

Confidently **separate**  
and **characterize**  
bio-molecules with  
Agilent BioHPLC columns



**Size Exclusion BioHPLC columns**



**Ion Exchange BioHPLC columns**

Our measure is your success.

products | applications | software | services



**Agilent Technologies**

*"It's a struggle to isolate and identify charge variants of our monoclonal antibodies. How can I better separate the protein's isoforms?"*

*"How can we be certain that our analytical methods will remain consistent in quality control?"*

*"My team is under a lot of pressure to better characterize our lead protein therapeutics. Is there any new analytical technology out there that might help us?"*



*Whether your goal is to characterize the next biopharmaceutical or isolate a target protein, Agilent can help you overcome the many challenges involved in developing these analytical methods.*



Introducing the Agilent Size Exclusion and Ion Exchange BioHPLC columns, featuring four new column families that enable highly reproducible and high resolution analytical separations of monoclonal antibodies, proteins, peptides, and other bio-molecules.

**Agilent Bio SEC-3 HPLC columns (page 4)** promote sharper peaks and faster size-based separations for bio-molecules and water-soluble polymers. They are packed with 3  $\mu\text{m}$  porous silica particles coated with a proprietary, hydrophilic layer to maximize separation efficiency and resolution.

**Agilent Bio SEC-5 HPLC columns (page 7)** offer improved peak capacity and resolution for a broad range of size-based, bio-molecule separations. They are packed with 5  $\mu\text{m}$  silica particles coated with a neutral hydrophilic layer decreasing secondary interactions.

**Agilent Bio MAb HPLC columns (page 10)** are specifically designed for high-resolution monoclonal antibody (MAb) separations. The columns are packed with polymeric, non-porous, weak cation exchange particles surrounded by a hydrophilic coating, which offers unique selectivity for antibodies and eliminates most non-specific interactions.

**Agilent Bio IEX HPLC columns (page 13)** ensure high-resolution, high-recovery, and highly efficient separations of proteins, peptides, oligonucleotides, and other bio-molecules. The columns are packed with polymeric, non-porous particles coated with a unique hydrophilic layer that virtually eliminates non-specific interactions. Multiple ion exchange groups are attached at each bonding site offering excellent capacity and selectivity.

As a leading provider of analytical solutions to the biopharmaceutical industry, Agilent understands that quality and consistency are critical to providing safe and highly efficacious therapeutic products. **Agilent's analytical BioHPLC columns offer the speed, resolution and reproducibility you need to quickly and cost-effectively get life-changing products into the hands of those who need them.**



Visit [www.agilent.com/chem/BioHPLC](http://www.agilent.com/chem/BioHPLC) to learn more.

# Agilent Bio SEC-3 HPLC columns (3 μm particle size)

High efficiency and high resolution  
size-based separations for bio-molecules

Agilent Bio SEC-3 HPLC columns are a unique technology for size exclusion chromatography (SEC). They are packed with spherical, narrowly dispersed 3 μm silica particles coated with a proprietary, hydrophilic layer. This thin polymeric layer is chemically bonded to pure, mechanically stable silica under controlled conditions, ensuring a highly efficient size exclusion particle.

Other column advantages include:

- Exceptional loading capacity, stability, and reproducibility for size-based, bio-molecule separations
- Sharper peaks, higher resolution, and better protein recovery
- Faster separations than large-particle SEC columns, in many cases
- Compatibility with most aqueous buffers
- Excellent stability in high and low salt conditions

## Column Characteristics



Agilent Bio SEC-3 HPLC columns are available in 100Å, 150Å and 300Å pore sizes to accommodate most peptide and protein size exclusion separations.

Column Phase	Size Exclusion
<b>Packing</b>	Spherical, high purity, porous silica with a hydrophilic polymeric coating
<b>Particle size</b>	3 μm
<b>Pore structure</b>	100Å, 150Å, 300Å
<b>Column exclusion limits (in Daltons)</b>	100 Å MW range: 100 ~ 100,000 150 Å MW range: 500 ~ 150,000 300 Å MW range: 5,000 ~ 1,250,000
<b>pH stability</b>	2-8.5
<b>Operating temperature limit</b>	Recommended range: 10-30°C, maximum: 80°C
<b>Operating pressure limit</b>	Recommended operating pressure: 135 bar (2,000 psi) Maximum pressure: 240 bar (3,500 psi)
<b>Mobile phase compatibility</b>	Recommended: 150 mM phosphate buffer, pH 7.0, other aqueous buffers with high and low salt can be used
<b>Working flow rate</b>	0.1 - 1.25 mL/min for 7.8 mm I.D. columns 0.1 - 0.4 mL/min for 4.6 mm I.D. columns

