Yarra™

Ultra-High Efficiency GFC/SEC

BIOMOLECULE CHARACTERIZATION & PURIFICATION AT EXTREMELY AFFORDABLE PRICES

AGGREGATES • ADC • mAb • BIOSIMILARS

Welcome to
Affordable, Higher Resolution Size Exclusion Chromatography

With Yarra™ SEC Columns you can:

- **Save Money** with extremely affordable prices
- **Achieve Better Results** through larger exclusion ranges and higher efficiencies
- **Get Enhanced Recovery** using more inert Yarra particles and Bio-Inert hardware
- **Gain Time** with faster more productive HPLC/UHPLC runs on the new 1.8 µm SEC-X150 and X300
- **Feel at Ease** knowing you have an unmatched product guarantee

Better Protein/Peptide SEC Starts With Yarra

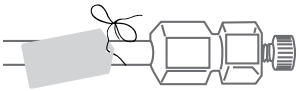
Affordable Pricing and Unmatched Product Guarantee

Yarra SEC columns are highly affordable and are accompanied by a product guarantee that ensures performance satisfaction, making it extremely easy to upgrade current SEC methods!

guarantee

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.

Yarra vs. Waters® BEH SEC



			Waters* 1.7 µm 150 x 4.6 mm	
SEC-X150	SEC-X300	VS.	BEH125 SEC	BEH200 SEC
1.8	1.8	**Particle Size** (µm)	1.7	1.7
150	300	**Pore Size** (Å)	125	200
1K-450K	10K-700K	**MW Range** in Native Conditions (Da)	1K–80K	10K–450K
>30,000	>30,000	**Efficiency** (plates/column)	>30,000	>30,000

*Waters specifications taken from Waters website.

Yarra vs. Tosoh Bioscience® TSKgel®

Yarra 300 x 7.8 mm				TSKgel† 300 x 7.8 mm		
SEC-2000	SEC-3000	SEC-4000	VS.	G2000SWxl	G3000SWxl	G4000SWxl
3	3	3	**Particle Size** (µm)	5	5	8
145	290	500	**Pore Size** (Å)	125	250	450
1K–300K	5K–700K	15K–1,500K	**MW Range** in Native Conditions (Da)	5K–150K	10K–500K	20K–7,000K
48,000	48,000	38,000	**Efficiency** (minimum theoretical plates)	20,000	20,000	16,000

†All TSKgel specifications were taken from Tosoh Bioscience 2004-5 Laboratory Products Catalog

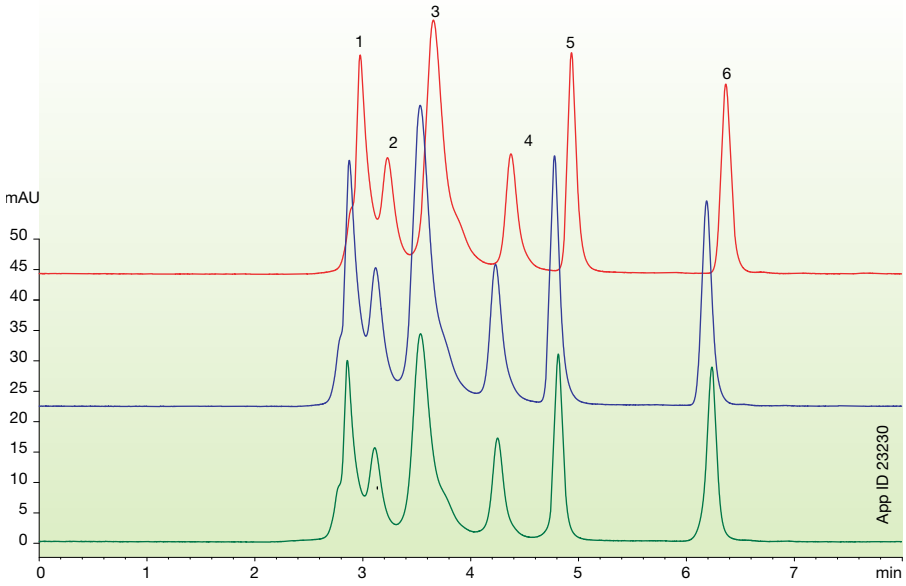
Comparative separations may not be representative of all applications.

Expert Manufacturing for Dependable 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 to ensure excellent reproducibility.

