Better Size Exclusion, Even Better Price

www.phenomenex.com/Yarra

Aqueous Size Exclusion Columns

phenomenex®
...breaking with tradition™

www.phenomenex.com/Yarra
Ultra-High Resolution Size Exclusion for Biomolecules at an Unbelievable Price

Introducing Yarra™, Ultra-High Resolution Size Exclusion Columns for Biomolecules

**EFFICIENT**
3 µm particle size for sharp peaks and increased resolution

**REPRODUCIBLE**
Expert manufacturing for consistent performance, time and time again

**DURABLE**
Engineered for long column lifetime

**INERT**
Optimized bonding for extreme surface inertness, ensuring accurate recoveries

**VERSATILE**
Three phases to achieve optimal separation

www.phenomenex.com/Yarra

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### Higher Efficiency, Much Lower Price Compared to TSKgel® — GUARANTEED!

<table>
<thead>
<tr>
<th>Phenomenex®</th>
<th>Yarra™</th>
<th>VS.</th>
<th>Tosoh Bioscience®</th>
<th>TSKgel®</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEC-0800</td>
<td>SEC-0800</td>
<td>SEC-4000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Particle Size (µm)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Pore Size (Å)</td>
<td>145</td>
<td>240</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>MW Range (Native Conditions)</td>
<td>1 K – 300 K</td>
<td>5 K – 50 K</td>
<td>5 K – 1.5 M</td>
<td></td>
</tr>
<tr>
<td>pH Stability</td>
<td>2.5 – 7.5</td>
<td>2.5 – 7.5</td>
<td>2.5 – 7.5</td>
<td></td>
</tr>
<tr>
<td>Maximum Backpressure (psi)</td>
<td>1915</td>
<td>1915</td>
<td>508</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>2.5 – 7.5</td>
<td>2.5 – 7.5</td>
<td>2.5 – 7.5</td>
<td></td>
</tr>
<tr>
<td>Maximum Temperature (°C)</td>
<td>10</td>
<td>10</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Maximum Flow Rate (mL/min)</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>Efficiency (minimum theoretical plates)</td>
<td>48,000</td>
<td>48,000</td>
<td>38,000</td>
<td></td>
</tr>
</tbody>
</table>

Also guaranteed against other aqueous GFC columns 3 µm or above.

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If Yarra 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.

*TSKgel and Tosoh Bioscience are registered trademarks of Tosoh Corporation. Comparative separations may not be representative of all applications.

*All TSKgel specifications were taken from Tosoh Bioscience 2004-5 Laboratory Products Catalog.
Engineered for Higher Efficiencies and Increased Resolving Power

Starting with 3 µm ultra-pure silica, Yarra particles are densely bonded with a proprietary hydrophilic surface chemistry. Coupled with tight particle and pore size distribution as well as strict packing and QC specifications, Yarra columns allow for the highest efficiencies and resolution possible.

**SEM of Yarra™ 3µm Particle**

Comparative separations may not be representative of all applications.

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**Yarra 3µm SEC-3000 vs. 5 µm SEC 3000 Column**

**Yarra 3µm SEC-3000**

54,524 plates/column

**5 µm SEC 3000**

31,949 plates/column

Conditions for all columns:
- Columns: Yarra 3µm SEC-3000
- 5µm SEC 3000 Column
- Dimensions: 300 x 7.8 mm
- Mobile Phase: 100 mM Sodium Phosphate in Water pH 6.8 + 0.025 % NaN3
- Flow Rate: 1 mL/min
- Temperature: Ambient
- Detection: UV @ 280 nm

Sample:
1. Thyroglobin (699 kDa)
2. IgA (300 kDa)
3. IgG (150 kDa)
4. Ovalbumin (44 kDa)
5. Myoglobin (17 kDa)
6. Uridine

Up to 70 % higher efficiencies delivering better resolution

How does your current SEC column compare?

www.phenomenex.com/Yarra
Expert Manufacturing for Optimal Performance and Reliability

Reproducible GFC columns require extreme detail in every aspect of the manufacturing and packing process. First, Yarra silica particles are synthesized using narrow tolerances for pore and particle size. Next, bonding of a proprietary hydrophilic ligand is tightly controlled, and packing of each column requires validated recipes tested to high specifications.

