

# Sepax SRT<sup>®</sup>-C, Zenix<sup>®</sup>-C SEC Phases

*Complimentary Phases to SRT for Derivatized Monoclonal Antibodies*

## General Description

**SRT, Zenix, SRT-C and Zenix-C SEC phases** developed based on innovative surface coating technology comprised of uniform, hydrophilic, and neutral nanometer thick films chemically bonded on high purity and mechanically stabilized silica. The two different types of coating chemistries, SRT and Zenix, stand-up monolayer bonded on porous silica, and SRT-C and Zenix-C, lay-down monolayer on porous silica offer ideal phase chemistries for sample type specific separation. The 3µm based Zenix and Zenix-C, and 5µm based SRT and SRT-C allow for high resolution and performance separation. The combination of these four lines of SEC phases provides a powerful total solution for robust, reproducible and highest resolution, size based separations of biological molecules.

## Featured Characteristics

- Higher resolution over wider MW range
- High lot-to-lot reproducibility
- High protein recovery with intact biological activity
- Negligible non-specific interactions
- Ideal for hydrophobic proteins, and monoclonal antibodies derivatized with polymer branches
- Suitable for separation and analysis of general biological samples

## Key features of Sepax SEC phases

Characteristics	SRT	Zenix	SRT-C	Zenix-C
Particle size	5 µm	3 µm	5 µm	3 µm
Pore size (Å)	100, 150, 300, 500, 1000 & 2000	100, 150, 300	150, 300 & 500	100, 150, 300
Resolution	High	Highest, Short column for faster separation	High	Highest, Short column for faster separation
Efficiency*	High	Doubled from 5µm	High	Doubled from 5µm
Selectivity	Same for SRT and Zenix		Same for SRT-C and Zenix-C	
Surface structure	Chemically bonded stand-up monolayer		Chemically bonded lay-down monolayer	
Recommended Sample Types	Monoclonal antibodies, proteins, peptides, nucleic acids, oligonucleotides, virus, and water-soluble polymers		"Tough samples" such as hydrophobic proteins like insulin, membrane proteins monoclonal antibodies derivatized with polymer branches, e.g. polypeptide, PEG.	

\* Using Ribonuclease A as the test molecule on a 7.8x300mm column, the plate count is 22,000 for Zenix vs. 11,160 for SRT.

## Stationary Phase Structure

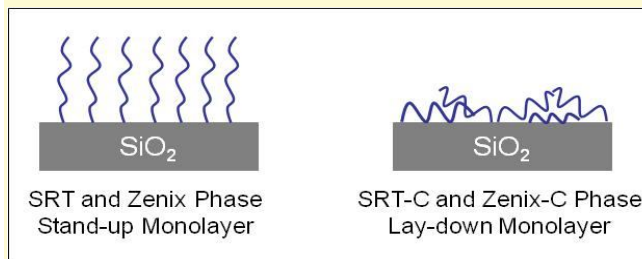


Figure 1. Phase structure difference: a monolayer stands up on the silica surface for SRT and Zenix, and a monolayer lays down on the silica surface for SRT-C and Zenix-C.