Batch-to-Batch Reproducibility

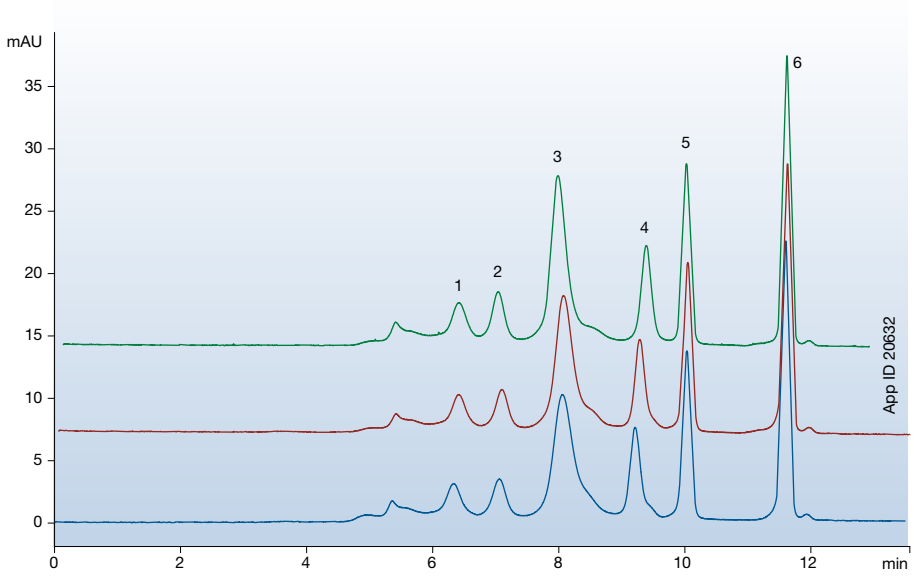
Yarra 1.8 µm SEC-X150



Column: Yarra 1.8 µm SEC-X150
Dimensions: 150 x 4.6 mm
Part No.: 00F-4631-E0
Mobile Phase: 100 mM Sodium Phosphate in Water pH 6.8 + 0.025 % NaN_3
Flow Rate: 0.3 mL/min
Detection: UV @ 280 nm
Sample: 1. Thyroglobulin (669 kDa)
2. IgA (300 kDa)
3. IgG (150 kDa)
4. Ovalbumin (44 kDa)
5. Myoglobin (17 kDa)
6. Uridine

Batch-to-Batch Reproducibility

Yarra 3 µm SEC-3000

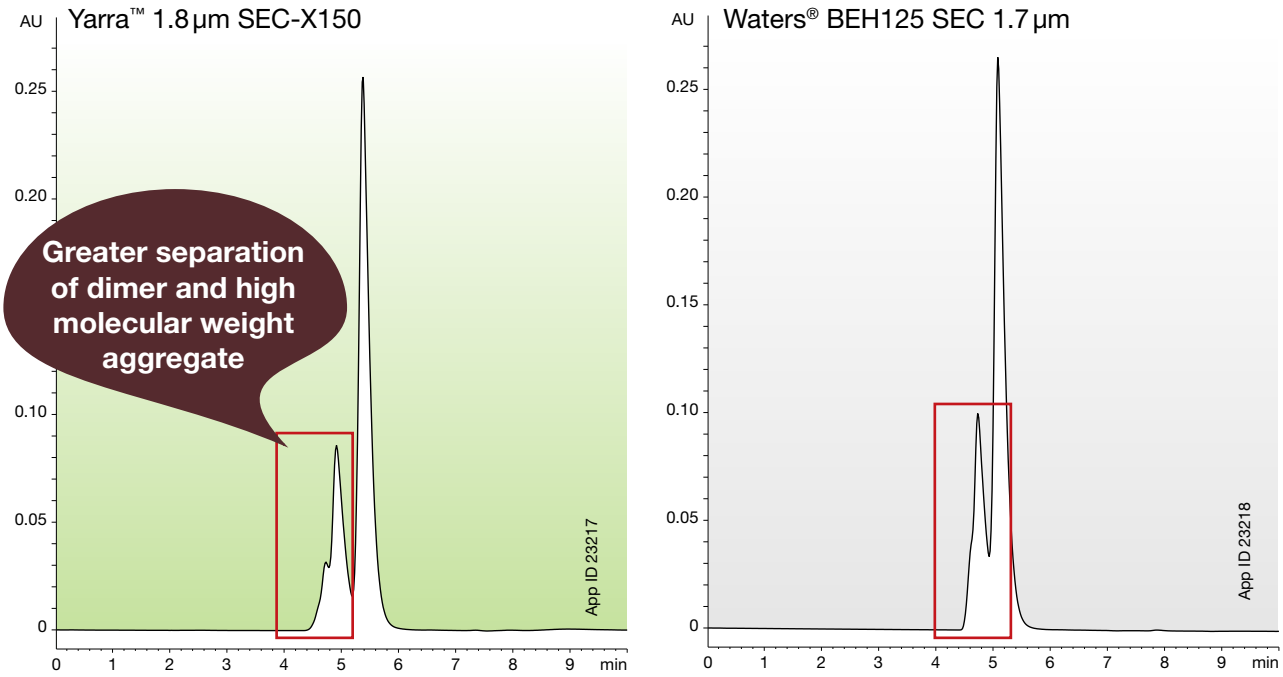


Column: Yarra 3 µm SEC-3000
Dimensions: 300 x 7.8 mm
Part No.: 00H-4513-K0
Mobile Phase: 100 mM Sodium Phosphate in Water pH 6.8 + 0.025 % NaN_3
Flow Rate: 1 mL/min
Detection: UV @ 280 nm
Sample: 1. Thyroglobulin (669 kDa)
2. IgA (300 kDa)
3. IgG (150 kDa)
4. Ovalbumin (44 kDa)
5. Myoglobin (17 kDa)
6. Uridine

Exceptional Separation Power - Insulin

The high resolution provided by Yarra 1.8 µm SEC-X150 columns make them an excellent solution for the characterization of biotherapeutic insulin and any resulting aggregates. With two column lengths, you have the ability to further strengthen resolution with a 300 mm or speed up methods with a 150 mm.

