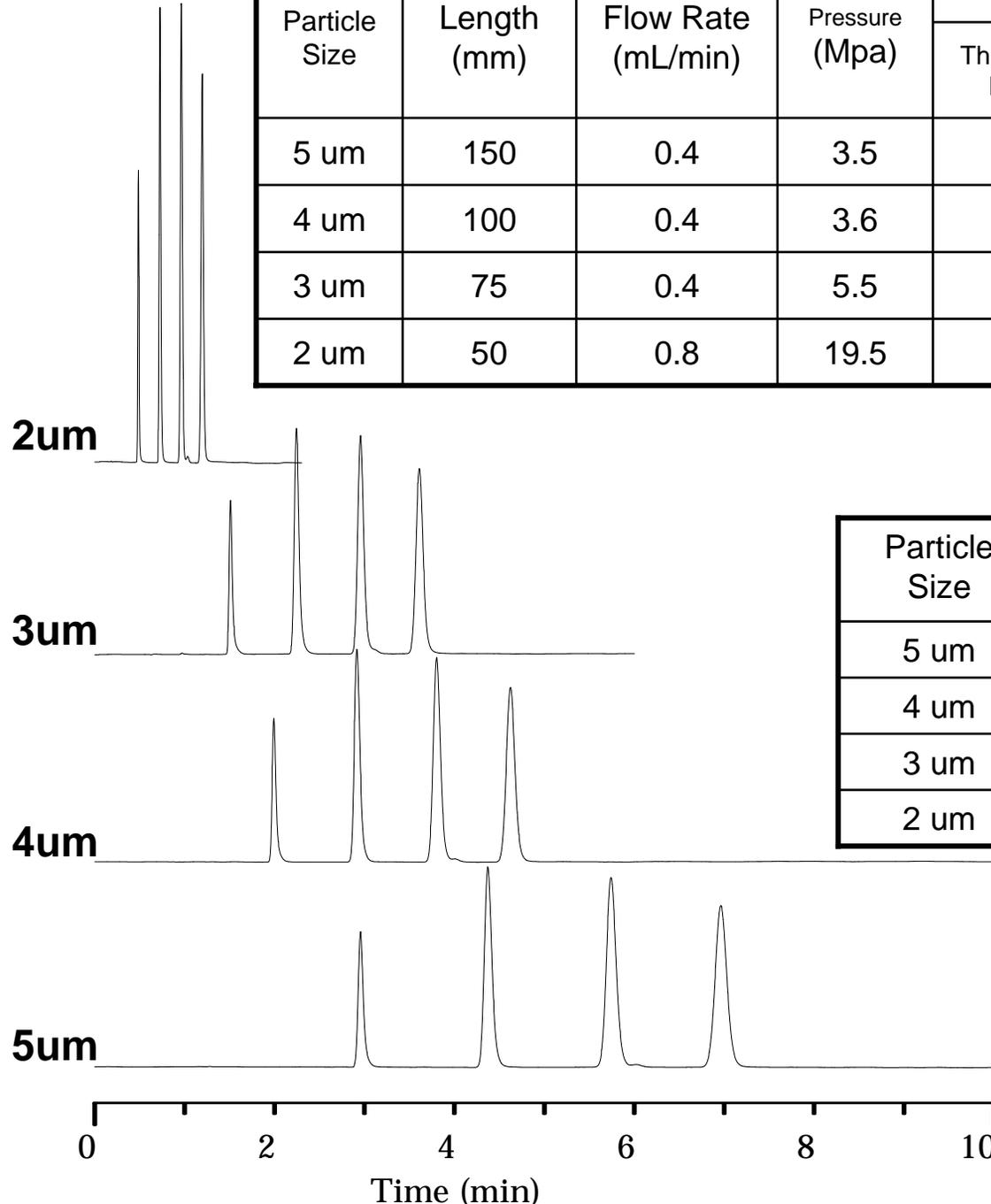
- \* N / Mpa: - Theoretical Plate of Number / 1MPa  
 - Dividing the Maximum Theoretical Plate by the Pressure.  
 - Higher the value is, higher the separating efficiency per unit pressure.

Particle Size	Length (mm)	Flow Rate (mL/min)	Pressure (Mpa)	Peak No.4			
				Theoretical Plates	Resolution	Ret. Time	Peak Height
5 um	150	0.4	3.5	13,206	5.43	6.96min	179,000
4 um	100	0.4	3.6	10,732	4.95	4.62min	194,000
3 um	75	0.4	5.5	9,362	4.70	3.61min	206,000
2 um	50	0.8	19.5	8,846	5.00	1.19min	433,000

Column I.D.: 3.0mm ; CH<sub>3</sub>CN/H<sub>2</sub>O=65/35

### Comparison with a 5um ; 150mm

Particle Size	Analysis Time	Peak Height
5 um	1.0	1.0
4 um	2/3 of 5um	1.08 times
3 um	1/2 of 5um	1.15 times
2 um	<b>1/6 of 5um</b>	<b>2.42 times</b>



- Although theoretical plate of number of 2um, 50mm length is lower than 5um, 150mm length, the separation efficiency are about the same.

- In addition, the analysis time can be 1/6 of 5um with much more higher peak height.

# Inertsil ODS-3 2um

## Instruction for Use

- When using an **ultra high pressure specification instrument**, please be careful with the **fitting type**.
- To maximize column life, **operate at pressures within 50MPa (approx. 7,200psi)**.
- To maximize the performance of the column, extreme care should be taken on the **internal diameter of piping and detector cell**.
- The below mentioned Seal Tight Fitting (Upchurch) can also be tightened by hand, however, leakage may be observed due to tolerance of an outer diameter of the piping or worn piping.  
Use stainless steel male nut and ferrule when analyzing precious samples.
- Please be careful with the setting of response speed of detector and retrieving interval on the data processor in a high throughput analysis.

Description	Cat.No.
Seal Tight Fitting, Short Nut, 10PCS/PACK, P/N F-195X (Upchurch)	*6010-72304
Seal Tight Fitting, Long Nut, 10PCS/PACK, P/N F-196X (Upchurch)	*6010-72305

\* For a quotation, please contact our local representative

- PEEK (2 piece fittings ; Seal Tight Ferrules (Comes with F-192X)
- O.D. 1/16" Tube (Nut Standard: No. 10-32UNF)
- Resistance to Pressure

When using Stainless Steel Piping:

9,000psi (Approx. 62 Mpa)

When using PEEK Piping:

7,000psi (Approx. 48 Mpa)

