



SRT[®]-10 SEC Bulk Media and Columns

High Resolution and High Loading Semi-prep and Preparative Size Exclusion Separation

General Description

Utilizing proprietary surface technologies, SRT-10 SEC phases are made of uniform, hydrophilic, and neutral nanometer thick films chemically bonded on high purity and mechanically stabilized 10 µm silica. The well-controlled surface chemistry results in excellent lot-to-lot reproducibility. Our unique bonding chemistry, coupled with the maximized bonding density, allows SRT-10 phases to provide high stability and negligible non-specific interactions. SRT-10 packings have large pore volume, resulting in high separation resolution. The narrowly dispersed, spherical silica particles of the SRT 10-150, 10-300 and P-500 have nominal pore sizes at 150, 300, and 500 Å, respectively. Typical applications for SRT-10 columns include separation and detection of biological molecules and water-soluble polymers in aqueous buffers.



Featured Characteristics

- Particle size: 10 µm
- Pore size selection: 150, 300 and 500 Å
- pH stability 2-8.5
- High capacity and resolution
- High stability over low and high concentration salt
- Excellent lot-to-lot reproducibility
- High protein recovery with intact biological activity
- Chemically bonded stationary phase resulting in negligible non-specific interactions
- Ideal for separation of biological molecules: proteins, nucleic acids, oligonucleotides, peptides and virus
- Ideal for separation of natural polymers, e.g. polysaccharides, water soluble synthetic polymers, and nanomaterials, e.g. nanoparticles

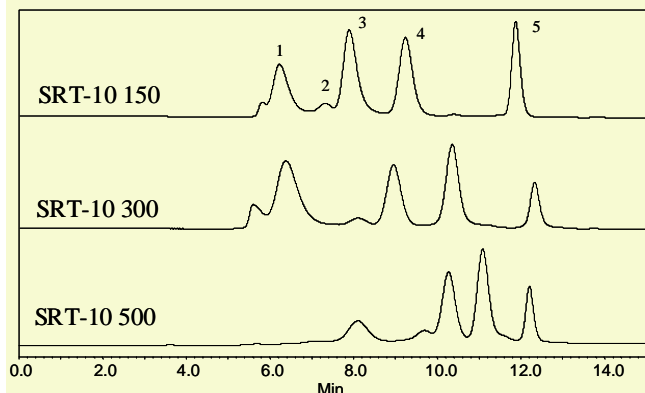
Pore size vs. MW exclusion limit

Phases (10 µm)	Pore Size	Protein MW Exclusion Limit
SRT 10-150	150 Å	150,000
SRT 10-300	300 Å	1,250,000
SRT 10-500	500 Å	5,000,000

High Resolution

Benefiting from the rigid silica particle with high pore volume and uniform hydrophilic coating, SRT-10 packings achieved high efficiency and high resolution. Figure 1 shows the separation profiles of four proteins (thyroglobulin, BSA dimer, BSA and ribonuclease A) and uracil with the molecular weight in the range of 660,000 – 120.

Figure 1. Comparison of the separation profiles of a protein mixture by SRT-10 150, 300 and 500 columns.