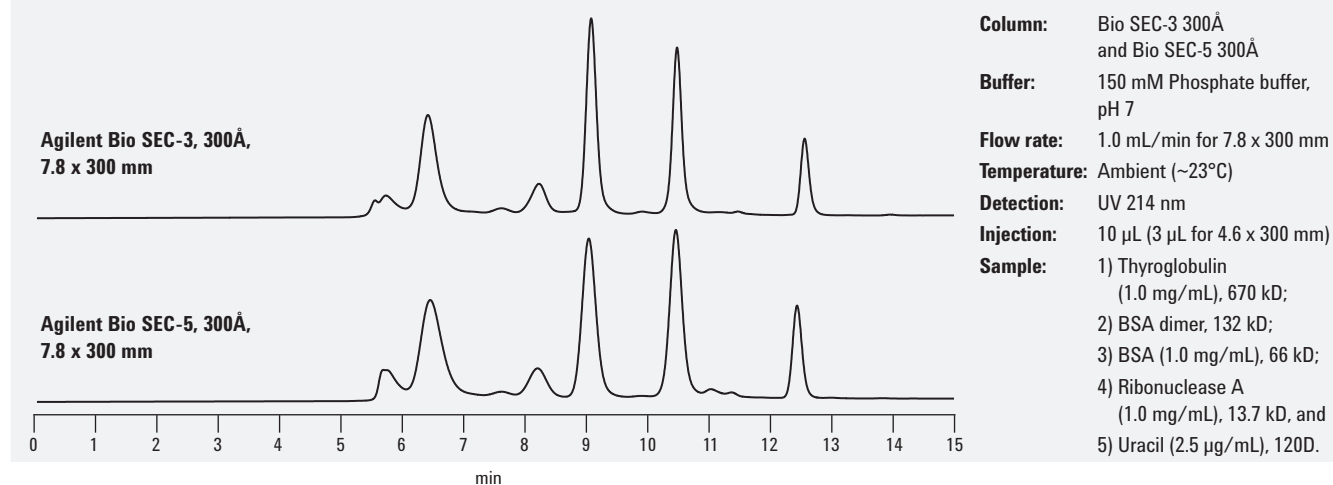


## Recommended Applications

Antibody and protein aggregation analysis, separation of proteins in cell lysates, separation of protein mixtures, natural polymers, nanomaterials, oligonucleotides, polysaccharides, and other bio-molecules.

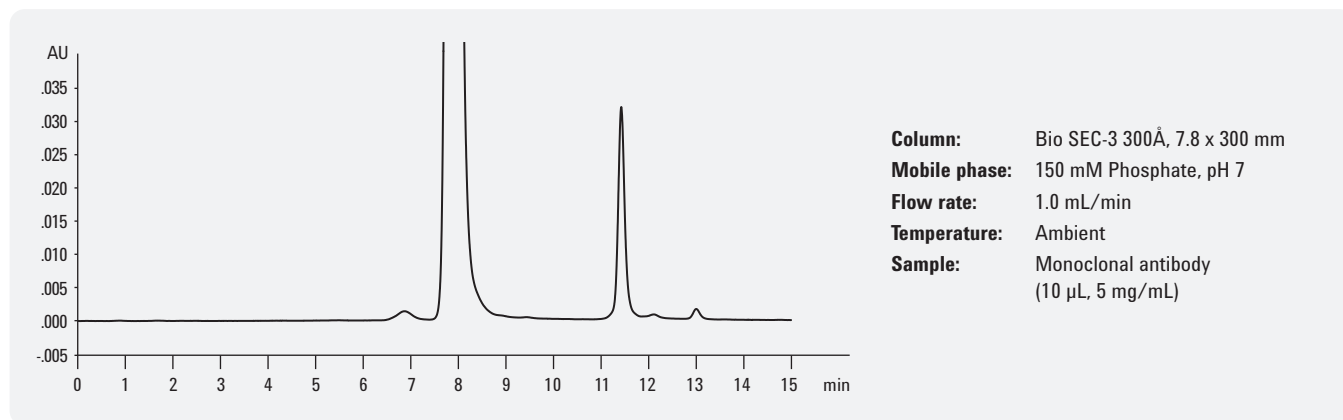
Column	Pressure
Bio SEC-3 (7.8 x 300 mm)	90 bar
Bio SEC-5 (7.8 x 300 mm)	45 bar

Peak Efficiencies for 3 $\mu$ m and 5 $\mu$ m Particle Columns			
Peak	Protein	Agilent Bio SEC-3, 300Å, 7.8 x 300 mm	Agilent Bio SEC-5, 300Å, 7.8 x 300 mm
1	Thyroglobulin	2460	1120
2	BSA Dimer	5100	2720
3	BSA	13090	6590
4	Ribonuclease A	22000	11160
5	Uracil	38500	27860

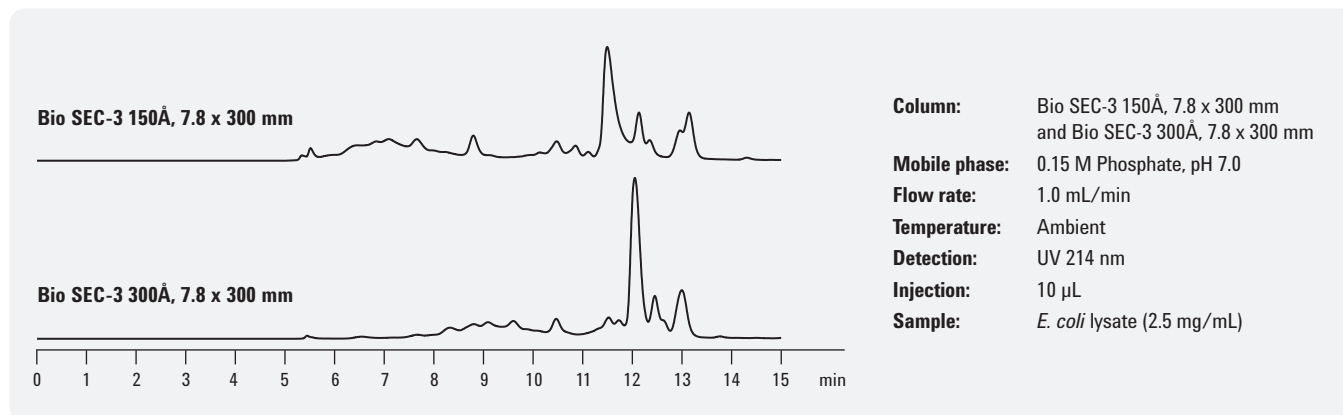


**The combination of unique surface chemistry and small particles:** This five-protein separation demonstrates how smaller particles deliver sharper peaks at higher flow rates, improving resolution and shortening runtimes.

## Agilent Bio SEC-3 HPLC columns



Aggregation analysis of a humanized monoclonal antibody (MAb), the Agilent Bio SEC-3 HPLC columns provides baseline separation of the antibody aggregate and monomer peaks in 15 minutes.



