BioSep®

High Performance
Size Exclusion
for Biomolecules

phenomenex®
...breaking with tradition℠

Columns for Gel Filtration Chromatography (GFC)

GFC is used for the analysis and/or characterization of proteins, peptides and other biomolecules; including antibodies, immunoglobulins, protein complexes, protein aggregates, and desalting. BioSep GFC columns offer many important benefits to keep your research, method development/validation, and ongoing size exclusion separations SIMPLE:

High Performance:

Analytical and preparative BioSep columns offer high resolution, maximum efficiency, and exceptional peak asymmetry.

Easy Column Selection:

Simply choose the right phase based on the MW of your sample, recommended application, currently used GFC column, or contact us for assistance!

Higher Value Solution:

BioSep is a high quality gel filtration media that comes with an affordable price tag.

Method Development and Optimization Services:

Phenomenex Services offers method development and optimization support for new methods, as well as transferring your current methods from other GFC media to BioSep-SEC-S phases.

guarantee

If BioSep analytical columns do not provide you with at least an equivalent separation as any other GFC column of similar porosity, type, and dimensions, send in your comparative data within 45 days and keep the column for FREE.

The BioSep® Advantage

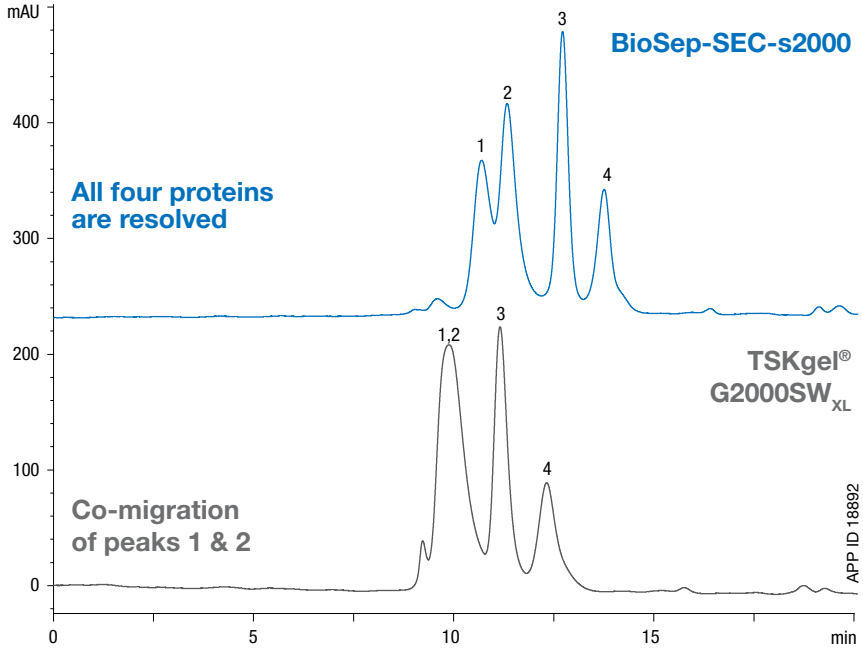
Applications and Technical Support

Ordering Information

Higher Efficiency for Greater Resolution

- Achieve greater baseline separation between your analytes due to tight particle size distribution and packing specifications

Protein Separation of 50-500 kDa MW on BioSep-SEC-s2000 vs. TSKgel® G2000SW$_{XL}$



BioSep-SEC-s2000 has a wider molecular weight window than TSKgel 2000 SW$_{XL}$, which enables increased resolution of proteins on the higher end of the molecular weight range. As illustrated in the chromatogram, peaks 1 and 2 co-migrate with the TSKgel column, but are resolved with the BioSep-SEC-s2000 column.

Conditions for both columns:

Columns: BioSep-SEC-s2000
TSKgel® G2000SW$_{XL}$
Dimensions: 300 x 7.8 mm
Mobile Phase: 10 mM Tris pH 7.4,
150 mM Sodium Chloride
Flow Rate: 0.6 mL/min
Temperature: Ambient
Detection: UV @ 214 nm
Sample: 1. Hu IgA 300 kDa
2. β-Amylase 200 kDa
3. BSA 66 kDa
4. Ovalbumin 45 kDa

Efficiency

(minimum number theoretical plates on 300 x 7.8 mm column)

SEC-s2000	SEC-s3000	SEC-s4000
30,000 Plates	30,000 Plates	25,000 Plates

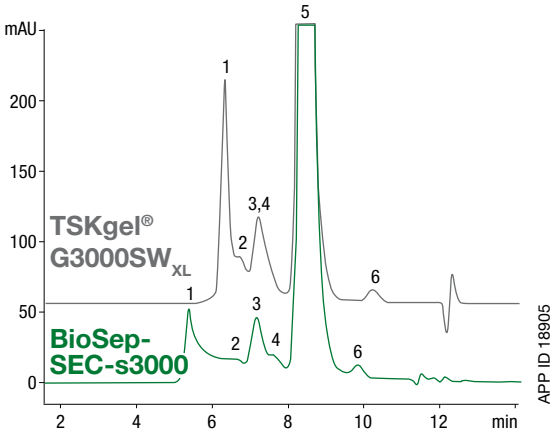
Disclaimer
Comparative separations may not be representative of all applications. Columns used for comparison were manufactured by Tosoh Corporation. Phenomenex is in no way affiliated with Tosoh Corporation.

Trademarks
TSKgel is a registered trademark of Tosoh Corporation. BioSep is a registered trademark of Phenomenex, Inc.

Expanded Resolution Windows

- Expect equal or better resolution than your current GFC column, guaranteed!
- Higher optimal molecular weight selectivity window and greater resolution of the analytes

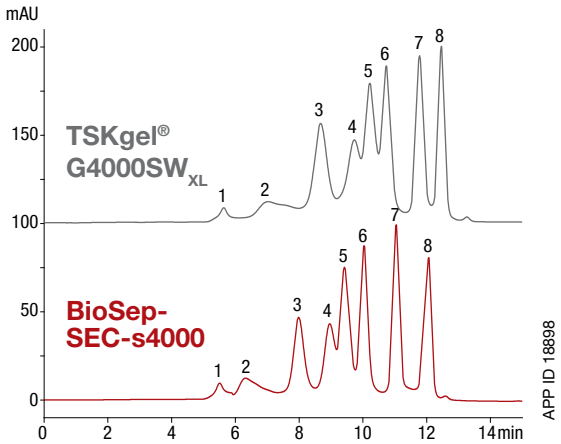
Human IgG2k Aggregates on BioSep-SEC-s3000 and TSKgel® G3000SW$_{XL}$



Conditions for both columns:

Columns: BioSep-SEC-s3000
TSKgel G3000SW$_{XL}$
Dimensions: 300 x 7.8 mm
Mobile Phase: 100 mM Sodium Phosphate pH 6.8
Flow Rate: 1 mL/min
Temperature: Ambient
Detection: UV @ 214 nm
Sample: 1. HMW aggregates
2. IgG Trimer
3. IgG Dimer 1
4. IgG2 kappa dimer 2
5. Hu IgG2 kappa monomer
6. Low MW impurity