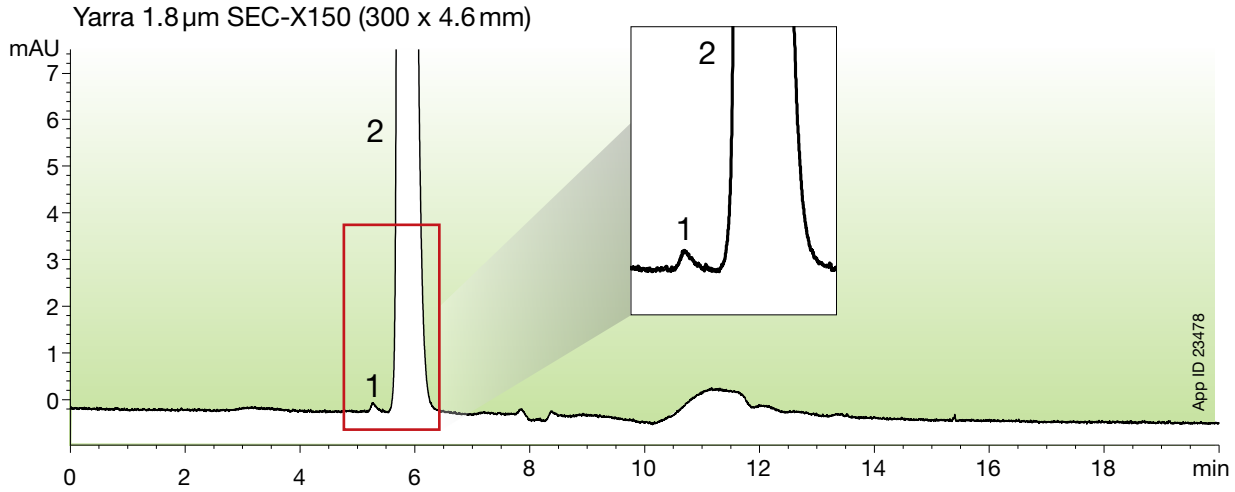
Degraded Human Insulin



Conditions for all columns:
Column: Yarra 1.8 µm SEC-X150
BEH125 SEC, 1.7 µm
Dimensions: 150 x 4.6 mm

Mobile Phase: 1 g/L L-Arginine in Water/Acetic Acid/Acetonitrile (65:15:20)
Flow Rate: 0.2 mL/min
Detection: UV @ 280 nm
Sample: Human Insulin

Expanded Resolution of Recombinant Human Insulin



Column: Yarra 1.8 µm SEC-X150
Dimensions: 300 x 4.6 mm
Part No.: 00H-4631-E0
Mobile Phase: Arginine (1 g/L) in Water/Acetic Acid/Acetonitrile (65:15:20)
Flow Rate: 0.4 mL/min

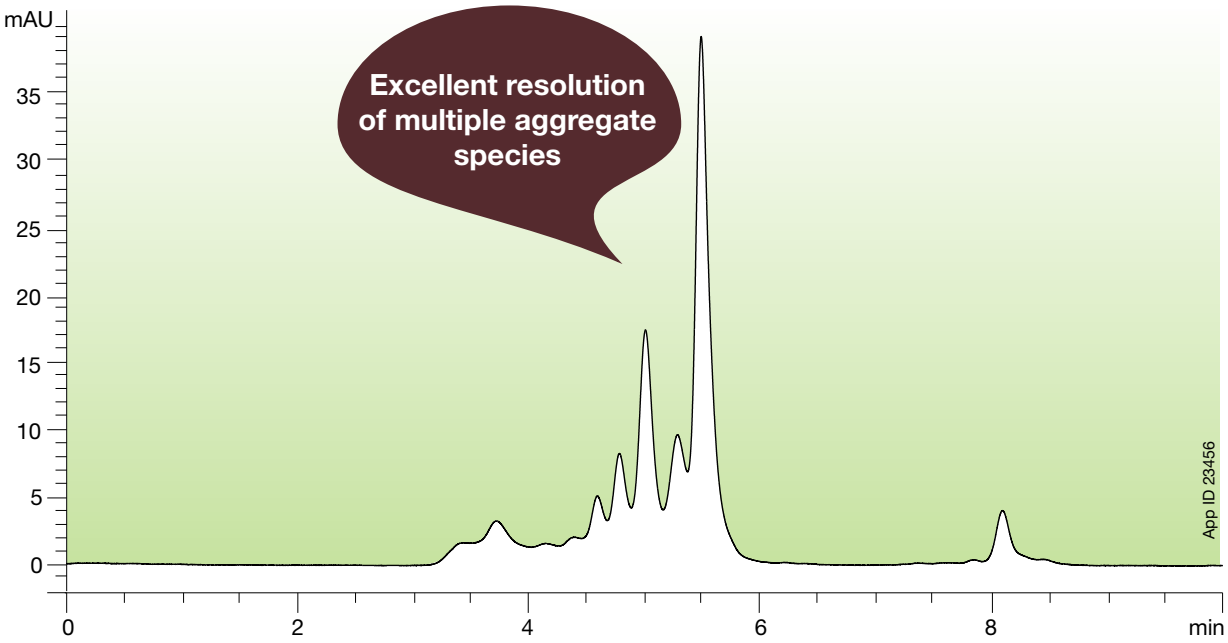
Temperature: Ambient
Detection: UV @ 276 nm
Sample: 1. Insulin Dimer
2. Insulin Monomer

Comparative separations may not be representative of all applications.

Exceptional Separation Power—Monoclonal Antibodies (mAb)

The large separation range of the Yarra SEC-X300 makes it ideal for high molecular weight aggregation studies of monoclonal antibodies. While the smaller MW focus of the SEC-X150 allows for excellent identification and separation of a mAb and its variable region fragments.