## Difference in Particle Size

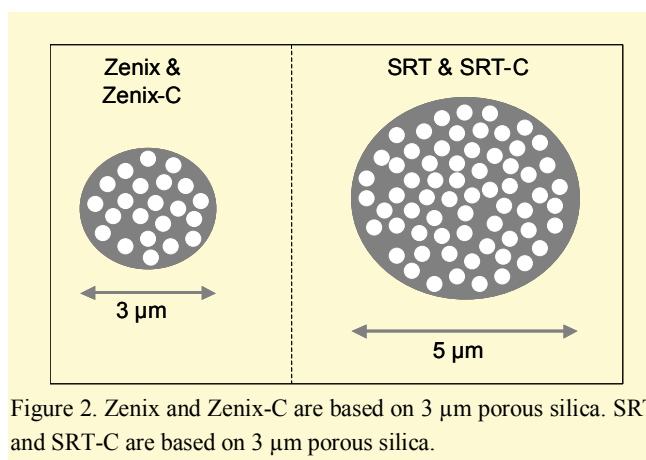
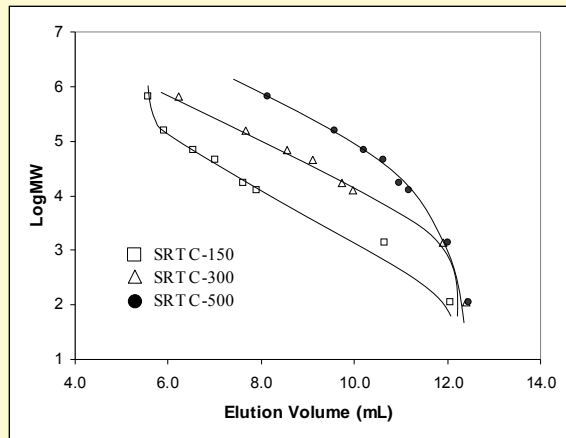


Figure 2. Zenix and Zenix-C are based on 3 µm porous silica. SRT and SRT-C are based on 5 µm porous silica.

## Protein MW Calibration

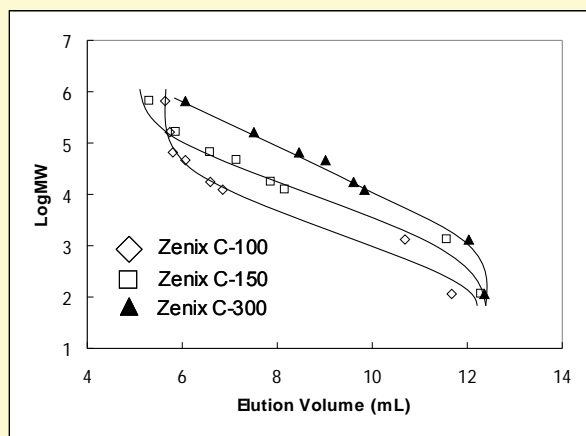
Protein molecular weight vs elution volume is plotted in Figure 3 and Figure 4, indicating that SRT C-150, 300 and 500, and Zenix-C 100, 150 and 300 have large linear elution regions for better resolution over a wider MW range.

Figure 3. Protein MW calibration with elution volume for SRT-C phases.



Columns: 7.8x300 mm, 5  $\mu$ m  
 Mobile phase: 150 mM Sodium Phosphate, pH 7.0  
 Flow rate: 1.0 mL/min  
 Detection: UV 214 nm  
 Injection volume: 10  $\mu$ L  
 Sample: 1. Thyroglobulin, 670 kD; 2.  $\gamma$ -Globulin, 158 kD; 3. BSA, 66 kD; 4. Ovalbumin, 44 kD; 5. Myoglobin, 17.6 kD; 6. Ribonuclease A, 13.7 kD; 7. B12, 1.35 kD; 8. Uracil, 120

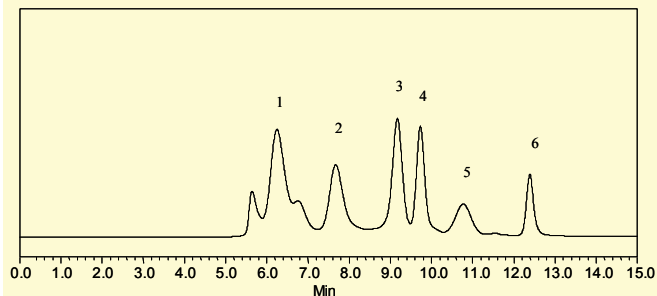
Figure 4. Protein MW calibration with elution volume for Zenix-C phases.



