Switch to BioSep™ GFC Columns for Protein Analysis

- Expanded Resolution Windows vs. Other GFC Columns
- Batch-to-Batch Reproducibility
- Highly Inert Material for Better Recovery and Quantitation
- Designed for Biogenerics and Peptide/Protein Therapeutics
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.

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, return column with comparative data within 45 days for a FULL REFUND.
The BioSep Advantage

Higher Efficiency for Greater Resolution ........................................... 4
Expanded Resolution Windows .......................................................... 5
Batch-to-Batch Reproducibility ........................................................... 6
Highly Inert Material for Better Recovery and Quantitation .......... 7

Applications and Technical Support

Proteins .......................................................................................... 9-11
Peptides and Small Proteins ............................................................. 12
Aggregates ..................................................................................... 13
PEGylated Proteins ......................................................................... 14-15
NEW Method Development Services ............................................. 16
Column Care and Use ................................................................. 17

Ordering Information

Easy Column Selection .................................................................. 18
Cross Reference Chart .................................................................. 19
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.

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

<table>
<thead>
<tr>
<th>SEC-S2000</th>
<th>SEC-S3000</th>
<th>SEC-S4000</th>
</tr>
</thead>
<tbody>
<tr>
<td>30,000 Plates</td>
<td>30,000 Plates</td>
<td>25,000 Plates</td>
</tr>
</tbody>
</table>

Terms and Conditions
Phenomenex reserves the right to refuse sale at its discretion. Offer applies to endusers only.

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

Disclaimer
Px Advanced Technology Solutions Pvt. Ltd. is a part of Phenomenex. 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.
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<sub>XL</sub>**

**Conditions for both columns:**
- **Columns:** BioSep-SEC-s3000, TSKgel G3000SW<sub>XL</sub>
- **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
  4. IgG2 kappa dimer
  5. Hu IgG2 kappa monomer
  6. Low MW impurity

**High MW Proteins on BioSep™-SEC-s4000 and TSKgel® G4000SW<sub>XL</sub>**

**Conditions for both columns:**
- **Columns:** BioSep-SEC-s4000, TSKgel G4000SW<sub>XL</sub>
- **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

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, return the column with comparative data within 45 days for a FULL REFUND.

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 trademark of Phenomenex, Inc.
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 A  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

1. Mobile phase containing NaCl
2. Mobile phase containing Arginine
3. Mobile phase without Arginine

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. 50mM Sodium Phosphate pH 7.0, 300mM Sodium Chloride
  2. 100mM Sodium Phosphate pH 6.8, 200mM Arginine
  3. 100mM Sodium Phosphate pH 6.8
- Flow Rate: 1 mL/min
- Temperature: Ambient
- Detection: UV @ 280 nm
- Sample: Human Serum
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
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: Human Serum
Human Serum Albumin (HSA)
# Applications

## Proteins (cont’d)

### Protein Mixture (1)

<table>
<thead>
<tr>
<th>Column:</th>
<th>BioSep-SEC-s3000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions:</td>
<td>300 x 7.8 mm</td>
</tr>
<tr>
<td>Part No.:</td>
<td>09H-2146-K0</td>
</tr>
<tr>
<td>Mobile Phase:</td>
<td>100 mM Sodium Phosphate pH 7.0, 300 mM Sodium Chloride</td>
</tr>
<tr>
<td>Flow Rate:</td>
<td>1 mL/min</td>
</tr>
<tr>
<td>Temperature:</td>
<td>Ambient</td>
</tr>
<tr>
<td>Detection:</td>
<td>UV @ 280 nm</td>
</tr>
</tbody>
</table>
| 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)

<table>
<thead>
<tr>
<th>Column:</th>
<th>BioSep-SEC-s3000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions:</td>
<td>300 x 7.8 mm</td>
</tr>
<tr>
<td>Part No.:</td>
<td>09H-2146-K0</td>
</tr>
<tr>
<td>Mobile Phase:</td>
<td>100 mM Sodium Phosphate pH 7.0, 300 mM Sodium Chloride</td>
</tr>
<tr>
<td>Flow Rate:</td>
<td>1 mL/min</td>
</tr>
<tr>
<td>Temperature:</td>
<td>Ambient</td>
</tr>
<tr>
<td>Detection:</td>
<td>UV @ 280 nm</td>
</tr>
</tbody>
</table>
| Sample: | 1. IgM 900 kDa  
2. IgA 300 kDa  
3. Transferrin 80 kDa  
4. β-Lactoglobulin 35 kDa  
5. Ribonuclease A 13.7 kDa  
6. Uridine 244 Da |
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

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

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

References
**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. 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

Phenomenex India  |  Tel: 040-3012 2400  |  Fax: 040-3012 2411  |  Email: indiainfo@phenomenex.com  |  Web: www.phenomenex.com
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 phenologix@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