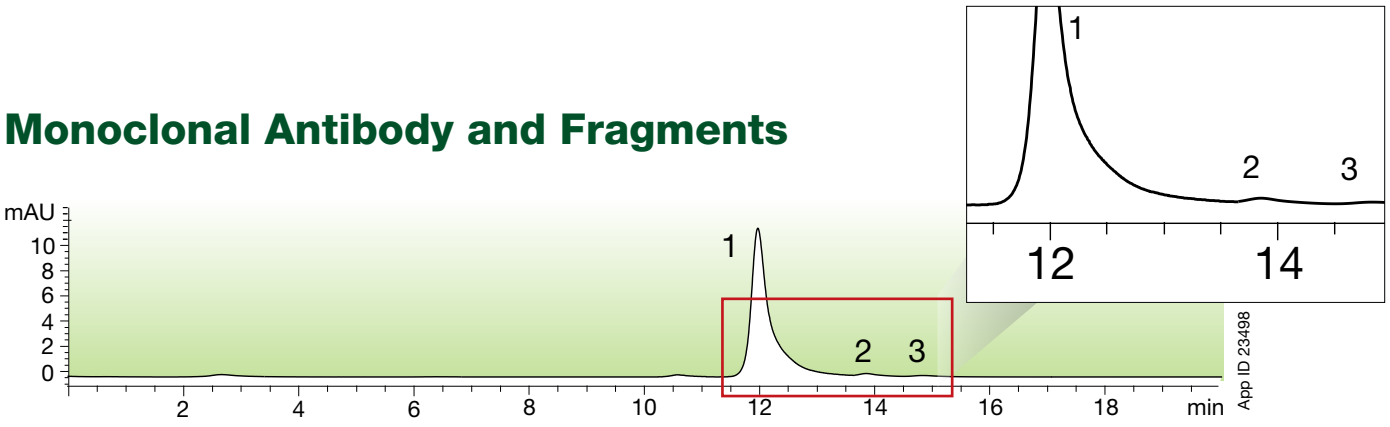
Mouse mAb (monoclonal antibody)



Column: Yarra 1.8 µm SEC-X300
Dimensions: 150 x 4.6 mm
Part No.: 00F-4743-E0
Mobile Phase: 0.1 M Sodium phosphate in Water (pH 6.8)
Flow Rate: 0.35 mL/min

Temperature: Ambient
Detection: UV @ 280 nm
Sample: Mouse Monoclonal antibody

Monoclonal Antibody and Fragments

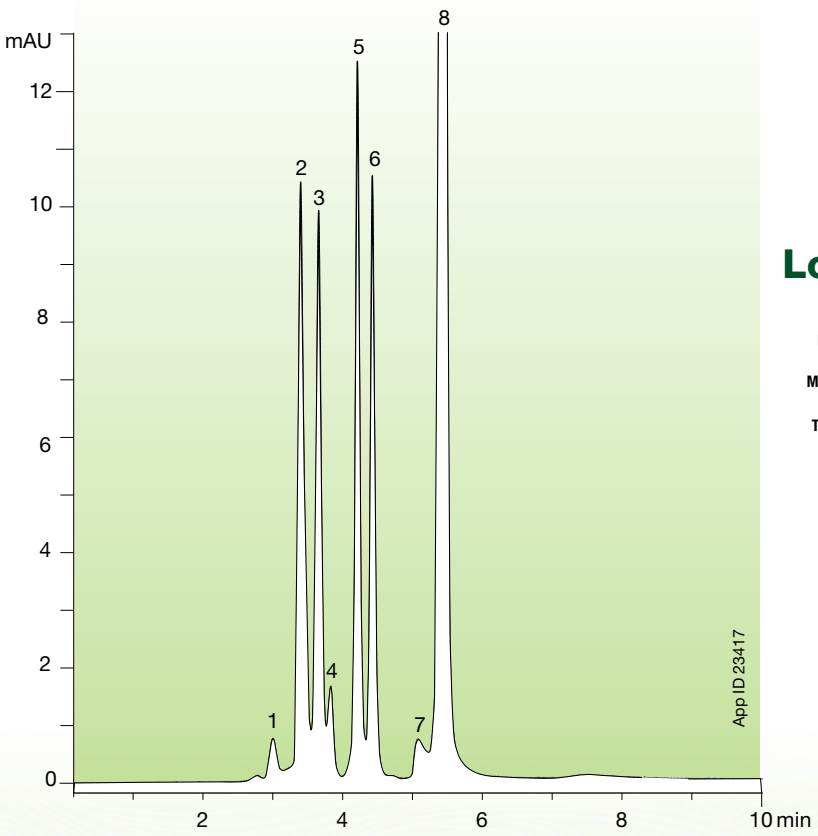


Column: Yarra 1.8 µm SEC-X150
Dimensions: 300 x 4.6 mm
Part No.: 00H-4631-E0
Mobile Phase: 0.2 M Sodium phosphate in Water (pH 6.8)
Flow Rate: 0.2 mL/min

Temperature: Ambient
Detection: UV @ 280 nm
Sample: 1. mAb(monomer)
2. Fragment 1
3. Fragment 2

