

Sepax SRT[®]-C, Zenix[®]-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

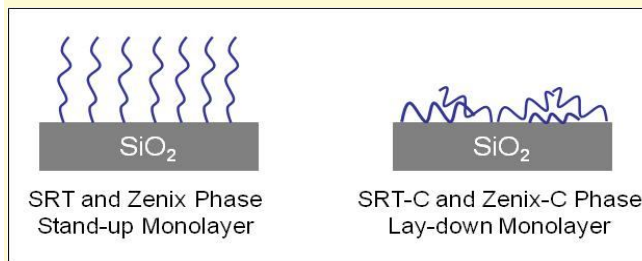


Figure 1. Phase structure difference: a monolayer stands up on the silica surface for SRT and Zenix, and a monolayer lays down on the silica surface for SRT-C and Zenix-C.

Difference in Particle Size

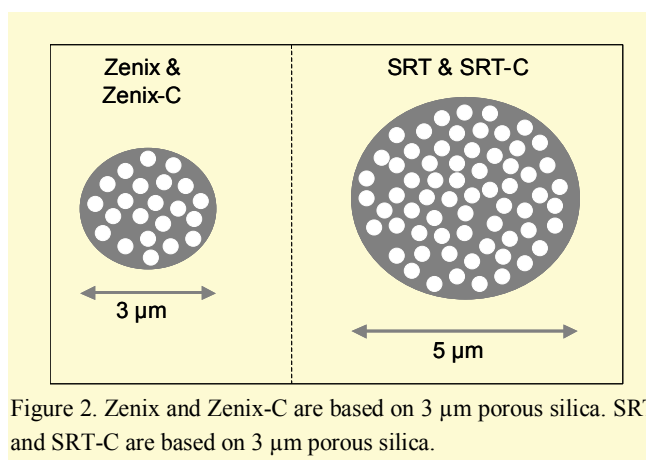
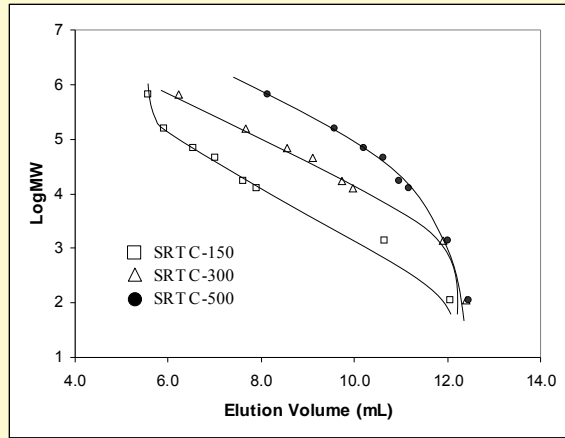


Figure 2. Zenix and Zenix-C are based on 3 µm porous silica. SRT and SRT-C are based on 5 µm porous silica.

Protein MW Calibration

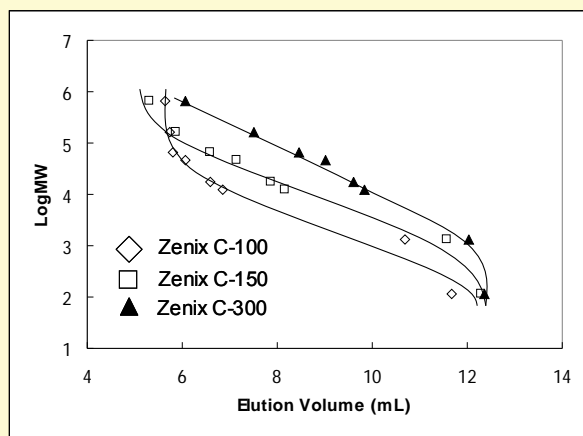
Protein molecular weight vs elution volume is plotted in Figure 3 and Figure 4, indicating that SRT C-150, 300 and 500, and Zenix-C 100, 150 and 300 have large linear elution regions for better resolution over a wider MW range.