<table>
<thead>
<tr>
<th></th>
<th>BioSep SEC-s2000</th>
<th>BioSep SEC-s3000</th>
<th>BioSep SEC-s4000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resin Type</strong></td>
<td>Silica</td>
<td>Silica</td>
<td>Silica</td>
</tr>
<tr>
<td><strong>Particle Size (µm)</strong></td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td><strong>Pore Size (Å)</strong></td>
<td>145</td>
<td>290</td>
<td>500</td>
</tr>
<tr>
<td><strong>pH Range</strong></td>
<td>2.5 - 7.5</td>
<td>2.5 - 7.5</td>
<td>2.5 - 7.5</td>
</tr>
<tr>
<td><strong>Maximum Backpressure (psi)</strong></td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
</tr>
<tr>
<td><strong>Typical Backpressure (psi)</strong></td>
<td>800</td>
<td>800</td>
<td>700</td>
</tr>
<tr>
<td><strong>Efficiency</strong></td>
<td>30,000</td>
<td>30,000</td>
<td>25,000</td>
</tr>
<tr>
<td><strong>Maximum Flow Rate</strong></td>
<td>(minimum number of theoretical plates 300 x 7.8 mm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Column Hardware</strong></td>
<td>Standard: 316 stainless steel column with stainless steel frits. Titanium frits available.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Maximum Temp.</strong></td>
<td>50 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Maximum Salt Conc.</strong></td>
<td>1 M</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Denaturants</strong></td>
<td>0.5 % SDS, 6 M Guanidine HCl, or 8 M urea</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Regeneration</strong></td>
<td>After exposure to denaturants, wash with water overnight.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Max. Organic Modifier</strong></td>
<td>Up to 100 % CH₃CN, Start with 100 % H₂O, linear gradient to 100 % CH₃CN over 50 min. Up to 90 % CH₃CN, 10 % DMSO or 500 mM β-mercaptoethanol.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cleaning Procedure</strong></td>
<td>General protein removal: wash with 30mL of 0.1 M NaH₂PO₄, pH 3.0. Hydrophobic protein removal: use acetonitrile gradient. Strongly adsorbed proteins: wash with 30mL of 0.5 % SDS or 6 M Guanidine thiocyanate or 10 % DMSO.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Storage</strong></td>
<td>Overnight storage: run mobile phase at 0.2 mL/minute. Prolonged storage: use 0.05 % NaN₃ in H₂O or 10 % methanol in H₂O.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Column Protection</strong></td>
<td>Use of a SecurityGuard is recommended to prolong column lifetime.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Molecular Weight Separation Ranges

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

- **Under 6 M GdnHCl**
  - S-4000: 5,000 - 700,000
  - S-3000: 1,000 - 150,000
  - S-2000: 500 - 100,000

- **Under 0.5 % SDS**
  - S-4000: 15,000 - 500,000
  - S-3000: 5,000 - 100,000
  - S-2000: 200 - 75,000

- **Native**
  - S-4000: 15,000 - 1,500,000
  - S-3000: 5,000 - 700,000
  - S-2000: 1,000 - 300,000

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-Lactoglobulin 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

<table>
<thead>
<tr>
<th>Stainless Steel Columns (mm):</th>
<th>Narrow Bore</th>
<th>Analytical</th>
<th>Preparative</th>
<th>SecurityGuard™ Cartridges (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phases</td>
<td>300 x 4.6</td>
<td>300 x 7.8</td>
<td>600 x 7.8</td>
<td>300 x 21.2</td>
</tr>
<tr>
<td>BioSep-SEC-s2000</td>
<td>00H-2145-E0</td>
<td>00K-2145-K0</td>
<td>00H-2145-P0</td>
<td>AJ0-4487</td>
</tr>
<tr>
<td>BioSep-SEC-s3000</td>
<td>00H-2146-E0</td>
<td>00K-2146-K0</td>
<td>00H-2146-P0</td>
<td>AJ0-4488</td>
</tr>
<tr>
<td>BioSep-SEC-s4000</td>
<td>00H-2147-E0</td>
<td>00K-2147-K0</td>
<td>00H-2147-P0</td>
<td>AJ0-4489</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stainless Steel Guard Columns (mm):</th>
<th>Narrow Bore</th>
<th>Express</th>
<th>Analytical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phases</td>
<td>30 x 4.6</td>
<td>35 x 7.8</td>
<td>75 x 7.8</td>
</tr>
<tr>
<td>BioSep-SEC-s2000</td>
<td>03A-2145-E0</td>
<td>03O-2145-K0</td>
<td>03C-2145-K0</td>
</tr>
<tr>
<td>BioSep-SEC-s3000</td>
<td>03A-2146-E0</td>
<td>03O-2146-K0</td>
<td>03C-2146-K0</td>
</tr>
<tr>
<td>BioSep-SEC-s4000</td>
<td>03A-2147-E0</td>
<td>03O-2147-K0</td>
<td>03C-2147-K0</td>
</tr>
</tbody>
</table>

Aqueous SEC 1 Column Check Standard
(for BioSep-SEC-S and other protein SEC columns)

Part No.: AL0-3042

<table>
<thead>
<tr>
<th>Unit quantity:</th>
<th>Dry; reconstituted to 2 mL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contains:</td>
<td>Bovine thyroglobulin; Human gamma globulin; Ovalbumin; Myoglobin; Uridine (reconstitute with 1 mL of 100 mM Sodium phosphate pH 6.8)</td>
</tr>
<tr>
<td>Diluent:</td>
<td>100 mM Sodium phosphate pH 6.8</td>
</tr>
<tr>
<td>Storage:</td>
<td>Add 0.1 % NaN₃ to the solution and refrigerate</td>
</tr>
</tbody>
</table>

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

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, return the column with comparative data within 45 days for a FULL REFUND.

Cross Reference Chart

<table>
<thead>
<tr>
<th>Phenomenex BioSep™ Phases</th>
<th>TSK-Gel®</th>
<th>Shodex®</th>
<th>Sepax</th>
<th>Bio-Rad®</th>
<th>Waters® BioSuite™</th>
<th>ZORBAX®</th>
</tr>
</thead>
<tbody>
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<td>BioSuite™ 450°</td>
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Terms and Conditions
Phenomenex reserves the right to refuse sale at its discretion. Offer applies to endusers only. Subject to Phenomenex Standard Terms & Conditions, which may be viewed at www.phenomenex.com/TermsAndConditions

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