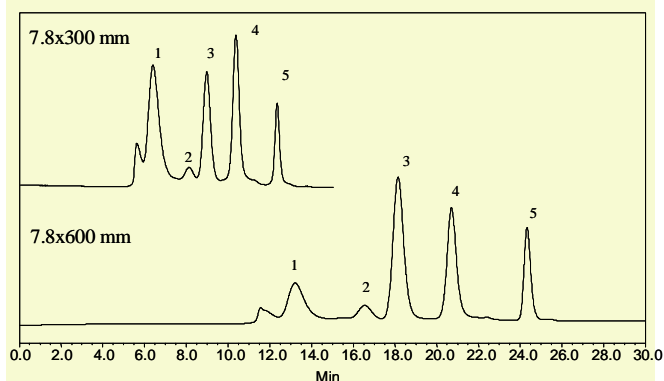


Columns: 7.8x300 mm (10 µm)
Mobile phase: 150 mM phosphate buffer, pH 7.0
Flow rate: 1.0 mL/min
Detection: UV 214 nm
Temperature: Ambient (23 °C)
Injection volume: 5.0 µL
Sample: 1) Thyroglobulin (1.0 mg/mL), 670 kD; 2) BSA dimer, 132 kD; 3) BSA (1.0 mg/mL), 66 kD; 4) Ribonuclease A (1.0 mg/mL), 13.7 kD, and 5) Uracil (2.5 µg/mL), 120.

Column Length Impact on Resolution

The separation resolution can be greatly enhanced by increasing the column length. Figure 2 is the protein separation by a 60 cm long SRT-10 300 column vs a 30 cm SRT-10 300 column. The efficiency with 60 cm length is almost doubled as that of 30 cm length.

Figure 2. The column length impact on separation efficiency.



Columns: SRT-10 300 (10 μ m)
 Mobile phase: 150 mM phosphate buffer, pH 7.0
 Flow rate: 1.0 mL/min
 Detection: UV 214 nm
 Temperature: Ambient (23 $^{\circ}$ C)
 Injection volume: 5.0 μ L
 Sample: 1) Thyroglobulin (670 kD), 2) BSA dimer (132 kD), 3) BSA (66 kD), 4) Ribonuclease A (13.7 kD), and 5) Uracil (120D).

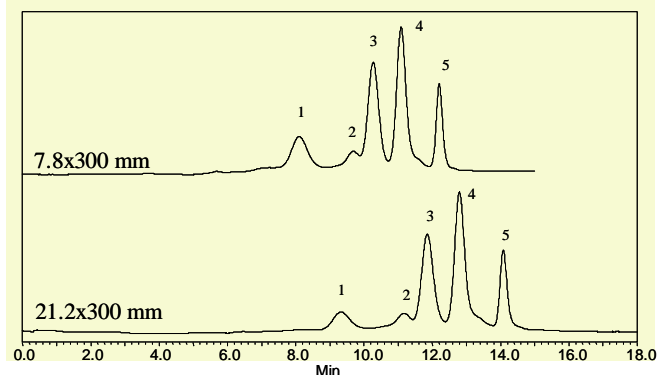
Table 1. Efficiency of SRT-10 300 columns with various lengths

Peak	Proteins	7.8x300mm	7.8x600mm
1	Thyroglobulin	691	1482
2	BSA dimer	2318	3452
3	BSA	3040	5827
4	Ribonuclease A	5272	10151
5	Uracil	14632	26821

Column ID Impact on Separation Resolution

Well packed SRT semi-preparative and preparative columns also increase their separation efficiency and resolution compared to the analytical column with the same length. Figure 3 shows the direct comparison of a 21.2 mm ID semi-prep column and a 7.8 mm ID analytical column, indicating that the semi-prep column increases the efficiency by 15% (The plate number of BSA is 4930 and 4338 for 21.2x300 mm and 7.8x300 mm columns, separately. For ribonuclease A, the plate number is 8098 and 6984 for 21.2x300 mm and 7.8x300 mm columns, separately.)

Figure 3. The column ID impact on separation efficiency.