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



Columns: 7.8x300 mm, 5 μ m
 Mobile phase: 150 mM Sodium Phosphate, pH 7.0
 Flow rate: 1.0 mL/min
 Detection: UV 214 nm
 Injection volume: 10 μ L
 Sample: 1. Thyroglobulin, 670 kD; 2. γ -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

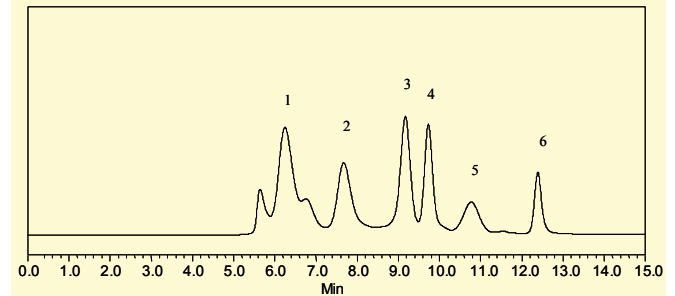
Figure 4. Protein MW calibration with elution volume for Zenix-C phases.



Columns: 7.8x300 mm, 3 μ m
 Mobile phase: 150 mM phosphate buffer, pH 7.0
 Flow rate: 1.0 mL/min
 Detection: UV 214 nm
 Injection volume: 10 μ L
 Sample: 1. Thyroglobulin, 670 kD; 2. γ -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

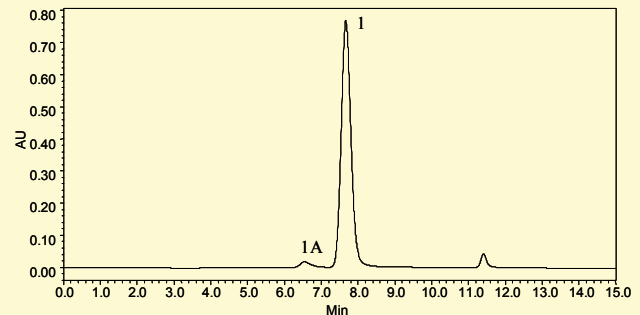
Applications

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



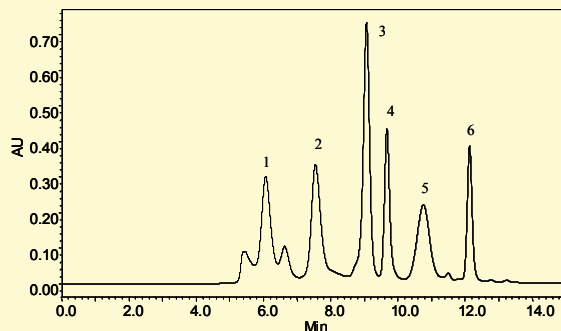
Column: SRT-C-300 (7.8x300 mm, 5 μ m)
 Mobile phase: 150 mM Sodium Phosphate, pH 7
 Flow rate: 1.0 mL/min
 Temperature: ambient (~23 $^{\circ}$ C)
 Detection: UV 214nm
 Injection: 10 μ L
 Sample: 1) Thyroglobulin, 670kD; 2) γ -Globulin, 158 kD; 3) Ovalbumin, 44kD; 4) Myoglobin, 17.6 kD; 5) Poly-DL-alanine (1-5 kD); 6) 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 μ 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 μ L
 Sample: Monoclonal antibody (1.3 mg/mL)

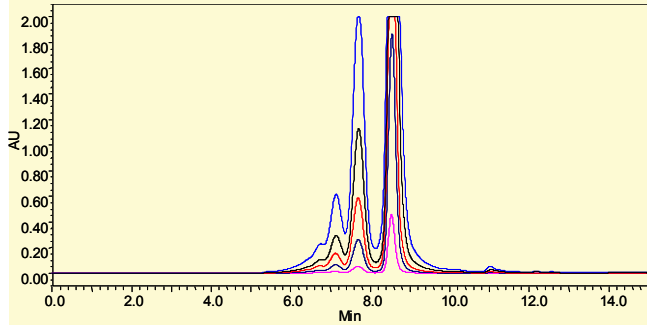
Figure 7. Separation of a protein mixture by Zenix-C 300 column.



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

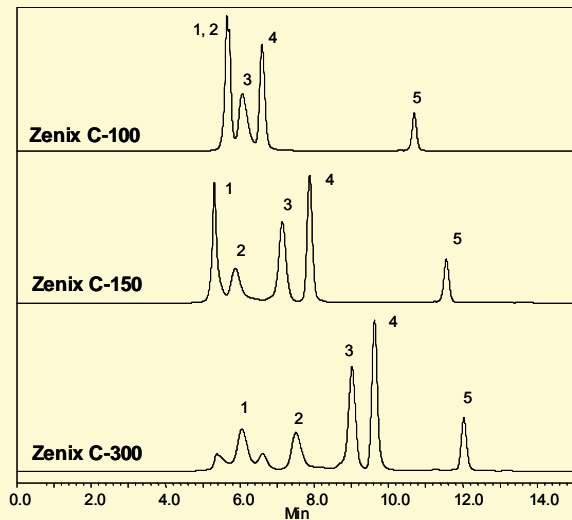
Flow rate: 1.0 mL/min
 Temperature: ambient (~23° C)
 Detection: UV 214nm
 Injection: 10 µL
 Sample: 1) Thyroglobulin, 670kD; 2) γ-Globulin, 158 kD; 3) Ovalbumin, 44kD; 4) Myoglobin, 17.6 kD; 5) Poly-DL-alanine (1-5 kD); 6) B12, 1.35KD.