High MW Proteins on BioSep-SEC-s4000 and TSKgel® G4000SW$_{XL}$



Conditions for both columns:

Columns: BioSep-SEC-s4000
TSKgel G4000SW$_{XL}$
Dimensions: 300 x 7.8 mm
Mobile Phase: 100 mM Sodium Phosphate pH 6.8
Flow Rate: 1 mL/min
Temperature: Ambient
Detection: UV @ 220 nm
Sample: 1. HMW impurity
2. IgM 900 kDa
3. Thyroglobulin 670 kDa
4. IgA 300 kDa
5. β-Amylase 200 kDa
6. BSA 66 kDa
7. Ribonuclease A 13.7 kDa
8. Uridine 244 Da

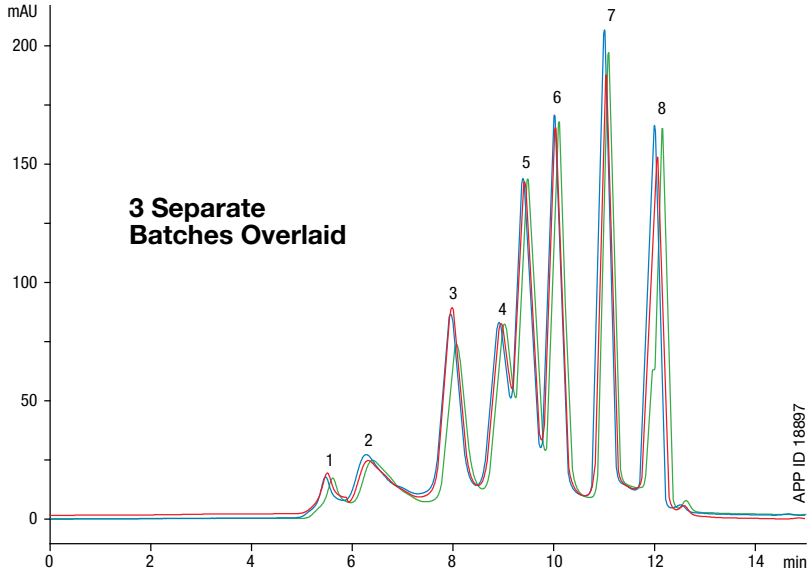
guarantee

If BioSep analytical columns do not provide you with at least an equivalent separation as any other GFC column of similar porosity, type, and dimensions, send in your comparative data within 45 days and keep the column for FREE.

Batch-to-Batch Reproducibility

- Reproducibility is of the utmost importance when validating methods
- Each batch of material is carefully monitored to ensure that particles have the proper size, shape, and pore characteristics batch-to-batch
- Every column is performance and QC tested to ensure the same high quality separation column-to-column

Batch-to-Batch Variations on BioSep-SEC-s4000



Three different silica batches were overlaid to show the batch-to-batch reproducibility of the media.

Conditions same for all batches:

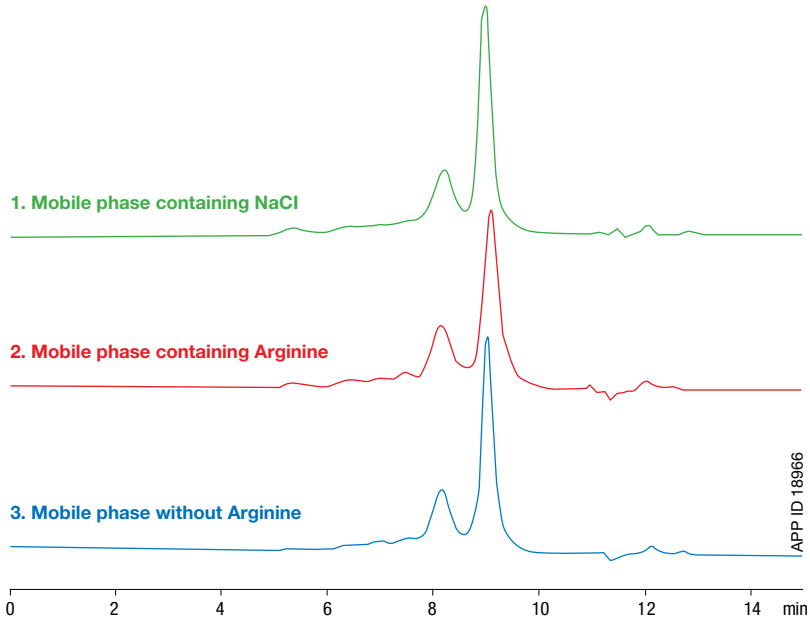
Column: BioSep-SEC-s4000
Dimensions: 300 x 7.8 mm
Part No.: 00H-2147-K0
Mobile Phase: 100 mM Sodium Phosphate pH 6.8
Flow Rate: 1 mL/min
Temperature: Ambient
Detection: UV @ 220 nm
Sample: 1. HMW Impurity

2. IgM	900 kDa
3. Thyroglobulin	670 kDa
4. IgA	300 kDa
5. β-Amylose	200 kDa
6. BSA	66 kDa
7. Ribonuclease Å	13.7 kDa
8. Uridine	244 Da

Highly Inert Material for Better Recovery and Quantitation

BioSep experiences a nominal amount of non-specific interactions which provides an extremely inert media demonstrating clear advantages for accurate quantitation of proteins and aggregates.

Human Serum under Different Mobile Phases



Equal recovery of proteins and aggregates under different mobile phase conditions is indicative of a highly inert column.

Conditions same for all separations except for mobile phase:

Column: BioSep-SEC-s3000
Dimensions: 300 x 7.8 mm
Part No.: 00H-2146-K0
Mobile Phase: 1. 50 mM Sodium Phosphate pH 7.0, 300 mM Sodium Chloride
2. 100 mM Sodium Phosphate pH 6.8, 200 mM Arginine
3. 100 mM Sodium Phosphate pH 6.8
Flow Rate: 1 mL/min
Temperature: Ambient
Detection: UV @ 280 nm
Sample: Human Serum

Recommended Applications for Each Phase

SEC-s2000

- Biogeneric aggregate applications
- Peptide therapeutics
- Small proteins
- PEGylated peptides and small proteins

SEC-s3000

- Immunoglobulin aggregate applications
- Medium to large size proteins
- Serum proteins

SEC-s4000

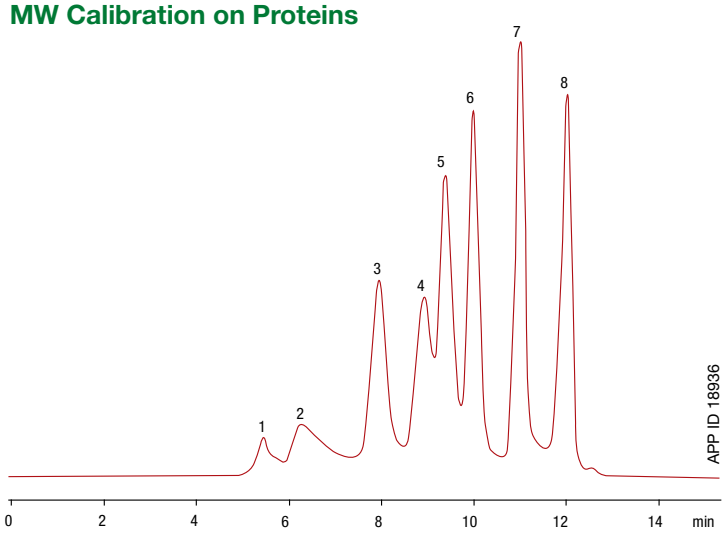
- Large proteins
- PEGylated IgG

Depending on the size and type of sample you have, there is a BioSep phase to fit your needs. BioSep SEC-s2000, SEC-s3000 and SEC-s4000 are all available in narrow bore, analytical, and preparative dimensions.