Expanded Separation Window

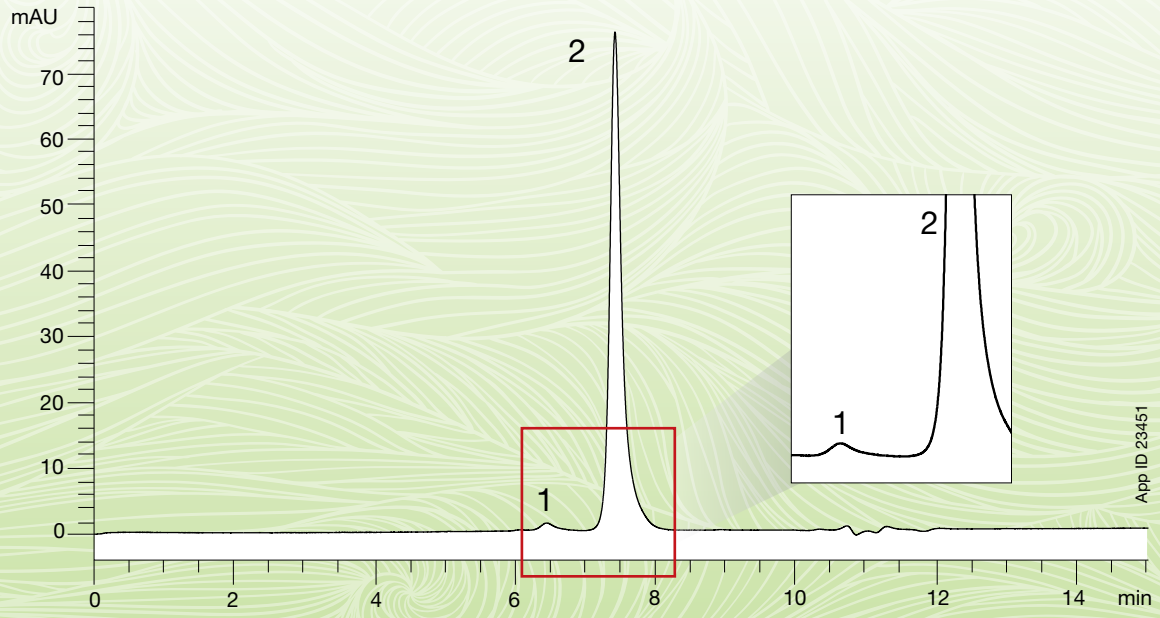
An expanded exclusion range was expertly developed and fine-tuned for both Yarra™ 1.8 µm products. Together they offer a wider applicability for popular biomolecule separations. The SEC-X150 focuses on smaller MW separations in the range of 1 kDa-450 kDa while the SEC-X300 targets those high MW compound mixes inside of 10 kDa-700 kDa.



Low MW Separation Mix

Column: Yarra 1.8 µm SEC-X150
Dimensions: 150 x 4.6 mm
Part No.: 00F-4631-E0
Mobile Phase: 100 mM Sodium Phosphate in Water pH 6.8 + 0.03 % NaN_3
Flow Rate: 0.35 mL/min
Temperature: Ambient
System: Agilent® 1260 UHPLC
Detection: UV @ 280 nm
Sample: 1. BSA Dimer (132 kDa)
2. BSA (66 kDa)
3. Ovalbumin (44 kDa)
4. Myoglobin Dimer (34 kDa)
5. Myoglobin (17 kDa)
6. Ribonuclease A (13.7 kDa)
7. Insulin (5800 Da)
8. Uridine (244 Da)

mAb with Dimer



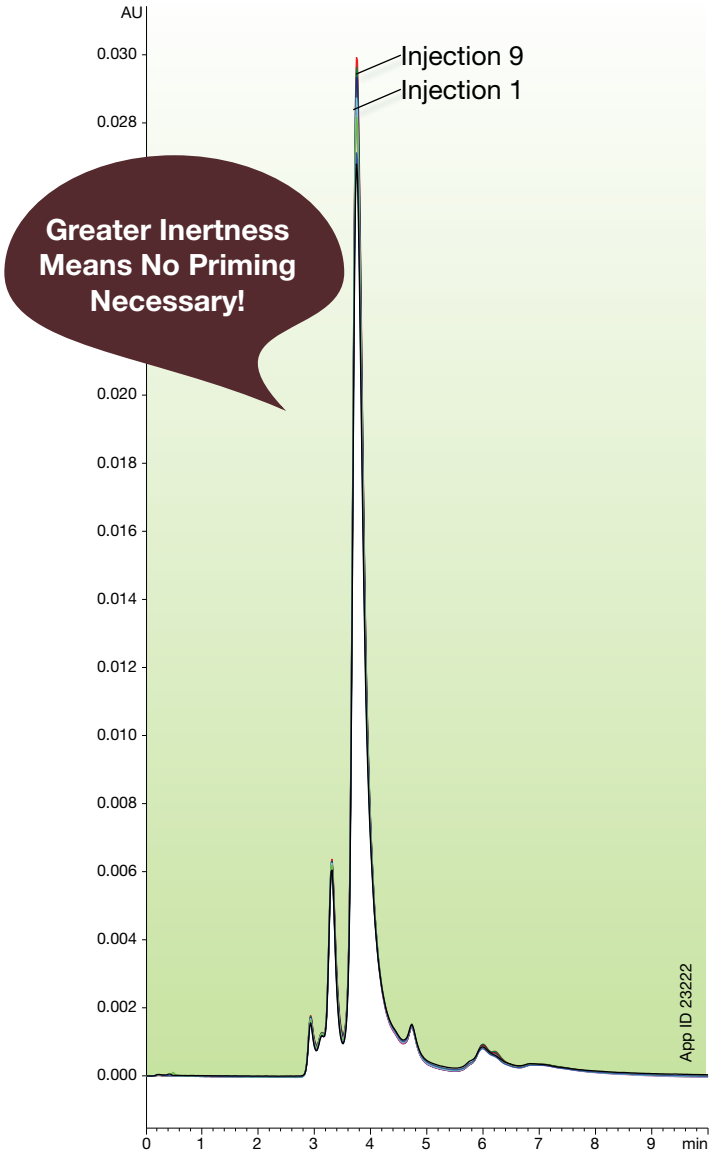
Column: Yarra 1.8 µm SEC-X300
Dimensions: 150 x 4.6 mm
Part No.: 00F-4743-E0
Mobile Phase: 0.1 M Potassium phosphate in Water (pH 6.8)
Flow Rate: 0.35 mL/min