Separation of an *E. coli* lysate on a 150Å and 300Å Agilent Bio SEC-3 HPLC column. Different proteins are well resolved when using columns with different exclusion limits.

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# Agilent Bio SEC-5 HPLC columns

## (5 µm particle size)

Highly reproducible and high resolution  
sized-based separations of biological molecules

Agilent Bio SEC-5 HPLC columns are packed with 5 µm silica particles coated with a proprietary, neutral, hydrophilic layer for maximum efficiency and stability. The specially designed packing also promotes high pore volume, improving both peak capacity and resolution.

Other column advantages include:

- Maximum recovery for a broad range of size-based, bio-molecule separations
- Outstanding reproducibility and column lifetime
- Excellent stability, even under high and low salt conditions and other harsh buffer conditions
- Compatibility with most aqueous buffers

### Column Characteristics



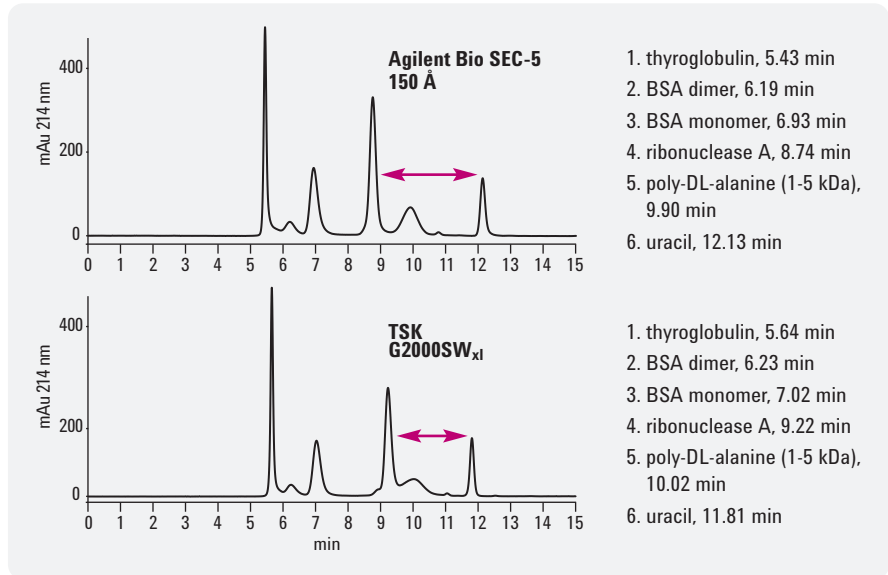
Particles available in:  
100Å, 150Å, 300Å, 500Å, 1000Å, and 2000Å pore sizes,  
offering a wide selection of exclusion limits.

Column Phase	Size Exclusion
<b>Packing</b>	Spherical, high purity, porous silica with a hydrophilic polymeric coating
<b>Particle size</b>	5 µm
<b>Pore structure</b>	100Å, 150Å, 300Å, 500Å, 1000Å, 2000Å
<b>Column exclusion limits (in Daltons)</b>	100 Å MW range: 100 ~ 100,000 150 Å MW range: 500 ~ 150,000 300 Å MW range: 5,000 ~ 1,250,000 500 Å MW range: 15,000 ~ 5,000,000 1000 Å MW range: 50,000 ~ 7,500,000 2000 Å MW range: >10,000,000
<b>pH stability</b>	2-8.5
<b>Operating temperature limit</b>	Recommended range: 10-30°C, maximum: 80°C
<b>Operating pressure limit</b>	Recommended operating pressure: 135 bar (2,000 psi) Maximum pressure: 240 bar (3,500 psi)
<b>Mobile phase compatibility</b>	Recommended: 150 mM phosphate buffer, pH 7.0, other aqueous buffers with high and low salt can be used
<b>Working flow rate</b>	0.1 - 1.25 mL/min for 7.8 mm I.D. columns 0.1 - 0.4 mL/min for 4.6 mm I.D. columns

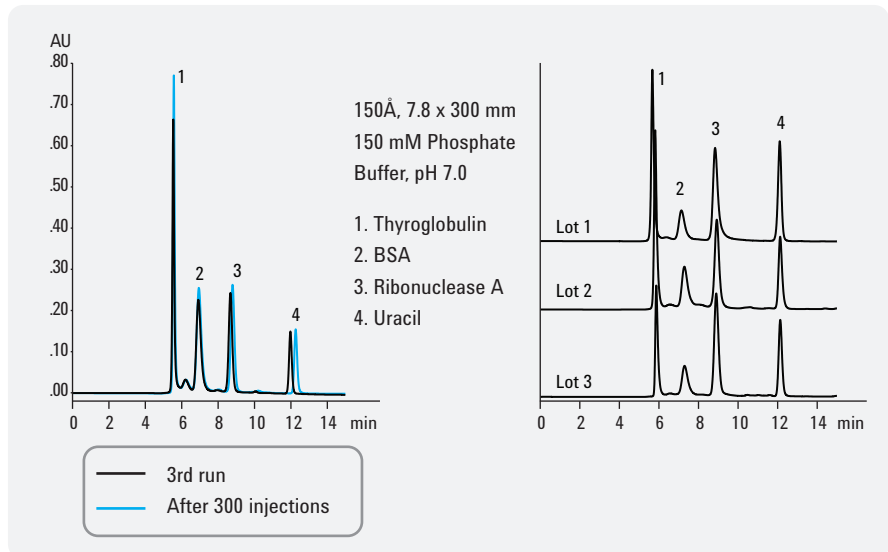
# Agilent Bio SEC-5 HPLC columns

## Recommended Applications

Antibody and protein aggregation analysis, separation of proteins in cell lysates, separation of protein mixtures, natural polymers, nanomaterials, oligonucleotides, polysaccharides, and other bio-molecules.