Applications

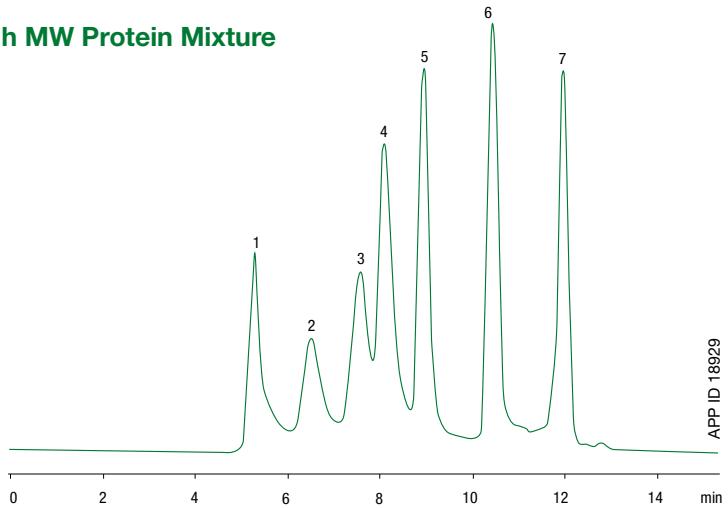
Proteins

MW Calibration on Proteins



Column: BioSep-SEC-s4000
Dimensions: 300 x 7.8 mm
Part No.: 00H-2147-K0
Mobile Phase: 100 mM Sodium Phosphate pH 7.0, 300 mM Sodium Chloride
Flow Rate: 1 mL/min
Temperature: Ambient
Detection: UV @ 214 nm
Sample: 1. HMW impurity
2. IgM 900 kDa
3. Thyroglobulin 669 kDa
4. IgA 300 kDa
5. β-Amylase 200 kDa
6. BSA 66 kDa
7. Ribonuclease A 13.7 kDa
8. Uridine 244 Da

High MW Protein Mixture

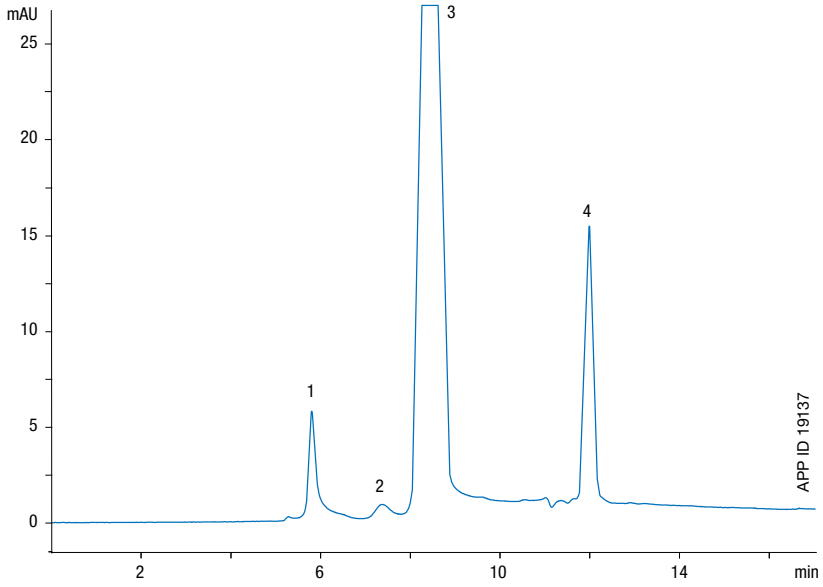


Column: BioSep-SEC-s3000
Dimensions: 300 x 7.8 mm
Part No.: 00H-2146-K0
Mobile Phase: 50 mM Sodium Phosphate pH 6.8, 300 mM Sodium Chloride
Flow Rate: 1 mL/min
Temperature: Ambient
Detection: UV @ 214 nm
Sample: 1. IgM 900 kDa
2. Thyroglobulin 670 kDa
3. IgA 300 kDa
4. β-Amylase 200 kDa
5. BSA 66 kDa
6. Ribonuclease A 13.7 kDa
7. Uridine 244 Da

Applications

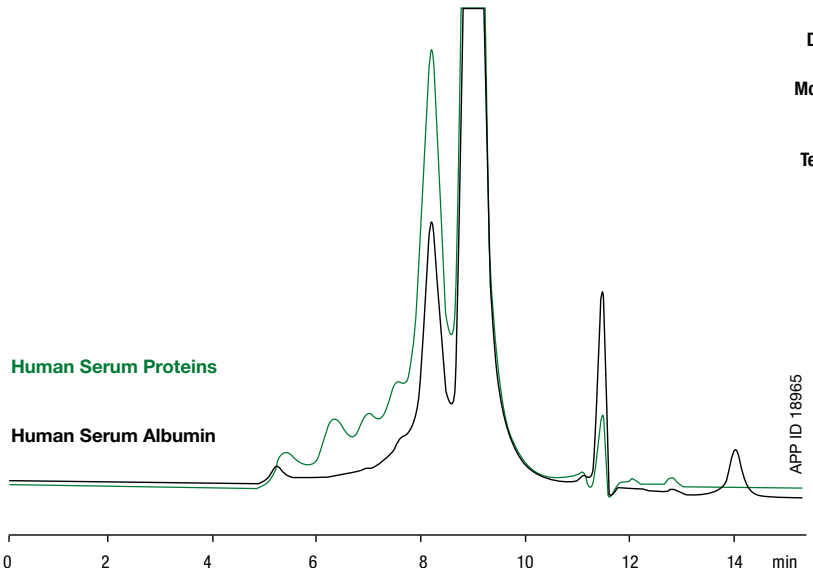
Proteins

Recombinant Human Erythropoietin (HuEPO)



Column: BioSep-SEC-s2000
Dimensions: 300 x 4.6 mm
Part No.: 00H-2145-E0
Mobile Phase: 50 mM Sodium Phosphate pH 6.8, 300 mM Sodium Chloride
Flow Rate: 0.35 mL/min
Temperature: Ambient
Detection: UV @ 220 nm
Sample: Recombinant Human Erythropoietin
1. HMW impurity
2. EPO dimer
3. EPO monomer
4. LMW impurity