Temperature: Ambient
Detection: UV @ 280 nm
Sample: 1. Dimer
2. Monomer

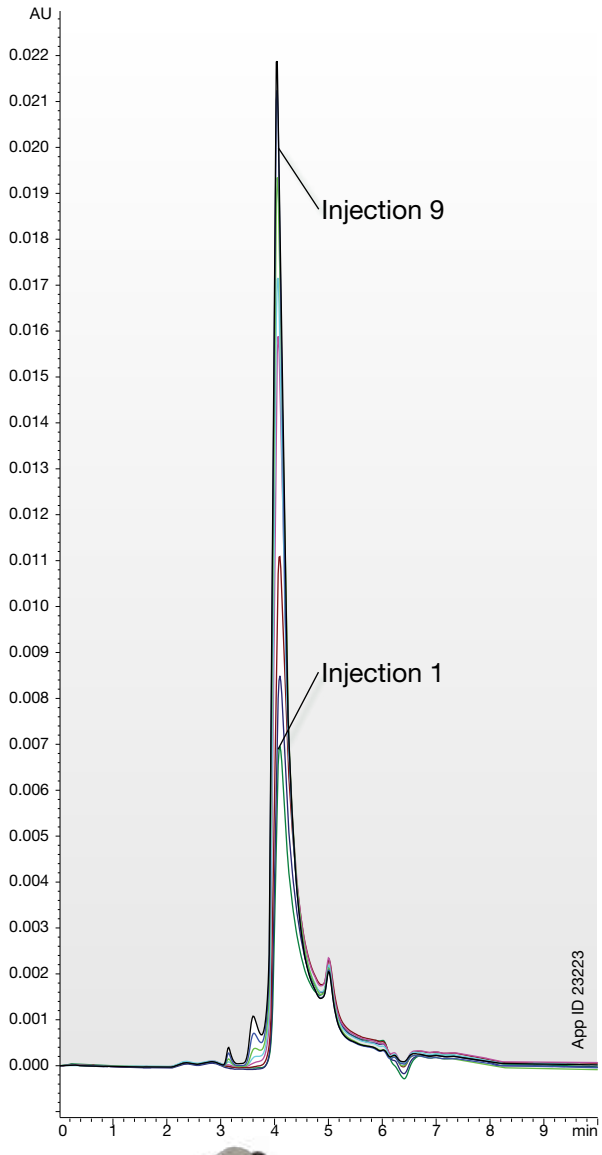
Better Recovery with Greater Inertness

Phenomenex's proprietary surface chemistry provides an inertness that is hard to match by other GFC columns. The result is minimal adsorption of peptides, proteins, and other protein aggregates leading to more accurate quantitation.

Yarra® 1.8 µm SEC-X150



Waters® BEH200 SEC 1.7 µm



Conditions for all columns:

Columns: Yarra 1.8 µm SEC-X150
BEH200 SEC 1.7 µm
Dimensions: 150 x 4.6 mm
Mobile Phase: 50 mM Sodium Phosphate in Water pH 5.0/
0.1 M Sodium Sulfate
Flow Rate: 0.3 mL/min
Temperature: Ambient
Detection: UV @ 280 nm
Sample: 1. IgG Dimer
2. IgG Monomer
3. Albumin

Comparative separations may not be representative of all applications.

New Bio-Inert Hardware

In addition to a highly inert particle chemistry, Yarra 1.8 µm SEC-X150 columns utilize a Bio-Inert hardware to further ensure accurate recoveries.

Fast GFC/SEC Methods on Your HPLC or UHPLC

Utilize the high performance of the new Yarra™ 1.8 µm on the system(s) that you know and are comfortable with! The amazing separation power of the Yarra 1.8 µm can easily be utilized on any HPLC and UHPLC system.

Waters® ACQUITY® UPLC®

Shimadzu® Nexera®

Agilent® 1200

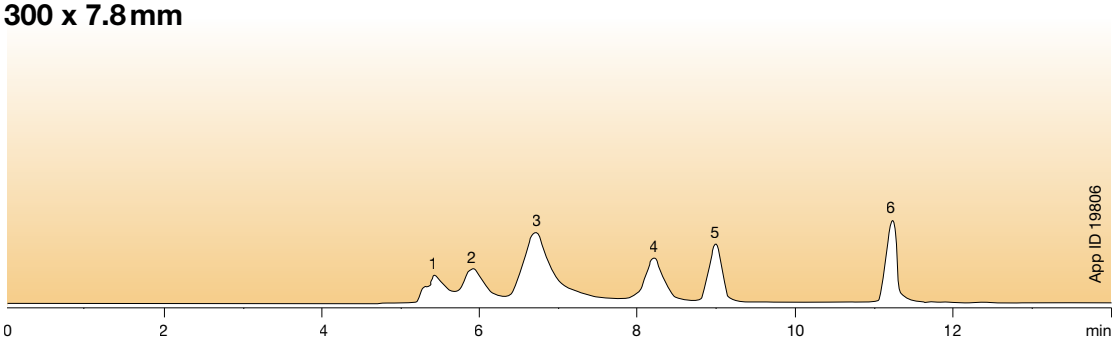
Questions About LC System Compatibility?

Contact your local Phenomenex representative for guidance!