Columns: 7.8x300 mm, 3  $\mu$ m  
 Mobile phase: 150 mM phosphate buffer, pH 7.0  
 Flow rate: 1.0 mL/min  
 Detection: UV 214 nm  
 Injection volume: 10  $\mu$ L  
 Sample: 1. Thyroglobulin, 670 kD; 2.  $\gamma$ -Globulin, 158 kD; 3. BSA, 66 kD; 4. Ovalbumin, 44 kD; 5. Myoglobin, 17.6 kD; 6. Ribonuclease A, 13.7 kD; 7. B12, 1.35 kD; 8. Uracil, 120

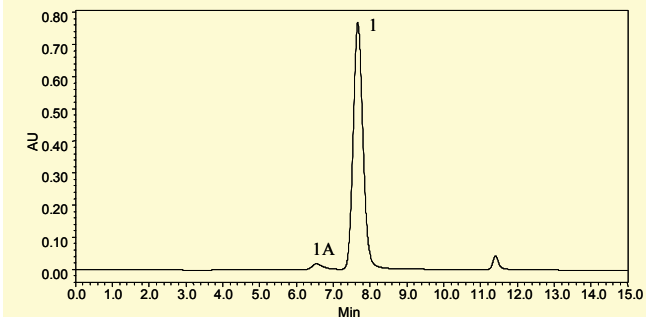
## Applications

Figure 5. Separation of a protein mixture by SRT-C-300 column.



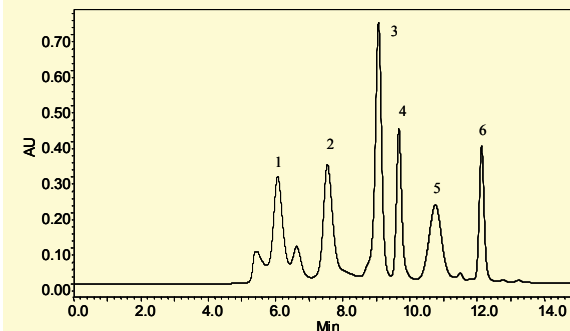
Column: SRT-C-300 (7.8x300 mm, 5  $\mu$ m)  
 Mobile phase: 150 mM Sodium Phosphate, pH 7  
 Flow rate: 1.0 mL/min  
 Temperature: ambient (~23 $^{\circ}$  C)  
 Detection: UV 214nm  
 Injection: 10  $\mu$ L  
 Sample: 1) Thyroglobulin, 670kD; 2)  $\gamma$ -Globulin, 158 kD; 3) Ovalbumin, 44kD; 4) Myoglobin, 17.6 kD; 5) Poly-DL-alanine (1-5 kD); 6) Uracil, 120D.

Figure 6. Separation of monoclonal antibody and its high MW species by SRT-C-300 column.



Column: SRT-C-300 (7.8x300 mm, 5  $\mu$ m)  
 Mobile phase: 150 mM Sodium Phosphate, pH 7  
 Flow rate: 1.0 mL/min  
 Temperature: Ambient (~23 $^{\circ}$  C)  
 Detection: UV 214nm  
 Injection: 10  $\mu$ L  
 Sample: Monoclonal antibody (1.3 mg/mL)

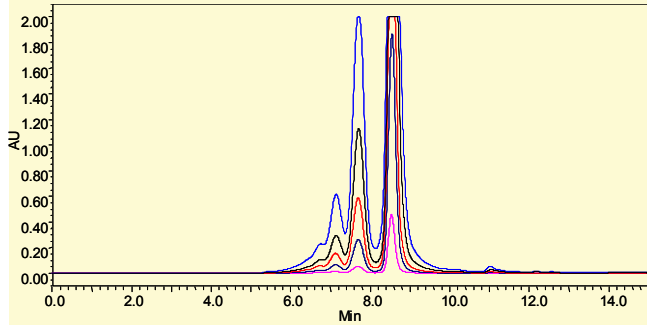
Figure 7. Separation of a protein mixture by Zenix-C 300 column.