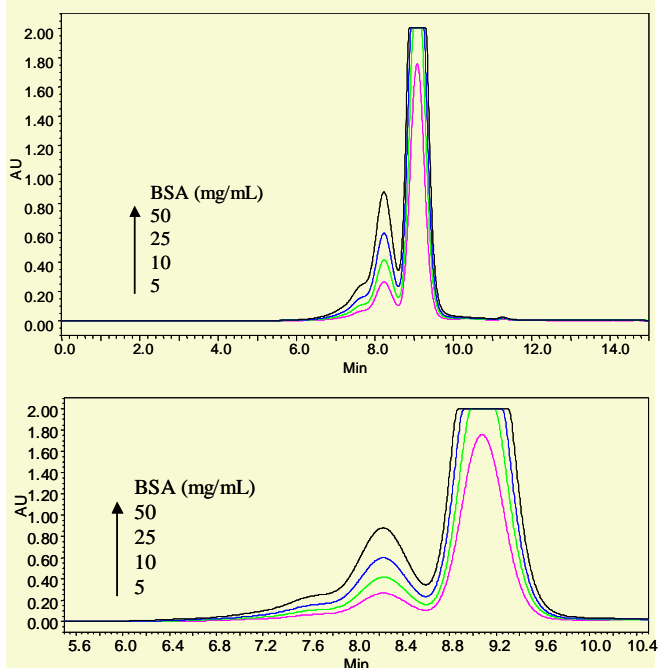


Columns: SRT-10 500 (10 μ m)
 Mobile phase: 150 mM phosphate buffer, pH 7.0
 Flow rate: 1.0 mL/min for 7.8x300 mm
 7.0 mL/min for 21.2x300mm
 Detection: UV 214 nm
 Temperature: Ambient (23 $^{\circ}$ C)
 Injection volume: 5.0 and 20 μ L for 7.8 and 21.2 mm ID
 Sample: 1) Thyroglobulin (1.0 mg/mL), 670 kD; 2) BSA dimer, 132 kD; 3) BSA (1.0 mg/mL), 66 kD; 4) Ribonuclease A (1.0 mg/mL), 13.7 kD, and 5) Uracil (2.5 μ g/mL), 120.

High Loading Capacity

Loading capacity is critical for size exclusion separation and purification. Figure 4 shows high loading capacity for BSA as one example (>500 μ g for a SRT-10 300, 7.8x300 mm analytical column).

Figure 4. BSA loading test on a SRT-10 300 column.



Column: SRT-10 (7.8x300 mm, 10 μ m)
 Mobile phase: 150 mM PBS, pH 8.5
 Flow Rate: 1.0 mL/min
 Injection volume: 10 μ L
 Detection: UV214 nm

High Robustness

SRT-10 packings have specially designed stationary phases that are densely bonded on the silica surface which enhances the stability of the column, resulting in high robustness at high flow rates.

High Stability

The proprietary stationary phases of SRT-10 packings utilize densely bonded chemistry on the silica surface, which greatly hinders the diffusion of the molecules that would attack the bond of silica-stationary phase layer, thus enabling high stability over a wide range of pH from 2 to 8.5. If use in higher pH, such as 9.0, equilibrate the column with 150 mM sodium phosphate at pH 7.0 and store the column in 50 mM sodium phosphate at pH 7.0.

Mobile Phase Compatibility

SRT-10 phases are compatible with most aqueous buffers, such as ammonium acetate, phosphate, trizma and so on. SRT-10 phases can tolerate high concentration of salts, such as 2.0 M. Furthermore, SRT-10 columns are stable in both organic solvents, such as methanol, ethanol, THF, DMF, DMSO, and so on; as well as the mixture of water and organic solvents.

High Protein Recovery

SRT-10 phases are hydrophilic and neutral. Proteins and other biological molecules have negligible nonspecific interactions with SRT-10 stationary phases. The protein

adsorption to the silica surface is suppressed, leading to high recovery of intact proteins, maintaining the protein activity after separation. More than 95% recovery is achieved for BSA and lysozyme, the representatives for acidic and basic proteins, respectively.