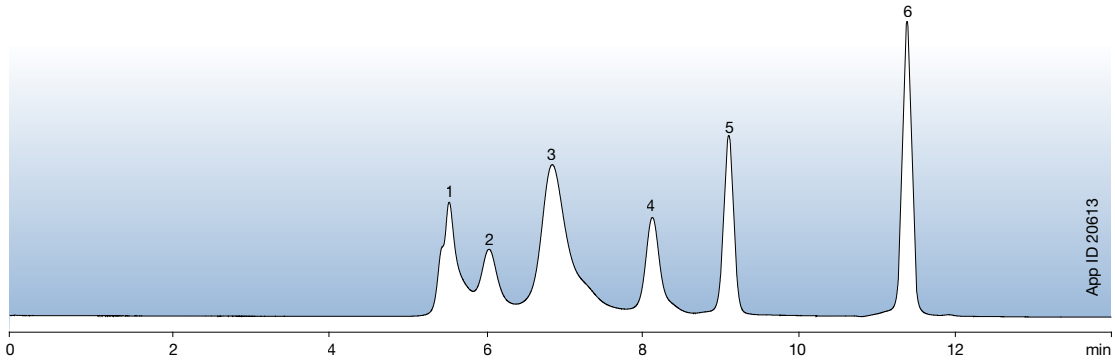
Performance Upgrade

Upgrading to better performance from existing SEC columns is easy with the Yarra column line. Yarra 3 µm particle columns are a quick replacement for existing 5 µm columns, giving increased performance and better peak shape without method adjustment. However, large gains in analyses times, resolution and efficiency can be realized with the Yarra 1.8 µm SEC-X150 on the desired HPLC/UHPLC system.

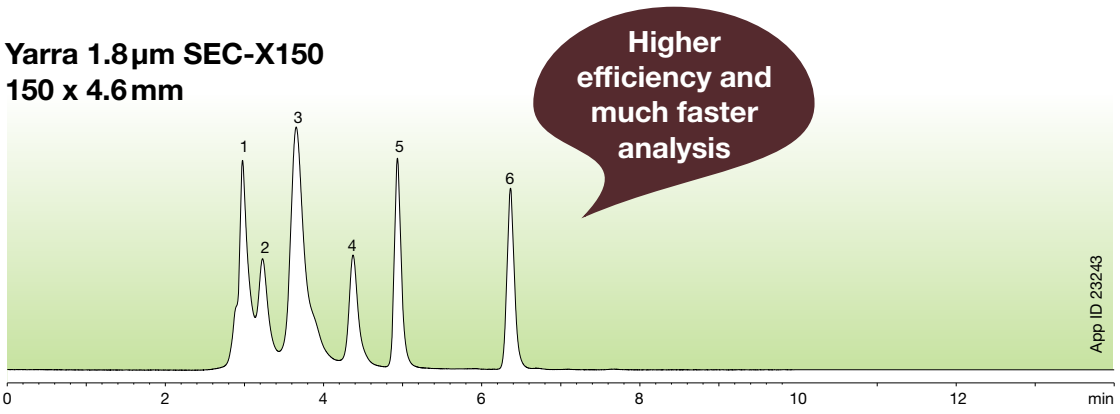
Conventional 5 µm 2000
300 x 7.8 mm



Yarra 3 µm SEC-2000
300 x 7.8 mm



Yarra 1.8 µm SEC-X150
150 x 4.6 mm



Conditions for all columns:

Columns: Conventional 5 µm 2000
Yarra 3 µm SEC-2000
Yarra 1.8 µm SEC-X150
Dimensions: As noted in chromatograms
Mobile Phase: 100 mM Sodium Phosphate in Water pH 6.8 + 0.025 % NaN_3
Flow Rate: 1 mL/min
0.3 mL/min (Yarra 1.8 µm SEC-X150 150 x 4.6 mm)

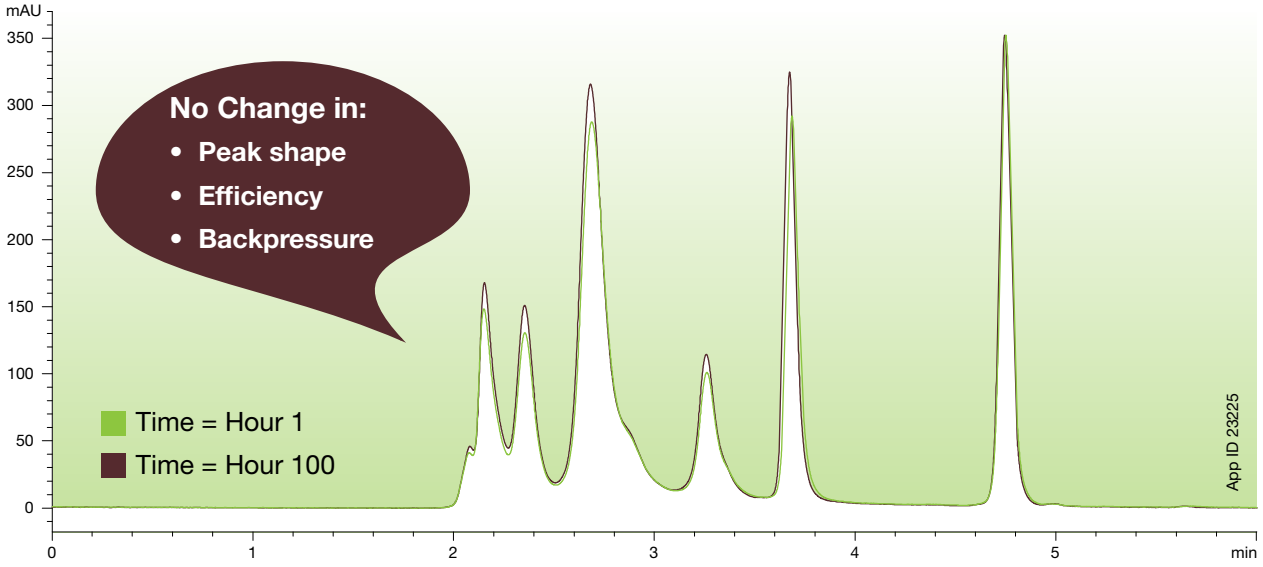
Temperature: Ambient
Detection: UV @ 280 nm
Sample: 1. Thyroglobulin (669 kDa)
2. IgA (300 kDa)
3. IgG (150 kDa)
4. Ovalbumin (44 kDa)
5. Myoglobin (17 kDa)
6. Uridine