Batch-to-Batch Reproducibility
Yarra™ 3 µm SEC-3000

- Columns: Yarra 3 µm SEC-3000
- Dimensions: 300 x 7.8 mm
- Part No.: 00H-4513-K0
- Mobile Phase: 100 mM Sodium Phosphate in Water pH 6.8 + 0.025 % NaN₃
- Flow Rate: 1 mL/min
- Temperature: Ambient
- Detection: UV @ 280 nm

Sample:
1. Thyroglobin (699 kDa)
2. IgA (300 kDa)
3. IgG (150 kDa)
4. Ovalbumin (44 kDa)
5. Myoglobin (17 kDa)
6. Uridine

Doing Reversed Phase Analysis?
Try Aeris core-shell columns for ultra-high resolution separations of proteins and peptides on HPLC and UHPLC systems. www.phenomenex.com/Aeris

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Reproducible performance, column-to-column and batch-to-batch
The great care exhibited in both engineering and packing Yarra™ columns can produce stable performance over longer lifetimes than other size exclusion columns on the market. Over the course of time, reduced numbers of column replacements add up to significant time and money savings for your lab.

**Efficiency and Retention Time Stability on Yarra 3µm SEC-2000 over 900 Injections**

- **Number of Plates per Column**
- **Retention Time (min)**

**Injections**
- 900

**Minimal change in retention and performance**

- **Column:** Yarra 3 µm SEC-2000
- **Dimensions:** 300 x 7.8 mm
- **Part No.:** 00H-4512-K0
- **Mobile Phase:** 100 mM Sodium Phosphate in Water pH 6.8 + 0.025 % NaN₃
- **Flow Rate:** 1 mL/min
- **Temperature:** Ambient
- **Detection:** UV @ 280 nm
- **Sample:**
  1. Thyroglobin (699 kDa)
  2. IgA (300 kDa)
  3. IgG (150 kDa)
  4. Ovalbumin (44 kDa)
  5. Myoglobin (17 kDa)
  6. Uridine

**Increase Your Column Lifetime.**

Use the SecurityGuard™ column protection system to extend the lifetime of your GFC column.

www.phenomenex.com/SecurityGuardHPLC
Extreme Surface Inertness for Accurate and Confident Recoveries

Phenomenex’s proprietary surface chemistry provides an inertness unmatched by other GFC columns. The result is minimal adsorption of proteins and other protein aggregates leading to more accurate quantitation.

Minimal “Priming Effect” with Yarra™ Columns

Conditions for all columns (except where noted):
- Columns: Yarra 3 µm SEC-3000, Tosoh 5 µm G3000SWxl, Tosoh 4 µm SuperSW3000
- Dimensions: 300 x 7.8 mm
- Mobile Phase: 50 mM Sodium Phosphate pH 5.0 / 0.1 M Sodium Sulfate
- Flow Rate: 1 mL/min (Yarra 3 µm SEC-3000), 0.35 mL/min (SuperSW3000)
- Temperature: Ambient
- Detection: UV @ 280 nm
- Sample: 1. IgG Dimer
  2. IgG Monomer
  3. Albumin

For Method Development and Optimization Tips, go to: www.phenomenex.com/Yarra
Yarra™ columns are available in three phases to separate a wide range of analytes:

**SEC-2000**
- Biosimilar aggregate applications
- Peptide therapeutics
- Small proteins
- PEGylated peptides and small proteins

**SEC-3000**
- Immunoglobulin aggregate applications
- Medium to large size proteins
- Serum proteins
- PEGylated proteins

**SEC-4000**
- Large proteins
- Antibodies
- PEGylated IgG

Search Yarra Applications online at
www.phenomenex.com/Yarra
It is useful to employ the differences in selectivity between Yarra SEC-2000, SEC-3000 and SEC-4000 columns. For molecular weight ranges where overlap occurs, we suggest screening at least two phases to identify the optimal selectivity for your separation.