Applications

SRT-10 bulk media and columns have wide applications in separation and purification, such as

- Proteins
- Monoclonal antibodies
- Cell lysates
- Nucleic acids
- Nucleotides
- Peptides
- Water-soluble polymers
- Nanoparticles
- Nanotubes

SRT-10 Technical Specifications

Phase	SRT-10 150	SRT-10 300	SRT-10 500
Material	Neutral, hydrophilic film bonded silica	Neutral, hydrophilic film bonded silica	Neutral, hydrophilic film bonded silica
Particle size	10 μm	10 μm	10 μm
Pore size (\AA)	~ 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 (flow rate at 1.0 mL/min for a 7.8x300 mm)	~ 300 psi	~ 300 psi	~300 psi
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 ($^{\circ}\text{C}$)	~ 80	~ 80	~ 80
Mobile phase compatibility	Aqueous and organic	Aqueous and organic	Aqueous and organic

Column Dimension Availability

Available SRT SEC column dimensions 4.6, 7.8, 10, 21.2, 30 and 50 mm I.D., and 50, 100, 150, 250, 300 and 600 mm length. Sepax also offers custom-made columns. Both stainless steel and PEEK tubes are available.

Column Loading Guideline

Column size	Loading (mg)		
	SRT-10 150	SRT-10 300	SRT-10 500
7.8x300mm	0.005 - 1.0	0.005 - 1.0	0.005 - 1.0
21.2x300mm	0.05 - 10.0	0.05 - 10.0	0.05 - 10.0
30x300mm	0.1 - 20.0	0.1 - 20.0	0.1 - 20.0
50x300mm	0.25 - 50.0	0.25 - 50.0	0.25 - 50.0

Ordering Information

SRT-10 Columns

SRT-10 150 (10 μm , 150 Å)

ID x Length (mm)	P/N
50x300	225150-50030
50x250	225150-50025
30x300	225150-30030
30x250	225150-30025
21.2x300	225150-21230
21.1x250	225150-21225
21.2x50 (Guard)	225150-21205
10x300	225150-10030
10x250	225150-10025
10x50 (Guard)	225150-10005
7.8x300	225150-7830
7.8x250	225150-7825
7.8x150	225150-7815
7.8x50 (Guard)	225150-7805
4.6x300	225150-4630
4.6x250	225150-4625
4.6x50 (Guard)	225150-4605

SRT-10 300 (10 μm , 300 Å)

ID x Length (mm)	P/N
50x300	225300-50030
50x250	225300-50025
30x300	225300-30030
30x250	225300-30025
21.2x300	225300-21230
21.1x250	225300-21225
21.2x50 (Guard)	225300-21205
10x300	225300-10030
10x250	225300-10025
10x50 (Guard)	225300-10005
7.8x300	225300-7830
7.8x250	225300-7825
7.8x150	225300-7815
7.8x50 (Guard)	225300-7805
4.6x300	225300-4630
4.6x250	225300-4625
4.6x50 (Guard)	225300-4605

SRT-10 500 (10 μm , 500 Å)

ID x Length (mm)	P/N
50x300	225500-50030
50x250	225500-50025
30x300	225500-30030
30x250	225500-30025
21.2x300	225500-21230
21.1x250	225500-21225
21.2x50 (Guard)	225500-21205
10x300	225500-10030
10x250	225500-10025
10x50 (Guard)	225500-10005
7.8x300	225500-7830
7.8x250	225500-7825
7.8x150	225500-7815
7.8x50 (Guard)	225500-7805
4.6x300	225500-4630
4.6x250	225500-4625
4.6x50 (Guard)	225500-4605

SRT-10 Bulk Media

SRT-10 150 (10 μm , 150 Å)

Quantity	P/N
10 g	225150-0010
100 g	225150-0100
500 g	225150-0500
1 kg	225150-1000
5 kg	225150-5000

SRT-10 300 (10 μm , 300 Å)

Quantity	P/N
10 g	225300-0010
100 g	225300-0100
500 g	225300-0500
1 kg	225300-1000
5 kg	225300-5000

SRT-10 500 (10 μm , 500 Å)

Quantity	P/N
10 g	225500-0010
100 g	225500-0100
500 g	225500-0500
1 kg	225500-1000
5 kg	225500-5000



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