**A side-by-side comparison:** Separation of a protein mixture on an Agilent Bio SEC-5 HPLC column and a Tosoh TSK-Gel column. Notice the sharper peaks and better resolution on the Agilent Bio SEC-5 HPLC column.



**Exceptional lot-to-lot reproducibility:** the four protein mixture shows excellent retention time reproducibility over 300 injections and on three columns from different manufacturing lots.



Injection No.	Efficiency	Tailing	Line
1	26512	1.192	—
2	25959	1.183	—
3	26182	1.180	—
10	25682	1.190	—
20	25872	1.194	—
64	25811	1.187	—
102	25776	1.170	—
140	25910	1.174	—
175	25177	1.208	—
192	24300	1.196	—
250	25707	1.172	—
300	25720	1.166	—

**Column:** Agilent Bio SEC-5, 300Å,  
7.8 x 300 mm

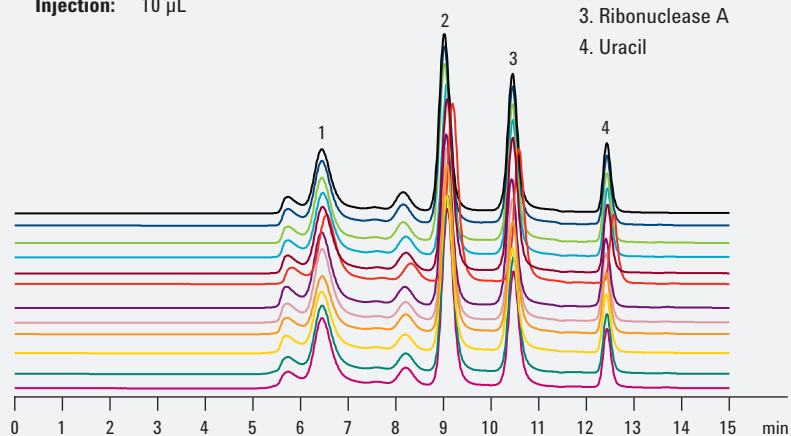
**Buffer:** 150 mM Phosphate buffer,  
pH 7.0

**Flow Rate:** 1.0 mL/min

**Detector:** 214 nm

**Injection:** 10 µL

1. Thyroglobulin
2. BSA
3. Ribonuclease A
4. Uracil



Even after 300 injections of a five protein mixture, the Agilent Bio SEC-5 HPLC columns provide reproducible results with minimal peak tailing over time.

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to learn more, and order online.

# Agilent Bio MAb HPLC columns

## High resolution ion exchange separations of monoclonal antibodies

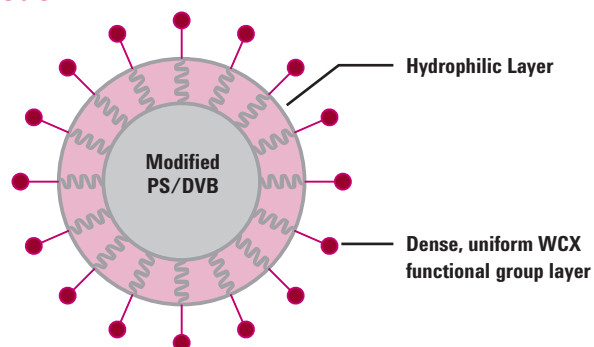
Thorough characterization of monoclonal antibodies includes the identification and monitoring of acidic and basic isoforms. The Agilent Bio MAb HPLC columns feature a unique resin specifically designed for high-resolution charge-based separations of monoclonal antibodies.

The unique particle design includes:

- A packing support composed of a rigid, spherical, highly cross-linked polystyrene divinylbenzene (PS/DVB) non-porous bead
- Particles grafted with a hydrophilic, polymeric layer, virtually eliminating nonspecific binding of antibody proteins, increasing efficiency and recoveries

### Agilent Bio MAb HPLC columns: superior performance from the inside out.

- Particles, coating and bonding are resistant to high pressures, promoting higher resolution and faster separations
- Hydrophilic coating eliminates most non-specific interactions
- A highly uniform, densely packed, weak cation exchange (WCX) layer chemically bonded to the hydrophilic, polymeric coating

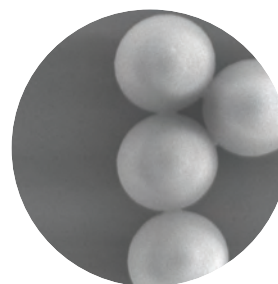


## Column Characteristics



Particles available 1.7  $\mu\text{m}$ , 3  $\mu\text{m}$ , 5 $\mu\text{m}$ , and 10  $\mu\text{m}$  sizes, providing higher resolution with the smaller particles.

Column Phase	Weak Cation Exchange (carboxylate)
<b>Packing</b>	Non-porous, poly(styrene divinylbenzene) (PS/DVB), grafted hydrophilic coating and bonded with a uniform, weak cation exchange layer
<b>Particle size</b>	1.7, 3, 5, and 10 $\mu\text{m}$
<b>Pore structure</b>	Non-porous
<b>pH stability</b>	2-12
<b>Operating temperature limit</b>	80°C
<b>Column hardware operating pressure limit</b>	600 bar (8,700 psi) for stainless steel column hardware 400 bar (5,800 psi) for PEEK column hardware
<b>Particle operating pressure limit</b>	275 bar (4,000 psi) for 10 $\mu\text{m}$ particles 413 bar (6,000 psi) for 5 $\mu\text{m}$ particles 551 bar (8,000 psi) for 3 $\mu\text{m}$ particles 689 bar (10,000 psi) for 1.7 $\mu\text{m}$ particles
<b>Mobile phase compatibility</b>	Compatible with aqueous solution buffers, acetonitrile/acetone/methanol and water mixtures. Commonly used buffers: phosphate, tris, MES and acetate
<b>Working flow rate</b>	Typical 0.1-1.0 mL/min for a 4.6 mm I.D. column