Column: Zenix-C 300 (7.8x300 mm, 3  $\mu$ m)  
 Mobile phase: 150 mM Sodium phosphate, pH 7

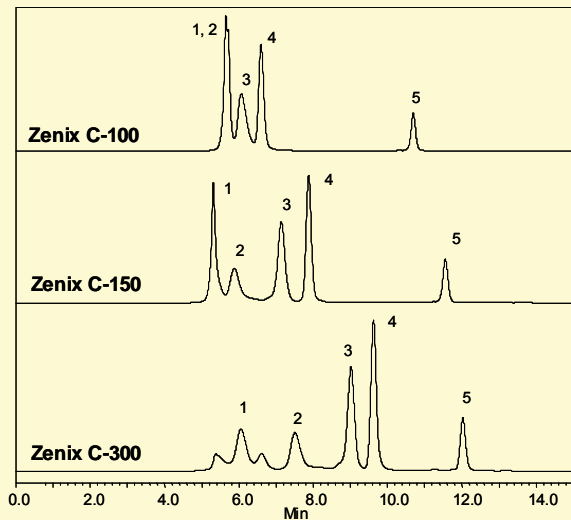
Flow rate: 1.0 mL/min  
 Temperature: ambient (~23° C)  
 Detection: UV 214nm  
 Injection: 10 µL  
 Sample: 1) Thyroglobulin, 670kD; 2) γ-Globulin, 158 kD; 3) Ovalbumin, 44kD; 4) Myoglobin, 17.6 kD; 5) Poly-DL-alanine (1-5 kD); 6) B12, 1.35KD.

Figure 8. BSA loading test on a Zenix-C SEC 300 column.



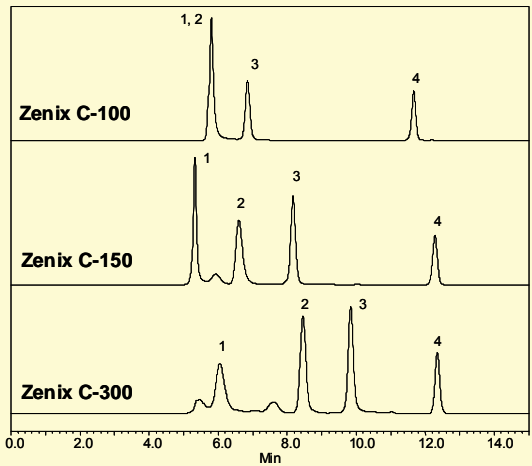
Column: Zenix SEC-300 (3 µm, 7.8x300 mm)  
 Mobile phase: 150 mM Sodium phosphate, pH 7.0  
 Flow Rate: 1.0 mL/min  
 Injection volume: 10 µL  
 BSA concentration: 1, 5, 10, 25 and 50 mg/mL (from low to high)  
 Detection: UV214 nm

Figure 9. Separation of Biorad® protein mix on Zenix-C SEC 100, 150 and 300 columns.



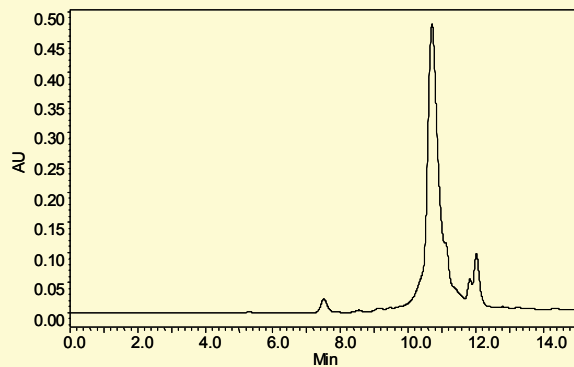
Columns: Zenix-C (3 µm, 7.8x300 mm)  
 Mobile phase: 150 mM Sodium phosphate, pH 7.0  
 Flow rate: 1.0 mL/min  
 Detection: UV214 nm  
 Injection: 10 µL  
 Sample: 1) Thyroglobulin, 670 kD; 2) γ-Globulin, 158 kD; 3) Ovalbumin, 44 kD; 4) Myoglobin, 16.9 kD; 5) Vitamin B12, 1355 D.