Human Serum and HSA

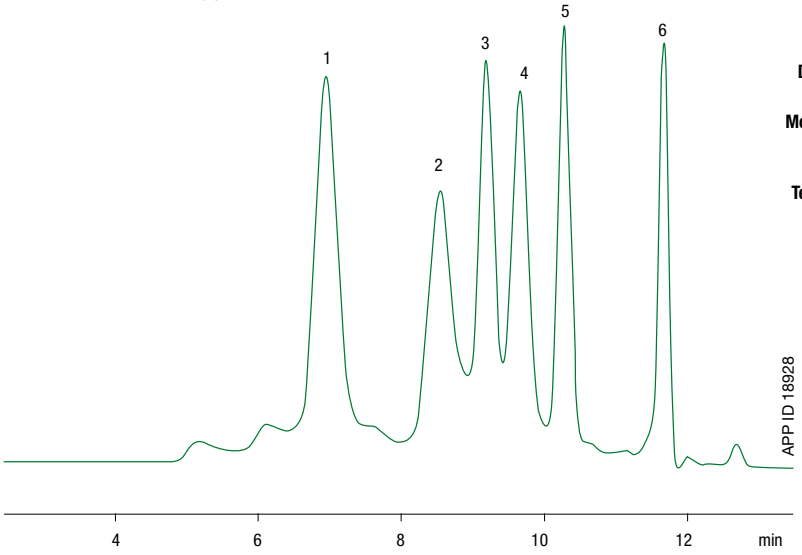


Column: BioSep-SEC-s3000
Dimensions: 300 x 7.8 mm
Part No.: 00H-2146-K0
Mobile Phase: 50 mM Sodium Phosphate pH 7.0, 300 mM Sodium Chloride
Flow Rate: 1 mL/min
Temperature: Ambient
Detection: UV @ 214 nm
Sample: 1. Human Serum
2. Human Serum Albumin (HSA)

Applications

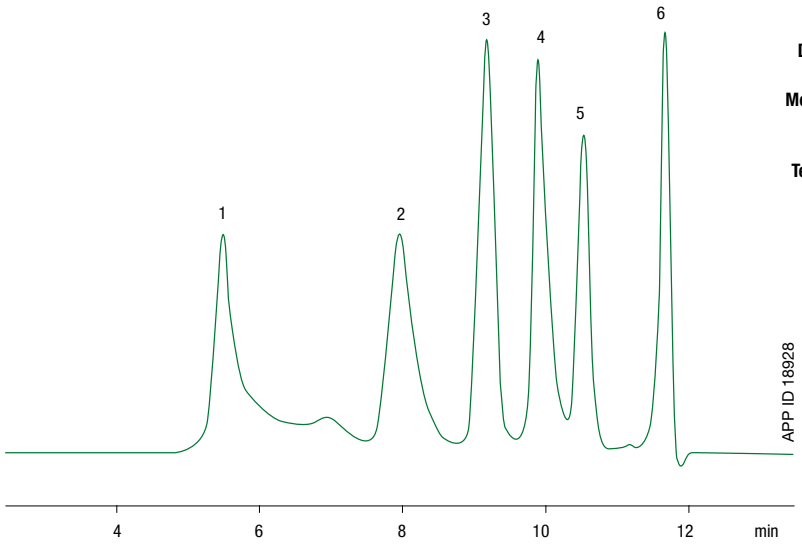
Proteins

Protein Mixture *(1)*



Column: BioSep-SEC-s3000
Dimensions: 300 x 7.8 mm
Part No.: 00H-2146-K0
Mobile Phase: 100 mM Sodium Phosphate pH 7.0, 300 mM Sodium Chloride
Flow Rate: 1 mL/min
Temperature: Ambient
Detection: UV @ 280 nm
Sample:
1. Thyroglobulin 669 kDa
2. IgG 156 kDa
3. BSA 66 kDa
4. Ovalbumin 45 kDa
5. Myoglobin 16.9 kDa
6. Uridine 244 Da

Protein Mixture *(2)*



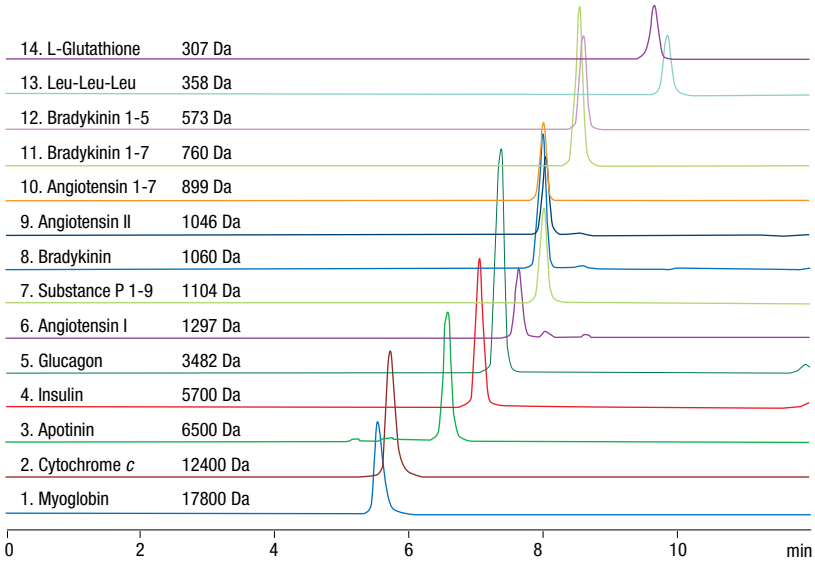
Column: BioSep-SEC-s3000
Dimensions: 300 x 7.8 mm
Part No.: 00H-2146-K0
Mobile Phase: 100 mM Sodium Phosphate pH 7.0, 300 mM Sodium Chloride
Flow Rate: 1 mL/min
Temperature: Ambient
Detection: UV @ 280 nm
Sample:
1. IgM 900 kDa
2. IgA 300 kDa
3. Transferrin 80 kDa
4. ß-Lactoglobin 35 kDa
5. Ribonuclease A 13.7 kDa
6. Uridine 244 Da

Applications

Peptides and Small Proteins

Unlike protein separations that resemble physiological conditions, peptide separations require different conditions to get good, low molecular weight resolution.