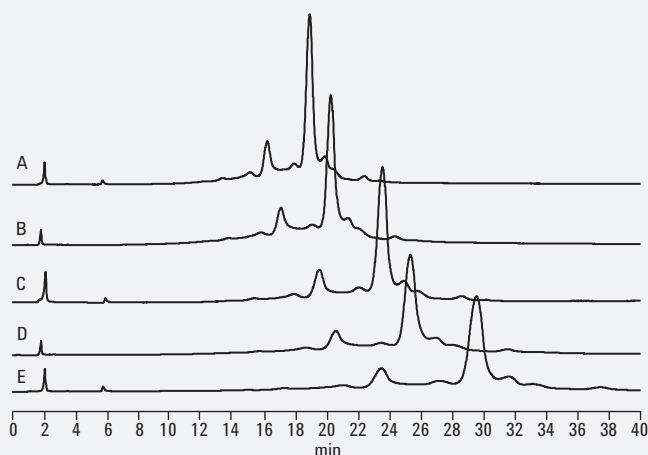


Agilent Bio MAb HPLC columns are packed with polymeric, non-porous, weak cation exchange particles (1.7  $\mu\text{m}$  PS/DVB particles shown here). These particles are coated with a unique hydrophilic layer, improving recovery by dramatically reducing non-specific binding of antibody proteins.

# Agilent Bio MAb HPLC columns

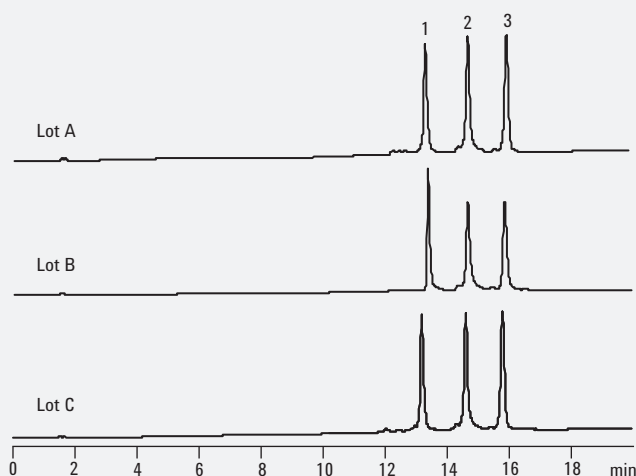
## Recommended Applications

Analytical separations of monoclonal antibody isoforms based on differences in their charge states.



**Columns:** Agilent Bio MAb, NP10, 4.6 x 250 mm  
**Mobile phase:** A, 10 mM phosphate, pH 7.5  
B, A + 0.1M NaCl  
**Gradient:** A) 15-75%B in 30 min  
B) 15-65%B in 30 min  
C) 15-55%B in 30 min  
D) 15-47.5%B in 30 min  
E) 15-40%B in 30 min  
**Flow rate:** 0.8 mL/min  
**Sample:** Monoclonal Antibody  
**Injection:** 10  $\mu$ L (1.5 mg/mL)  
**Temperature:** 25°C  
**Detection:** UV 214 nm

Optimization of method conditions for the isoform characterization of a monoclonal antibody. Changes in the gradient conditions sharpen peaks and increase resolution of acidic and basic isoforms.



**Columns:** Agilent Bio MAb, NP10, 4.6 x 250 mm  
**Mobile phase:** A, 10 mM phosphate, pH 6.0;  
B, A + 1.0 M NaCl  
**Gradient:** 0-100%B in 42 min  
**Flow rate:** 1.0 mL/min  
**Sample:** 1) Cytochrome C,  
2) Lysozyme,  
3) Ribonuclease A  
**Injection:** 5  $\mu$ L (1 mg/mL for each protein)  
**Temperature:** 25°C  
**Detection:** UV 214 nm

The combination of well-controlled resin production, column surface chemistry, and column packing virtually eliminates retention time variations from column to column and lot to lot.

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# Agilent Bio IEX HPLC columns

High resolution charge-based analytical separations of proteins, peptides, and other biological molecules

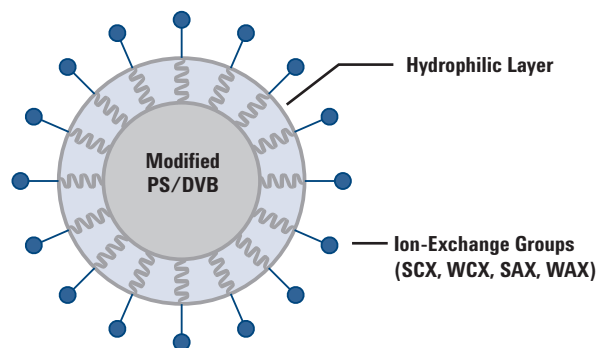
Agilent Bio IEX HPLC columns are packed with polymeric, nonporous, ion exchange particles and are designed for high resolution, high recovery and highly efficient separations of proteins, peptides, oligonucleotides, and other bio-molecules.

Unique features of these columns include:

- Highly crosslinked and rigid nonporous poly(styrene divinylbenzene) (PS/DVB) particles are grafted with a hydrophilic, polymeric layer, eliminating nonspecific binding, increasing efficiency and recoveries
- Uniform, densely packed ion exchange functional groups are chemically bonded to the hydrophilic layer (multiple ion exchange groups per anchoring) to increase column capacity
- Includes strong cation exchange (SCX), weak cation exchange (WCX), strong anion exchange (SAX) and weak anion exchange (WAX) phases.

## Agilent Bio IEX HPLC columns: superior performance from the inside out.

- Particles, coating and bonding are resistant to high pressures, promoting higher resolution and faster separations.
- Hydrophilic coating eliminates most non-specific interactions.
- Multiple ion-exchange groups are captured on one anchoring to increase capacity.