Use the MW chart and/or calibration curves to select the most appropriate phase(s) to evaluate.
We Stand Behind Yarra’s Performance

Set Yarra side-by-side with your current size exclusion column. We GUARANTEE® similar or better performance, or receive a FULL REFUND.

Compare Yarra’s Resolving Power to TSKgel’s

Phenomenex®
Yarra® 3 µm SEC-3000

Tosoh Bioscience®
TSKgel® 5 µm G3000SWx1

If Yarra 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.

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I was very impressed with the Yarra 3µm SEC-3000, 300x7.8 mm column. It provided excellent resolution between the monomer and HMWP peaks, which allowed for consistent integration. The peak shape was greatly improved for all sample components. We immediately revised our test method to include the Yarra SEC-3000 column. This is a column that G.H. Lathe and C.R.J. Ruthven would be proud of!

Kieran Curley, Mannkind Corporation, Danbury, CT, USA

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Comparisons for all columns:

Columns: Yarra 3µm SEC-3000
TSKgel 5µm G3000SWx1

Dimensions: 300 x 7.8 mm
Mobile Phase: 50 mM Sodium Phosphate pH 6.8 / 0.3 M Sodium Chloride
Flow Rate: 1 mL/min
Temperature: Ambient
Detection: UV @ 220 nm

Sample:
1. IgM
2. Thyroglobin (699 kDa)
3. Beta Amylase
4. Ovalbumin (44 kDa)
5. Myoglobin (17 kDa)
6. Uridine

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Aqueous Size Exclusion Columns

**Ordering Information**

**Aqueous SEC 1 Column Check Standard**

<table>
<thead>
<tr>
<th>Part No.: AL0-3042</th>
<th>Description</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>for 4.6 to 7.8 mm ID column</td>
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</table>

**Column Specifications**

<table>
<thead>
<tr>
<th>Yarra 3 µm SEC-2000</th>
<th>Yarra 3 µm SEC-3000</th>
<th>Yarra 3 µm SEC-4000</th>
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<tbody>
<tr>
<td>Resin Type</td>
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<td>Silica</td>
</tr>
<tr>
<td>Particulate Size (µm)</td>
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<td>2.0</td>
</tr>
<tr>
<td>pH Range</td>
<td>2.5 - 7.5</td>
<td>2.5 - 7.5</td>
</tr>
<tr>
<td>Maximum Backpressure (psi)</td>
<td>3,000</td>
<td>3,000</td>
</tr>
<tr>
<td>Typical Backpressure (psi)</td>
<td>1,300</td>
<td>1,300</td>
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<tr>
<td>Efficiency (minimum number of theoretical plates, 300 x 7.8)</td>
<td>48,000</td>
<td>48,000</td>
</tr>
<tr>
<td>Max. Flow Rate (µL/min)</td>
<td>1.5</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**Terms and Conditions**

Subject to Phenomenex Standard Terms and Conditions which may be viewed at [http://www.phenomenex.com/TermsAndConditions](http://www.phenomenex.com/TermsAndConditions).

**Trademarks**

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**Disclaimer**

Phenomenex is in no way affiliated with Tosoh Corporation. Comparative separations may not be representative of all applications. SecurityGuard is patented by Phenomenex. U.S. Patent No. 6,162,362

*The opinions stated herein are solely those of the speaker and not necessarily those of any company or organization.*

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**SecurityGuard Cartridge Holder Kit**

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<th>Part No.</th>
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<tbody>
<tr>
<td>KJ0-4282</td>
<td>for 4.6 to 7.8 mm ID column</td>
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</tbody>
</table>

**Share your Thoughts!**

How did Yarra perform on your method? Please share, and we will send you a little something to thank you for your efforts.

[www.phenomenex.com/YarraFeedback](http://www.phenomenex.com/YarraFeedback)