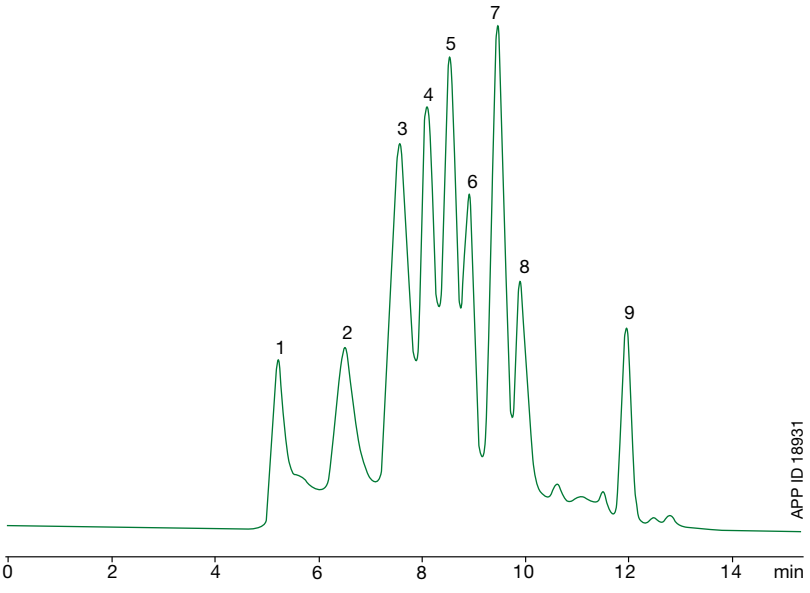
Low MW Protein and Peptide Mixture



Column: BioSep-SEC-s2000
Dimensions: 300 x 7.8 mm
Part No.: 00H-2145-K0
Mobile Phase: 45 % Acetonitrile, 0.1 % TFA
Flow Rate: 1 mL/min
Temperature: Ambient
Detection: UV @ 214 nm
Sample:
1. Myoglobin 17800 Da
2. Cytochrome *c* 12400 Da
3. Apotinin 6500 Da
4. Insulin 5700 Da
5. Glucagon 3482 Da
6. Angiotensin I 1297 Da
7. Substance P 1-9 1104 Da
8. Bradykinin 1060 Da
9. Angiotensin II 1046 Da
10. Angiotensin 1-7 899 Da
11. Bradykinin 1-7 760 Da
12. Bradykinin 1-5 573 Da
13. Leu-Leu-Leu 358 Da
14. L-Glutathione 307 Da

The use of acetonitrile and the weak ion pairing buffer TFA (0.1 %) minimizes secondary interactions between peptides and the stationary phase, leading to sharper peaks and better resolution in the low molecular weight ranges. BioSep SEC-s2000 is the recommended media as it has the smallest pore size of the BioSep GFC media.

Medium MW Protein Mixture



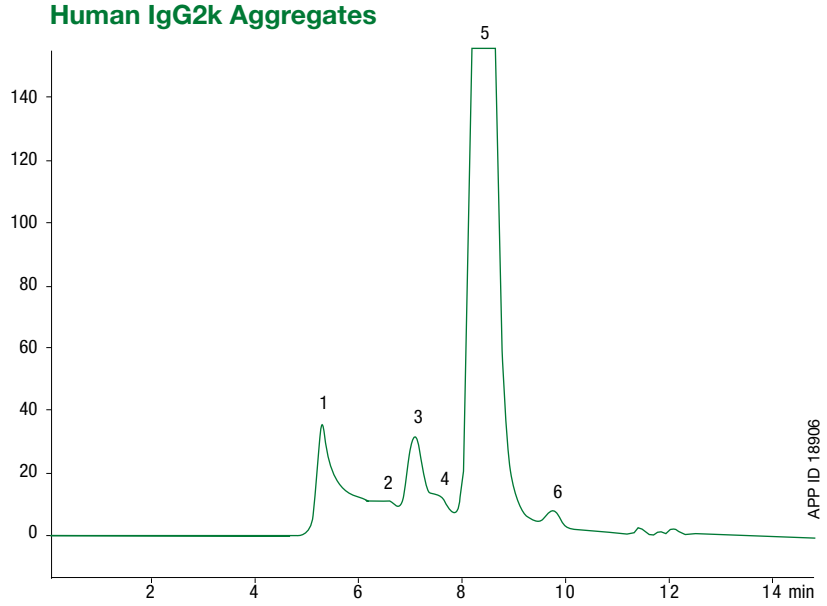
Column: BioSep-SEC-s3000
Dimensions: 300 x 7.8 mm
Part No.: 00H-2146-K0
Mobile Phase: 50 mM Sodium Phosphate pH 6.8, 300 mM Sodium Chloride
Flow Rate: 1 mL/min
Temperature: Ambient
Detection: UV @ 214 nm
Sample:
1. HMW impurity
2. Thyroglobulin 670 kDa
3. IgA 300 kDa
4. β-Amylase 200 kDa
5. IgG 150 kDa
6. Transferrin 80 kDa
7. Ovalbumin 45 kDa
8. β-Lactoglobulin A 35 kDa
9. Uridine 224 Da

Applications

Aggregates

Protein aggregation is a common application in biotherapeutics. Optimal resolution is necessary in order to separate the monomer peak from associated dimers and possible trimers in the sample. Using BioSep-SEC-S columns allows accurate quantitation of monomer and aggregate.

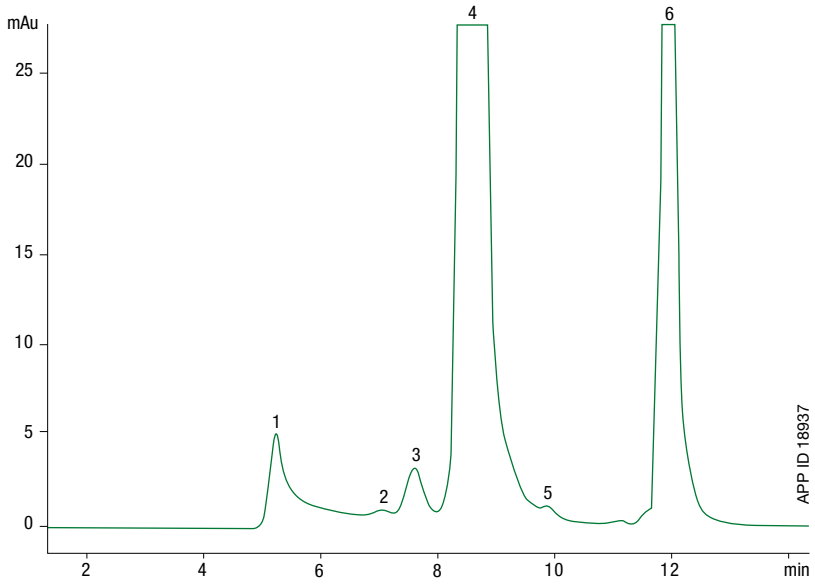
Human IgG2k Aggregates



Column: BioSep-SEC-s3000
Dimensions: 300 x 7.8 mm
Part No.: 00H-2146-K0
Mobile Phase: 100 mM Sodium Phosphate pH 6.8
Flow Rate: 1 mL/min
Temperature: Ambient
Detection: UV @ 220 nm
Sample: 1. IgG aggregate peak
2. IgG trimer peak
3. IgG dimer peak #1
4. IgG dimer peak #2
5. IgG Monomer
6. IgG low MW fragment

Results show that the dimer peak of IgG is well resolved from the monomer peak. There appears to be two different dimer forms that are partially resolved, aggregate at the total excluded void of the column, and the appearance of a possible trimer peak ahead of the dimer peak. Finally, there is a fragment peak that elutes after the IgG monomer peak, most likely attributed to an IgG that is missing one of its Fab fragments. These results show the utility of using BioSep-SEC-s3000 for antibody aggregate analysis.