# Agilent Bio IEX HPLC columns

## Column Characteristics



All phases available in 1.7  $\mu\text{m}$ , 3  $\mu\text{m}$ , 5  $\mu\text{m}$ , and 10  $\mu\text{m}$  non-porous particles sizes and a variety of column dimensions

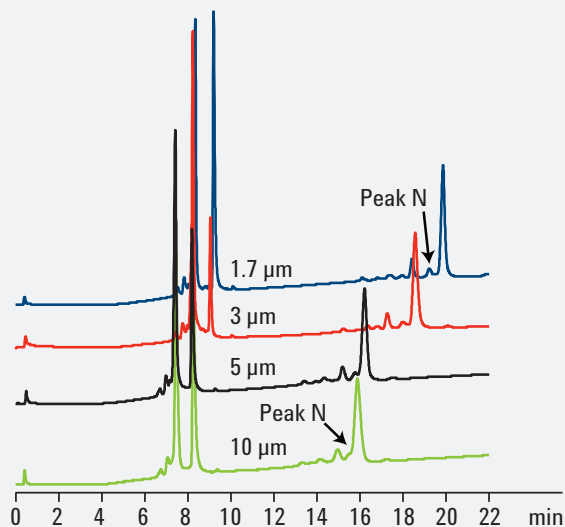
<b>Column Phases</b>	<b>SCX (Strong cation exchange) – <math>\text{SO}_3\text{H}</math></b> <b>WCX (Weak cation exchange) – <math>\text{COOH}</math></b> <b>SAX (Strong anion exchange) – <math>\text{N}(\text{CH}_3)_3</math></b> <b>WAX (Weak anion exchange) – <math>\text{N}(\text{C}_2\text{H}_5)_2</math></b>
<b>Packing</b>	Non-porous, poly(styrene divinylbenzene) (PS/DVB), grafted hydrophilic coating and bonded with a uniform, ion exchange layer
<b>Particle size</b>	1.7, 3, 5, and 10 $\mu\text{m}$
<b>Pore structure</b>	Non-porous
<b>Dynamic Binding Capacity</b>	SCX NP3: 53 mg/mL, SCX NP5: 38 mg/mL, SCX NP10: 20 mg/mL WCX NP3: 19 mg/mL, WCX NP5: 15 mg/mL, WCX NP10: 10 mg/mL SAX NP3: 35 mg/mL, SAX NP5: 28 mg/mL, SAX NP5: 17 mg/mL WAX NP3: 26 mg/mL, WAX NP5: 18 mg/mL, WAX NP3: 12 mg/mL
<b>pH stability</b>	2-12
<b>Operating temperature limit</b>	80°C
<b>Column hardware operating pressure limit</b>	600 bar (8,700 psi) for stainless steel column hardware 400 bar (5,800 psi) for PEEK column hardware
<b>Particle operating pressure limit</b>	275 bar (4,000 psi) for 10 $\mu\text{m}$ particles 413 bar (6,000 psi) for 5 $\mu\text{m}$ particles 551 bar (8,000 psi) for 3 $\mu\text{m}$ particles 689 bar (10,000 psi) for 1.7 $\mu\text{m}$ particles
<b>Mobile phase compatibility</b>	Compatible with aqueous solution buffers, acetonitrile/acetone/methanol and water mixtures. Commonly used buffers: phosphate, tris, MES and acetate
<b>Working flow rate</b>	Typical 0.1-1.0 mL/min for a 4.6 mm I.D. column



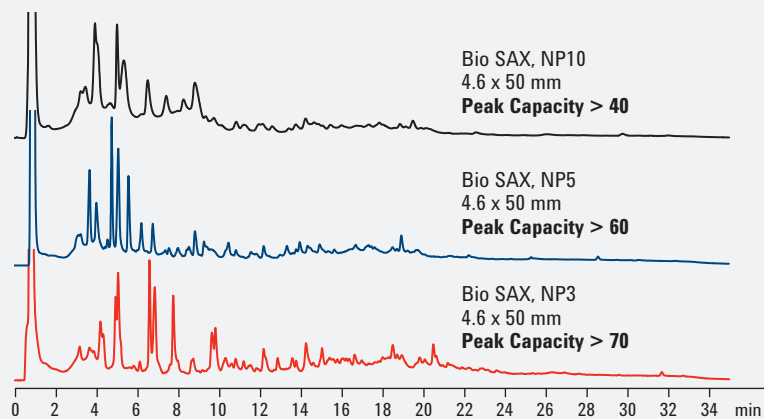
**Column:** Bio WCX-NP, 4.6 x 50 mm  
**Buffer A:** 20 mM PBS  
**Buffer B:** A+1.0 M NaCl  
**Gradient:** 0-100%B (20 min)  
**Flow rate:** 1.0 mL/min for NP10, NP5,  
 NP3 0.75 mL/min for NP1.7

**Sample:**  
 1. Ribonuclease A  
 2. Cytochrome C  
 3. Lysozyme

**Concentration:** 1.0 mg/mL  
**Detector:** 280 nm  
 Average N~80,000 for WCX-NP1.7



**Buffer A:** 20 mM Tris, pH 9.0  
**Buffer B:** A + 0.5 M NaCl  
**Gradient:** 0-100%B (30 min)  
**Flow Rate:** 0.5 mL/min  
**Injection:** 10 µL/min (2.5 mg/mL)

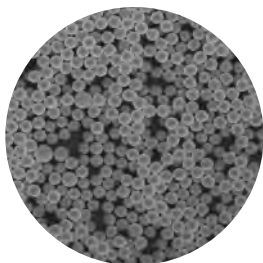


The separations above demonstrate how a smaller particle size gives you the flexibility to push for sharper peaks and better resolution. Note the sharpness of the 1.7 µm particle size peaks.