Figure 10. Separation of protein mixture A by Zenix-C SEC 100, 150 and 300 columns.

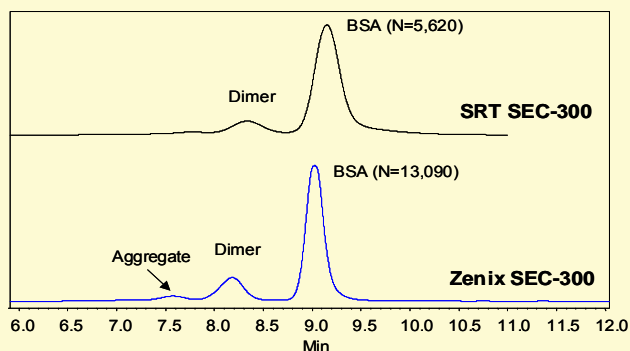


Column: Zenix-C (3 µm, 7.8x300 mm)  
 Mobile phase: 150 mM Sodium phosphate, pH 7.0  
 Flow rate: 1.0 mL/min  
 Temperature: Ambient (~23° C)  
 Detection: UV 214nm  
 Injection: 10 µL (3 µL for 4.6x300 mm)  
 Sample: 1) Thyroglobulin (1.0 mg/mL), 670 kD; 2) BSA (1.0 mg/mL), 66 kD; 3) Ribonuclease A (1.0 mg/mL), 13.7 kD, and 4) Uracil (2.5 µg/mL), 120D.

Figure 11. Elution of insulin from Zenix-C 300 column.



Columns: Zenix SEC (3 µm, 7.8x300 mm)  
 Mobile phase: 150 mM Sodium phosphate, pH 7.0  
 Flow rate: 1.0 mL/min  
 Detection: UV 214 nm  
 Injection: 10 µL  
 Sample: Insulin (from a commercial source containing impurity)



## Unique benefits of Zenix and Zenix-C Phases

Zenix and Zenix-C columns offer highest efficiency and resolution for biomolecules over a wide MW range.

Figure 3. Column: 7.8x300mm; 150 mM sodium phosphate, pH 7.0; Flow rate: 1.0 mL/min; UV 214nm; Injection: 10  $\mu$ L (5.0 mg/mL).

## SRT SEC Technical Specifications

Phase	SRT-C-150	SRT-C-300	SRT-C-500
Material	Neutral, hydrophilic film bonded silica	Neutral, hydrophilic film bonded silica	Neutral, hydrophilic film bonded silica
Particle size	5 $\mu$ m	5 $\mu$ m	5 $\mu$ m
Pore size (Å)	~ 150	~ 300	~ 500
Protein MW range (native)	500 - 150,000	5,000 - 1,250,000	15,000 - 5,000,000
pH stability	2 - 8.5 (pH 8.5-9.5 can be tolerated temporarily.)	2 - 8.5 (pH 8.5-9.5 can be tolerated temporarily.)	2 - 8.5 (pH 8.5-9.5 can be tolerated temporarily.)
Backpressure (1 mL/min, 7.8x300mm)	~ 700	~ 700	~ 700
Maximum backpressure (psi)	~ 4,500	~ 3,500	~ 3,000
Salt concentration range	20 mM - 2.0 M	20 mM - 2.0 M	20 mM - 2.0 M
Maximum temperature (°C)	~ 80	~ 80	~ 80
Mobile phase compatibility	Aqueous and organic	Aqueous and organic	Aqueous and organic