Murine IgG1k Aggregates



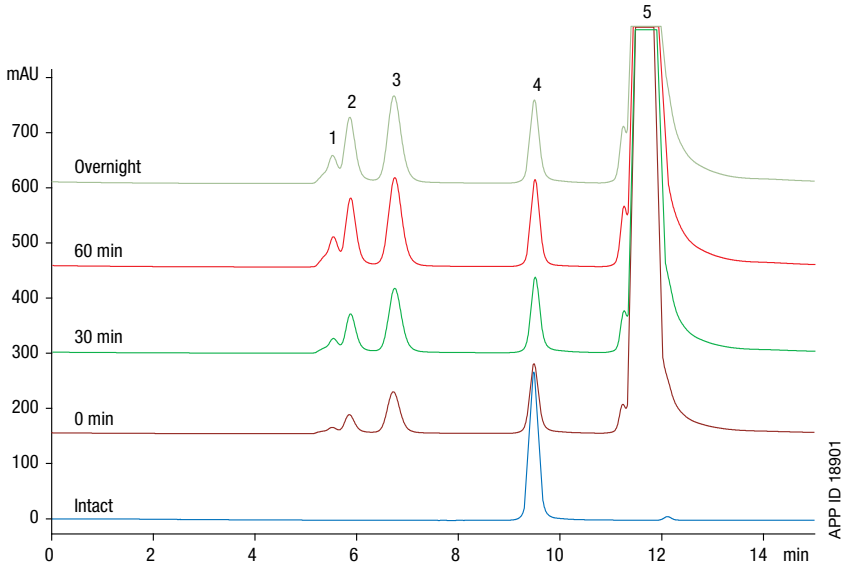
Column: BioSep-SEC-s3000
Dimensions: 300 x 7.8 mm
Part No.: 00H-2146-K0
Mobile Phase: 50 mM Sodium Phosphate pH 6.8, 300 mM Sodium Chloride
Flow Rate: 1 mL/min
Temperature: Ambient
Detection: UV @ 220 nm
Sample: 1. HMW aggregates
2. IgG1 kappa dimer 1
3. IgG1 kappa dimer 2
4. IgG Monomer
5. Low MW impurity
6. Void Volume Peak

Applications

PEGylated Proteins

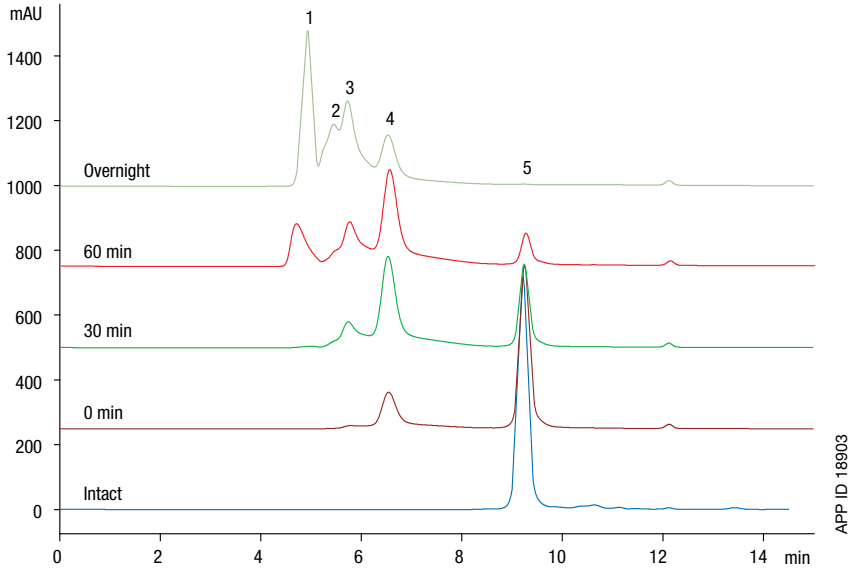
Therapeutic proteins are often PEGylated to increase their serum lifetime; however, such reactions typically generate a heterogeneous product that can be difficult to characterize and purify. It is common that proteins can be PEGylated at multiple sites even with N-terminal specific chemistries; thus the need for time course monitoring. BioSep-SEC-s2000 is typically used as it provides optimal resolution of molecular weights below 150 kDa, the range of most PEGs, proteins, and their conjugates. Resolution of each component on a BioSep can be used for monitoring or purification capacity to get high recovery and purity of the desired PEGylated protein.

PEGylated Ribonuclease A (amine PEG 20 kDa)



Column: BioSep-SEC-s2000
Dimensions: 300 x 7.8 mm
Part No.: 00H-2145-K0
Mobile Phase: 100 mM Sodium Phosphate pH 6.8
Flow Rate: 1 mL/min
Temperature: Ambient
Detection: UV @ 220 nm
Sample: 1. Ribo A + 3 PEG Complex
2. Ribo A + 2 PEG Complex
3. PEGylated Ribonuclease A
4. Unmodified Ribonuclease A
5. PEG Reagents

PEGylated L-Chymotrypsinogen A (N-terminal PEG 20 kDa)

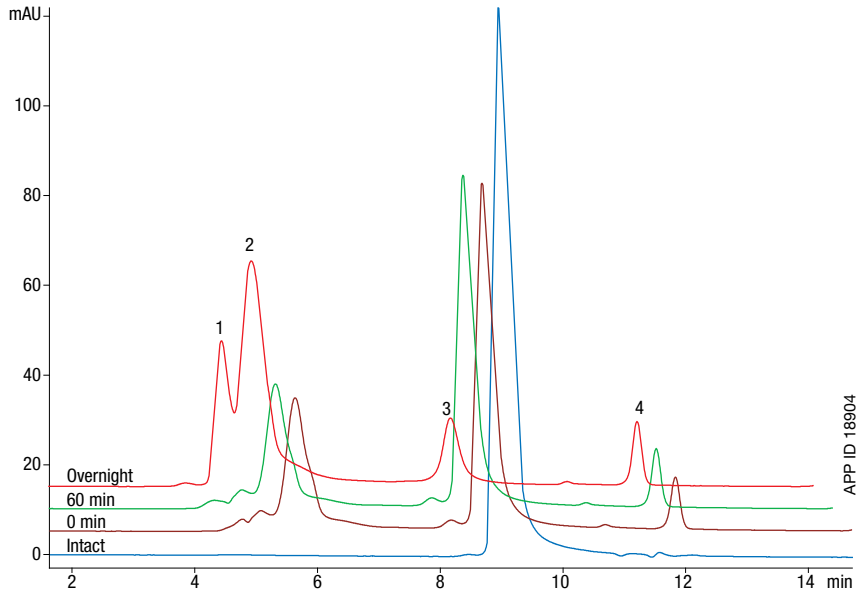


Column: BioSep-SEC-s2000
Dimensions: 300 x 7.8 mm
Part No.: 00H-2145-K0
Mobile Phase: 100 mM Sodium Phosphate pH 6.8
Flow Rate: 1 mL/min
Temperature: Ambient
Detection: UV @ 220 nm
Sample: 1. 4 PEG + Chymo A Complex
2. 3 PEG + Chymo A Complex
3. 2 PEG + Chymo A Complex
4. PEGylated Chymotrypsinogen A
5. Chymotrypsinogen A