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



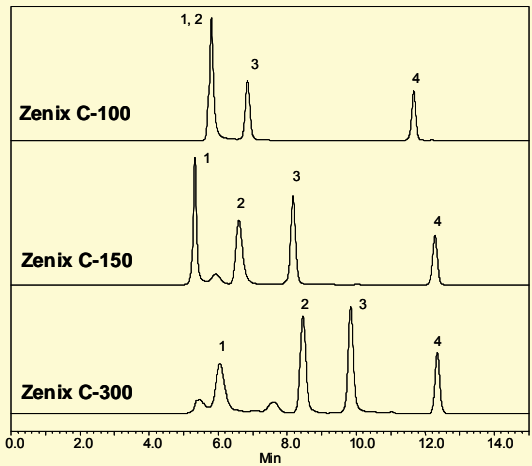
Column: Zenix SEC-300 (3 µm, 7.8x300 mm)
 Mobile phase: 150 mM Sodium phosphate, pH 7.0
 Flow Rate: 1.0 mL/min
 Injection volume: 10 µL
 BSA concentration: 1, 5, 10, 25 and 50 mg/mL (from low to high)
 Detection: UV214 nm

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



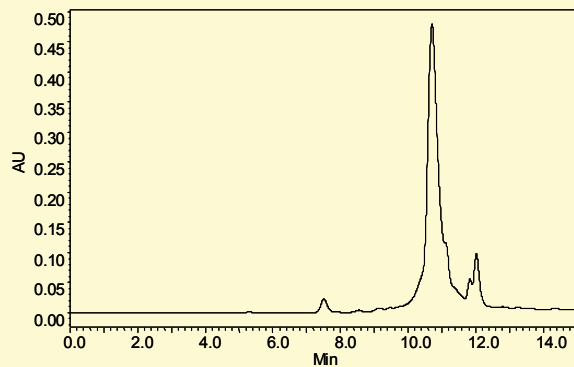
Columns: Zenix-C (3 µm, 7.8x300 mm)
 Mobile phase: 150 mM Sodium phosphate, pH 7.0
 Flow rate: 1.0 mL/min
 Detection: UV214 nm
 Injection: 10 µL
 Sample: 1) Thyroglobulin, 670 kD; 2) γ-Globulin, 158 kD; 3) Ovalbumin, 44 kD; 4) Myoglobin, 16.9 kD; 5) Vitamin B12, 1355 D.

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

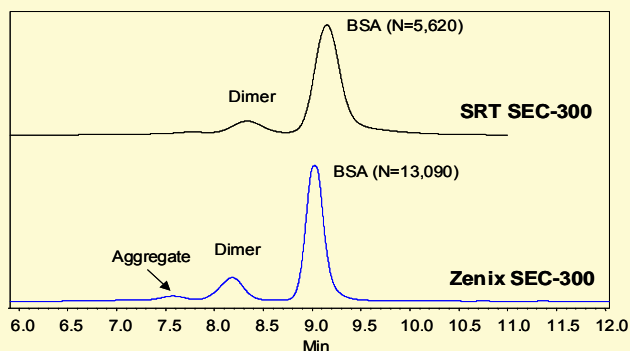


Column: Zenix-C (3 µm, 7.8x300 mm)
 Mobile phase: 150 mM Sodium phosphate, pH 7.0
 Flow rate: 1.0 mL/min
 Temperature: Ambient (~23° C)
 Detection: UV 214nm
 Injection: 10 µL (3 µL for 4.6x300 mm)
 Sample: 1) Thyroglobulin (1.0 mg/mL), 670 kD; 2) BSA (1.0 mg/mL), 66 kD; 3) Ribonuclease A (1.0 mg/mL), 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 μ 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 μ m | 5 μ m | 5 μ 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 μ m | 3 μ m | 3 μ 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.**