## Zenix SEC Technical Specifications

Phase	Zenix SEC-100	Zenix SEC-150	Zenix SEC-300
Material	Neutral, hydrophilic film bonded silica	Neutral, hydrophilic film bonded silica	Neutral, hydrophilic film bonded silica
Particle size	3 $\mu$ m	3 $\mu$ m	3 $\mu$ m
Pore size (Å)	~ 100	~ 150	~ 300
Protein MW range (native)	100 - 100,000	500 - 150,000	5,000 - 1,250,000
pH stability	2 - 8.5 (pH 8.5-9.5 can be tolerated temporarily.)	2 - 8.5 (pH 8.5-9.5 can be tolerated temporarily.)	2 - 8.5 (pH 8.5-9.5 can be tolerated temporarily.)
Backpressure for 7.8x300 mm (1.0 mL/min)	~ 1,500 psi	~ 1,375 psi	~ 1,100 psi
Backpressure for 4.6x300 mm (0.35 mL/min)	~ 1,400 psi	~ 1,250 psi	~ 1,000 psi
Maximum backpressure (psi)	~ 4,500	~ 4,500	~ 3,500
Salt concentration range	20 mM - 2.0 M	20 mM - 2.0 M	20 mM - 2.0 M
Maximum temperature (°C)	~ 80	~ 80	~ 80
Mobile phase compatibility	Aqueous and organic	Aqueous and organic	Aqueous and organic

**Ordering Information:**  
**Distributed by: The Nest Group, Inc.. Call for pricing and availability.**

*Other dimension and pore size available upon request*

**SRT-C-150 (5µm, 150Å)**

ID x Length (mm)	P/N
7.8x300	T 235150-7830
7.8x50 (Guard)	T 235150-7805
4.6x300	T 235150-4630
4.6x50 (Guard)	T 235150-4605
10x300	T 235150-10030
21.2x300	T 235150-21230

**SRT-C-300 (5µm, 300Å)**

ID x Length (mm)	P/N
7.8x300	T 235300-7830
7.8x50(Guard)	T 235300-7805
4.6x300	T 235300-4630
4.6x50 (Guard)	T 235300-4605
10x300	T 235300-10030
21.2x300	T 235300-21230

**SRT-C-500 (5µm, 500Å)**

ID x Length (mm)	P/N
7.8x300	T 235500-7830
7.8x50(Guard)	T 235500-7805
4.6x300	T 235500-4630
4.6x50 (Guard)	T 235500-4605
10x300	T 235500-10030
21.2x300	T 235500-21230

**Zenix-C-100 (3µm, 100Å)**

ID x Length (mm)	P/N
7.8x300	T 233100-7830
7.8x50 (Guard)	T 233100-7805
4.6x300	T 233100-4630
4.6x50 (Guard)	T 233100-4605
10x300	T 233100-10030
21.2x300	T 233100-21230

**Zenix-C-150 (3µm, 150Å)**

ID x Length (mm)	P/N
7.8x300	T 233150-7830
7.8x50(Guard)	T 233150-7805
4.6x300	T 233150-4630
4.6x50 (Guard)	T 233150-4605
10x300	T 233150-10030
21.2x300	T 233150-21230

**Zenix-C-300 (3µm, 300Å)**

ID x Length (mm)	P/N
7.8x300	T 233300-7830
7.8x50(Guard)	T 233300-7805
4.6x300	T 233300-4630
4.6x50 (Guard)	T 233300-4605
10x300	T 233300-10030
21.2x300	T 233300-21230

**Zenix & Zenix-C SEC Solution Pack**

**P/N T Z233300-7830**

Includes

- 1 Zenix (300Å, 7.8x300mm)
- +
- 1 Zenix-C (300Å, 7.8x300mm)

**P/N T Z233150-7830**

Includes

- 1 Zenix (150Å, 7.8x300mm)
- +
- 1 Zenix-C (150Å, 7.8x300mm)

**Limited Time Introductory Offer \$2,400 / pk.**