Applications

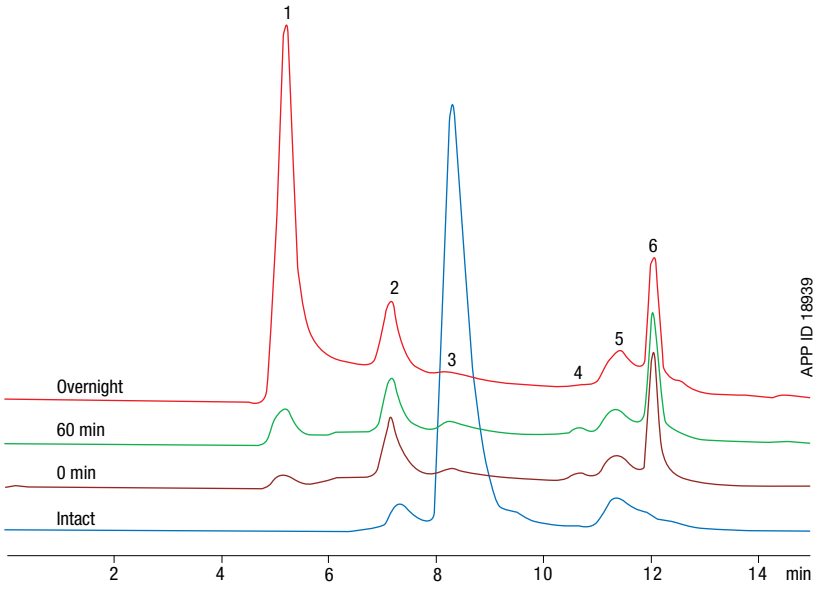
PEGylated Proteins *(cont'd)*

PEGylated β-Lactoglobulin A (N-Terminal PEG 20 kDa)



Column: BioSep-SEC-s2000
Dimensions: 300 x 7.8 mm
Part No.: 00H-2145-K0
Mobile Phase: 100 mM Sodium Phosphate pH 6.8
Flow Rate: 1 mL/min
Temperature: Ambient
Detection: UV @ 220 nm
Sample: 1. 2 PEG Modified Complex
2. PEGylated β-Lactoglobulin
3. β-Lactoglobulin
4. PEG Reagent

PEGylated IgG (N-Terminal PEG 40 kDa)



Column: BioSep-SEC-s3000
Dimensions: 300 x 7.8 mm
Part No.: 00H-2146-K0
Mobile Phase: 100 mM Sodium Phosphate pH 6.8
Flow Rate: 1 mL/min
Temperature: Ambient
Detection: UV @ 220 nm
Sample: 1. High MW PEG/IgG Complex
2. IgG Dimer + IgG/ 1 PEG Complex
3. IgG monomer unmodified
4. Low MW impurity
5. Low MW impurity
6. PEG reagent impurity

Now Available! Method Development, Re-Validation and Optimization Services

- **Too busy to re-validate your current methods onto BioSep columns?**
- **Need help optimizing your current gel filtration method?**
- **Looking for assistance designing the best method for your separation?**

Give us a call. We can help!

Phenomenex is pleased to offer method development, re-validation and optimization services to our customers. We approach our service efforts with over 25 years of industry experience, technical expertise and an unsurpassed dedication to our customer's needs.

We are committed to supporting you and your work, every step of the way.

The process is simple, and it's FREE*:

1. Contact us and fill out a project request form
2. Mail your sample to our services team
3. You will receive a comprehensive report with detailed results and an optimal method within 10 business days*

For more information on any of the Phenomenex service offerings, or to begin a project today, please call your local Phenomenex office or contact us via email at **phenodev@phenomenex.com**

Additional Services Available for:

- **HPLC | UHPLC | LC/MS**
- **GC | GC/MS**
- **Chiral Separations**
- **Solid Phase Extraction (SPE)**
- **Preparative | Bulk**
- **Synthetic Oligonucleotides**
- **On-Site Training**

** Depending on the complexity of a project, extended timelines and certain fees may be involved. These are determined at the start of a project.*

Easy Column Care and Use

- Completely regenerate by flushing with water overnight
- Restore to non-denaturing conditions quickly and easily
- Adsorbed materials are easily removed by washing with sodium phosphate buffer at pH 3.0
- Strongly retained proteins may be removed by washing with acetonitrile or methanol without compromising performance

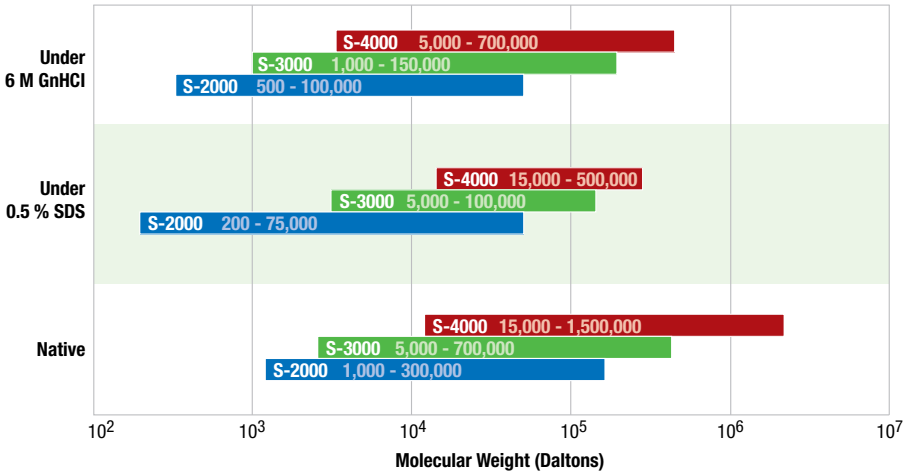
Technical Data and Specifications

	BioSep SEC-s2000	BioSep SEC-s3000	BioSep SEC-s4000
Resin Type	Silica	Silica	Silica
Particle Size (µm)	5	5	5
Pore Size (Å)	145	290	500
pH Range	2.5 - 7.5	2.5 - 7.5	2.5 - 7.5
Maximum Backpressure (psi)	1,500	1,500	1,500
Typical Backpressure (psi)	800	800	700
Efficiency (minimum number theoretical plates 300 x 7.8 mm)	30,000	30,000	25,000
Maximum Flow Rate	This is a function of pressure. Columns can withstand up to 1,500 psi, but avoid sudden pressure changes.		
Column Hardware	Standard: 316 stainless steel column with stainless steel frits. Titanium frits available.		
Maximum Temp.	50 °C		
Maximum Salt Conc.	1 M		
Denaturants	0.5 % SDS, 6 M Guanidine HCl, or 8 M urea		
Regeneration	After exposure to denaturants, wash with water overnight.		
Max. Organic Modifier	Up to 100 % CH_3CN. Start with 100 % H_2O, linear gradient to 100 % CH_3CN over 50 min. Up to 90 % CH_3CN, 10 % DMSO or 500 mM β-mercaptoethanol.		
Cleaning Procedure	General protein removal: wash with 30 mL of 0.1 M NaH_2PO_4, pH 3.0. Hydrophobic protein removal: use acetonitrile gradient. Strongly adsorbed proteins: wash with 30 mL of 0.5 % SDS or 6 M Guanidine thiocyanate or 10 % DMSO.		
Storage	Overnight storage: run mobile phase at 0.2 mL/minute. Prolonged storage: use 0.05 % NaN_3 in H_2O or 10 % methanol in H_2O.		
Column Protection	Use of a SecurityGuard is recommended to prolong column lifetime.		