# Agilent Bio IEX HPLC columns

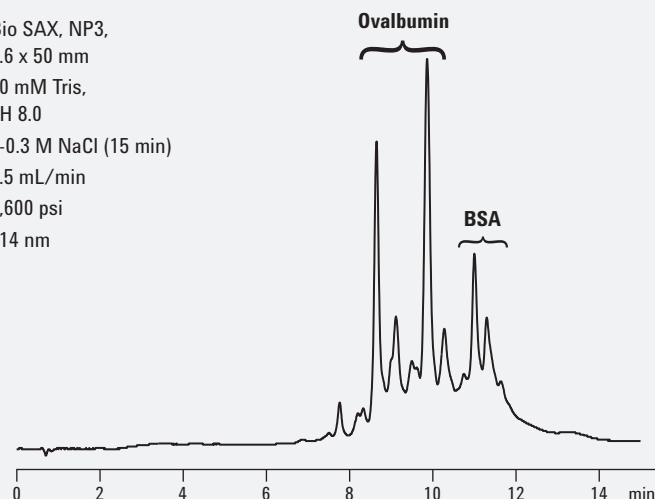
## Recommended Applications

Analytical separations of peptides, proteins, carbohydrates, oligonucleotides, polynucleotides, cell lysates, and multi-dimensional separations.



Highly crosslinked and rigid nonporous polystyrene divinylbenzene particles (5 µm PS/DVD shown here) are grafted with a hydrophilic, polymeric layer, eliminating nonspecific binding, increasing efficiency and recoveries.

**Column:** Bio SAX, NP3, 4.6 x 50 mm  
**Buffer:** 20 mM Tris, pH 8.0  
**Gradient:** 0-0.3 M NaCl (15 min)  
**Flow Rate:** 0.5 mL/min  
**Backpressure:** 1,600 psi  
**Detector:** 214 nm

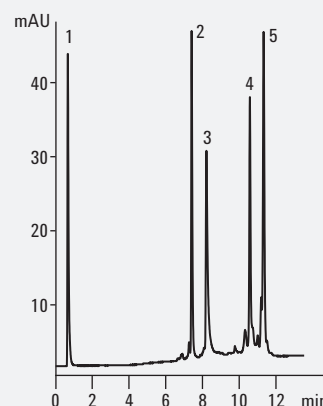


Using an Agilent Bio SAX, NP3 (3µm particle) column, the isoforms and impurities of both ovalbumin and BSA can easily be resolved.

**Column:** Bio SCX, NP3, 4.6 x 50 mm  
**Buffer:** 10 mM Phosphate, pH 6.0  
**Gradient:** 0-1.0 M NaCl (15 min)  
**Flow rate:** 0.5 mL/min  
**Detector:** 280 nm

**Samples**      **pI**  
1. Ovalbumin      4.6  
2. Ribonuclease A      8.7  
3. Cytochrome C      9.6  
4. Aprotinin      10.0  
5. Lysozyme      11.0

N > 100,000/50 mm for Lysozyme



**Exceptional separating power:** the hydrophilic, polymeric layer and densely packed ion exchange functional groups provides extremely sharp peak shapes and high resolution of a mixture of proteins with a broad range of isoelectric points (pI).

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## Agilent BioHPLC columns for starting your method development and validation:

Use the charts on the next pages to identify which BioHPLC columns are best for your specific application.

### Agilent Bio SEC-3 HPLC Columns

Description	Size (mm)	Particle Size ( $\mu\text{m}$ )	Part No.
Bio SEC-3, 100Å	7.8 x 300	3	5190-2501
Bio SEC-3, 100Å	7.8 x 150	3	5190-2502
Bio SEC-3, 100Å	4.6 x 300	3	5190-2503
Bio SEC-3, 100Å	4.6 x 150	3	5190-2504
Bio SEC-3, 100Å, Guard	7.8 x 50	3	5190-2505
Bio SEC-3, 150Å	7.8 x 300	3	5190-2506
Bio SEC-3, 150Å	7.8 x 150	3	5190-2507
Bio SEC-3, 150Å	4.6 x 300	3	5190-2508
Bio SEC-3, 150Å	4.6 x 150	3	5190-2509
Bio SEC-3, 150Å, Guard	7.8 x 50	3	5190-2510
Bio SEC-3, 300Å	7.8 x 300	3	5190-2511
Bio SEC-3, 300Å	7.8 x 150	3	5190-2512
Bio SEC-3, 300Å	4.6 x 300	3	5190-2513
Bio SEC-3, 300Å	4.6 x 150	3	5190-2514
Bio SEC-3, 300Å, Guard	7.8 x 50	3	5190-2515



# Agilent BioHPLC columns *(continued)*

## Agilent Bio SEC-5 HPLC Columns

Description	Size (mm)	Particle Size (µm)	Part No.
Bio SEC-5, 100Å	7.8 x 300	5	5190-2516
Bio SEC-5, 100Å	7.8 x 150	5	5190-2517
Bio SEC-5, 100Å	4.6 x 300	5	5190-2518
Bio SEC-5, 100Å	4.6 x 150	5	5190-2519
Bio SEC-5, 100Å, Guard	7.8 x 50	5	5190-2520
Bio SEC-5, 150Å	7.8 x 300	5	5190-2521
Bio SEC-5, 150Å	7.8 x 150	5	5190-2522
Bio SEC-5, 150Å	4.6 x 300	5	5190-2523
Bio SEC-5, 150Å	4.6 x 150	5	5190-2524
Bio SEC-5, 150Å, Guard	7.8 x 50	5	5190-2525
Bio SEC-5, 300Å	7.8 x 300	5	5190-2526
Bio SEC-5, 300Å	7.8 x 150	5	5190-2527
Bio SEC-5, 300Å	4.6 x 300	5	5190-2528
Bio SEC-5, 300Å	4.6 x 150	5	5190-2529
Bio SEC-5, 300Å, Guard	7.8 x 50	5	5190-2530
Bio SEC-5, 500Å	7.8 x 300	5	5190-2531
Bio SEC-5, 500Å	7.8 x 150	5	5190-2532
Bio SEC-5, 500Å	4.6 x 300	5	5190-2533
Bio SEC-5, 500Å	4.6 x 150	5	5190-2534
Bio SEC-5, 500Å, Guard	7.8 x 50	5	5190-2535
Bio SEC-5, 1000Å	7.8 x 300	5	5190-2536
Bio SEC-5, 1000Å	7.8 x 150	5	5190-2537
Bio SEC-5, 1000Å	4.6 x 300	5	5190-2538
Bio SEC-5, 1000Å	4.6 x 150	5	5190-2539
Bio SEC-5, 1000Å, Guard	7.8 x 50	5	5190-2540
Bio SEC-5, 2000Å	7.8 x 300	5	5190-2541
Bio SEC-5, 2000Å	7.8 x 150	5	5190-2542
Bio SEC-5, 2000Å	4.6 x 300	5	5190-2543
Bio SEC-5, 2000Å	4.6 x 150	5	5190-2544
Bio SEC-5, 2000Å, Guard	7.8 x 50	5	5190-2545

## Agilent Bio MAb HPLC Columns

Description	Size (mm)	Particle Size (µm)	Part No.
Bio MAb, stainless steel	4.6 x 50	1.7	5190-2401
Bio MAb, stainless steel guard	4 x 10	1.7	5190-2402
Bio MAb, stainless steel	4.6 x 50	3	5190-2403
Bio MAb, stainless steel guard	4 x 10	3	5190-2404
Bio MAb, stainless steel	4.6 x 250	5	5190-2405
Bio MAb, stainless steel guard	4 x 10	5	5190-2406
Bio MAb, PEEK	4.6 x 250	5	5190-2407
Bio MAb, PEEK guard	4.6 x 50	5	5190-2408
Bio MAb, stainless steel	2.1 x 250	5	5190-2409
Bio MAb, stainless steel guard	2 x 10	5	5190-2410
Bio MAb, PEEK	2.1 x 250	5	5190-2411
Bio MAb, PEEK guard	2.1 x 50	5	5190-2412
Bio MAb, stainless steel	4.6 x 250	10	5190-2413
Bio MAb, stainless steel guard	4 x 10	10	5190-2414
Bio MAb, PEEK	4.6 x 250	10	5190-2415
Bio MAb, PEEK guard	4.6 x 50	10	5190-2416
Bio MAb, stainless steel	2.1 x 250	10	5190-2417
Bio MAb, stainless steel guard	2 x 10	10	5190-2418
Bio MAb, PEEK	2.1 x 250	10	5190-2419
Bio MAb, PEEK guard	2.1 x 50	10	5190-2420

4.6mm I.D. columns available March 2010

2.1mm I.D. columns available May 2010



## Agilent Bio IEX HPLC Columns

Description	Size (mm)	Particle Size (µm)	Bio SCX Part No.	Bio WCX Part No.	Bio SAX Part No.	Bio WAX Part No.
Agilent Bio IEX, stainless steel	4.6 x 50	1.7	5190-2421	5190-2441	5190-2461	5190-2481
Agilent Bio IEX, stainless steel guard	4 x 10	1.7	5190-2422	5190-2442	5190-2462	5190-2482
Agilent Bio IEX, stainless steel	4.6 x 50	3	5190-2423	5190-2443	5190-2463	5190-2483
Agilent Bio IEX, stainless steel guard	4 x 10	3	5190-2424	5190-2444	5190-2464	5190-2484
Agilent Bio IEX, stainless steel	4.6 x 250	5	5190-2425	5190-2445	5190-2465	5190-2485
Agilent Bio IEX, stainless steel guard	4 x 10	5	5190-2426	5190-2446	5190-2466	5190-2486
Agilent Bio IEX, PEEK	4.6 x 250	5	5190-2427	5190-2447	5190-2467	5190-2487
Agilent Bio IEX, PEEK guard	4.6 x 50	5	5190-2428	5190-2448	5190-2468	5190-2488
Agilent Bio IEX, stainless steel	2.1 x 250	5	5190-2429	5190-2449	5190-2469	5190-2489
Agilent Bio IEX, stainless steel guard	2 x 10	5	5190-2430	5190-2450	5190-2470	5190-2490
Agilent Bio IEX, PEEK	2.1 x 250	5	5190-2431	5190-2451	5190-2471	5190-2491
Agilent Bio IEX, PEEK guard	2.1 x 50	5	5190-2432	5190-2452	5190-2472	5190-2492
Agilent Bio IEX, stainless steel	4.6 x 250	10	5190-2433	5190-2453	5190-2473	5190-2493
Agilent Bio IEX, stainless steel guard	4 x 10	10	5190-2434	5190-2454	5190-2474	5190-2494
Agilent Bio IEX, PEEK	4.6 x 250	10	5190-2435	5190-2455	5190-2475	5190-2495
Agilent Bio IEX, PEEK guard	4.6 x 50	10	5190-2436	5190-2456	5190-2476	5190-2496
Agilent Bio IEX, stainless steel	2.1 x 250	10	5190-2437	5190-2457	5190-2477	5190-2497
Agilent Bio IEX, stainless steel guard	2 x 10	10	5190-2438	5190-2458	5190-2478	5190-2498
Agilent Bio IEX, PEEK	2.1 x 250	10	5190-2439	5190-2459	5190-2479	5190-2499
Agilent Bio IEX, PEEK guard	2.1 x 50	10	5190-2440	5190-2460	5190-2480	5190-2500

4.6mm I.D. columns available March 2010

2.1mm I.D. columns available May 2010



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