Easy Column Selection

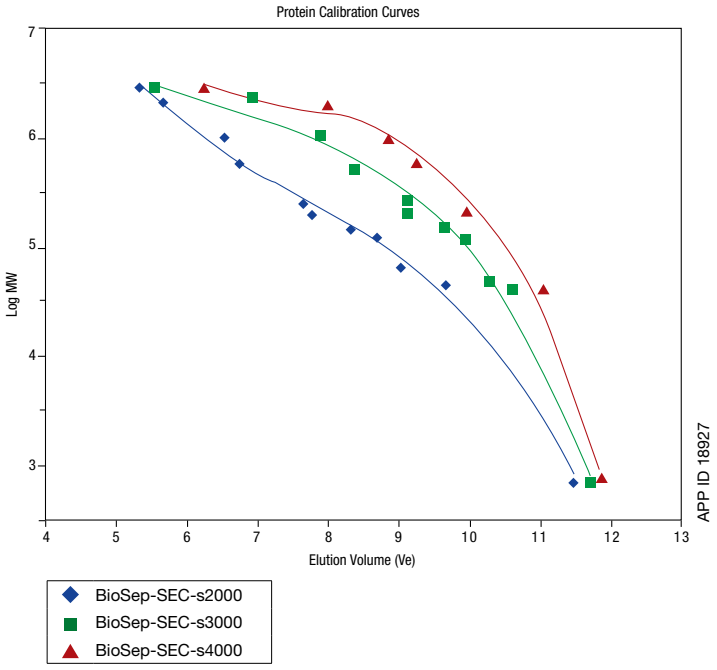
Molecular Weight Separation Ranges

3 BioSep phase options to separate samples of varying molecular weight (MW) ranges: 2000, 3000, 4000, as described below:



MW Calibration Curves for Protein Separation

- Utilize calibration curves to help guide your column selection
- Low to High MW



Conditions for all columns:

Columns: BioSep-SEC-s2000
BioSep-SEC-s3000
BioSep-SEC-s4000

Dimensions: 300 x 7.8 mm

Mobile Phase: 100 mM Sodium Phosphate pH 7.0, 300 mM Sodium Chloride

Flow Rate: 1 mL/min

Temperature: Ambient

Detection: UV @ 280 nm

Samples:
1. IgM 900 kDa
2. Thyroglobulin 669 kDa
3. IgA 300 kDa
4. IgG 156 kDa
5. Transferrin 80 kDa
6. BSA 66 kDa
7. Ovalbumin 45 kDa
8. β-Lactoglobin 35 kDa
9. Myoglobin 16.9 kDa
10. Ribonuclease A 13.7 kDa
11. Uridine 244 Da

Calibration curves are used to identify the MW of an unknown analyte and/or to select the appropriate column phase based on the ideal linear MW range for analytes of interest. If you need assistance using these curves, please contact your Phenomenex Technical Consultant.

Ordering Information

- Global support and availability in over 65 countries
- 3 batches available for validation
- Large inventory for immediate shipment

Stainless Steel Columns (mm):	Narrow Bore	Analytical		Preparative	SecurityGuard™ Cartridges (mm)	
Phases	300 x 4.6	300 x 7.8	600 x 7.8	300 x 21.2	4 x 3.0*	15 x 21.2**
					/10pk	ea
BioSep-SEC-s2000	00H-2145-E0	00H-2145-K0	00K-2145-K0	00H-2145-P0	AJ0-4487	AJ0-8588
BioSep-SEC-s3000	00H-2146-E0	00H-2146-K0	00K-2146-K0	00H-2146-P0	AJ0-4488	AJ0-8589
BioSep-SEC-s4000	00H-2147-E0	00H-2147-K0	00K-2147-K0	00H-2147-P0	AJ0-4489	AJ0-8590
					for ID: 4.6-7.8 mm	for ID: 21.2 mm

Stainless Steel Guard Columns (mm)	Narrow Bore	Express	Analytical
Phases	30 x 4.6	35 x 7.8	75 x 7.8
BioSep-SEC-s2000	03A-2145-E0	03Q-2145-K0	03C-2145-K0
BioSep-SEC-s3000	03A-2146-E0	03Q-2146-K0	03C-2146-K0
BioSep-SEC-s4000	03A-2147-E0	03Q-2147-K0	03C-2147-K0

*SecurityGuard Analytical cartridges require holder, Part No.: KJ0-4282
** PREP SecurityGuard Cartridges require holder, Part No.: AJ0-8223

Aqueous SEC 1 Column Check Standard

(for BioSep-SEC-S and other protein SEC columns)

Part No.: AL0-3042

Unit quantity: Dry; reconstituted to 2 mL

Contains: Bovine thyroglobulin; Human gamma globulin; Ovalbumin; Myoglobin; Uridine (reconstitute with 1 mL of 100 mM Sodium phosphate pH 6.8)

Diluent: 100 mM Sodium phosphate pH 6.8

Storage: Add 0.1 % NaN_3 to the solution and refrigerate

Test Conditions

Mobile phase: 100 mM Sodium phosphate, pH 6.8

Flow rate: 1.0 mL/min for a 300 x 7.8 mm column

Injection volume: 10 µL

Detection: UV @ 280 nm

guarantee

If BioSep analytical columns do not provide you with at least an equivalent separation as any other GFC column of similar porosity, type, and dimensions, send in your comparative data within 45 days and keep the column for FREE.

Cross Reference Chart

Phenomenex BioSep Phases	TSK-Gel®	Shodex®	Sepax	Bio-Rad®	Waters® BioSuite™	ZORBAX®
SEC-s2000	G2000SW G2000SW$_{XL}$	PROTEIN KW-802.5	SRT®-100* SRT®-150	Bio-Sil® SEC 125	BioSuite™ 125	GF-250
SEC-s3000	G3000SW G3000SW$_{XL}$	PROTEIN KW-803	SRT®-300	Bio-Sil® SEC 250	BioSuite™ 250	GF-450
SEC-s4000	G4000SW G4000SW$_{XL}$	PROTEIN KW-804	SRT®-500**	Bio-Sil® SEC 400	BioSuite™ 450**	

** *Only up to 1,500,000 MW*

* *Only above 1,000 MW*

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