Comparative separations may not be representative of all applications.

Excellent Stability and Lifetime

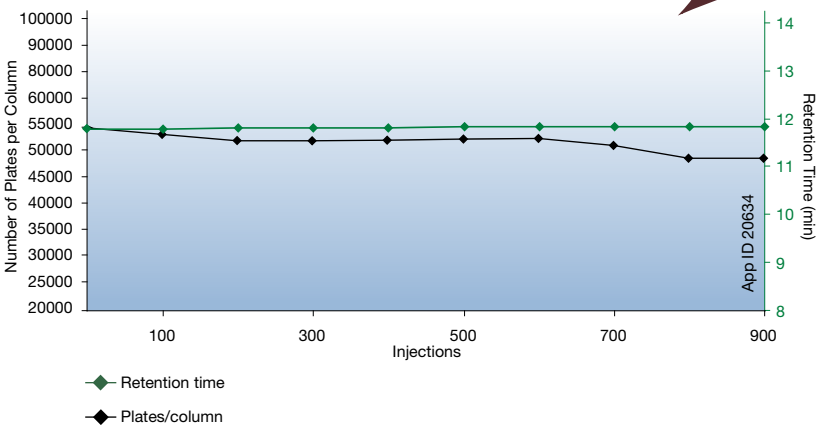
The great care exhibited in both engineering and packing of Yarra™ columns can produce stable performance over longer lifetimes than other size exclusion columns on the market. By gaining extended lifetime with Yarra columns, you save significant time and money for your lab.

Increased Lifetime Under Extreme Conditions (10 % IPA and higher flow rate)



Column: Yarra 1.8 µm SEC-X150
Dimension: 150 x 4.6 mm
Part No.: 00F-4631-E0
Mobile Phase: 100 mM Sodium Phosphate in Water pH 6.8 + 0.025 % NaN_3 + **10 % IPA**
Flow Rate: **0.4 mL/min**
Temperature: Ambient
Detection: UV @ 280 nm
Sample: 1. Thyroglobulin (669 kDa)
2. IgA (300 kDa)
3. IgG (150 kDa)
4. Ovalbumin (44 kDa)
5. Myoglobin (17 kDa)
6. Uridine

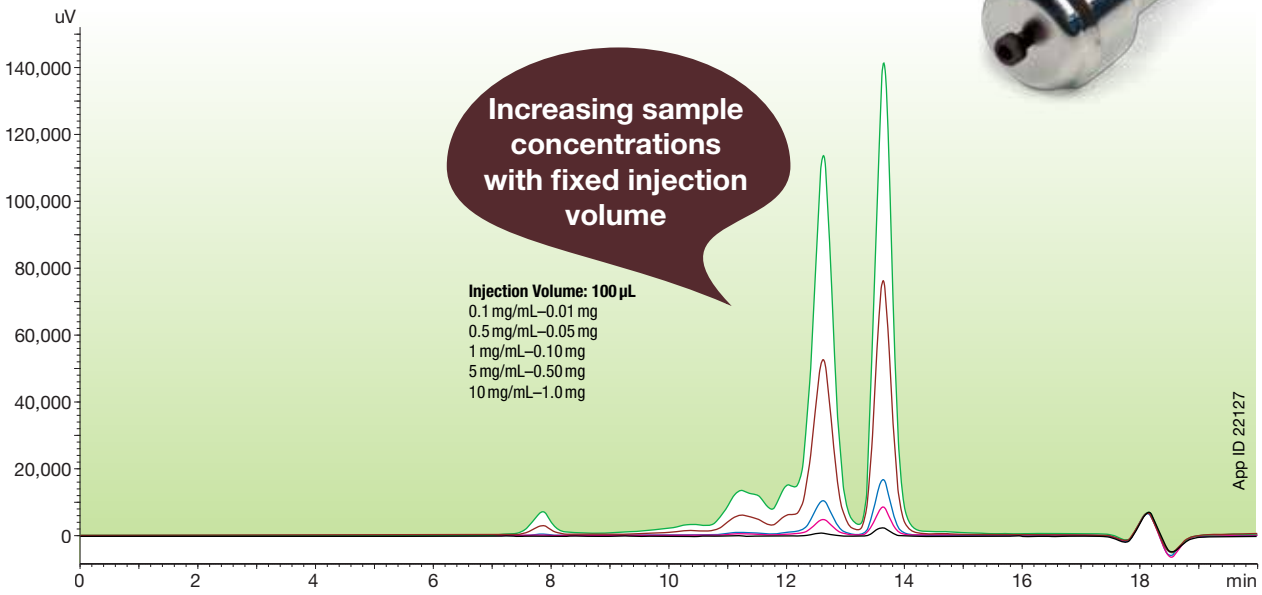
Exceptional Stability Over 900 Injections

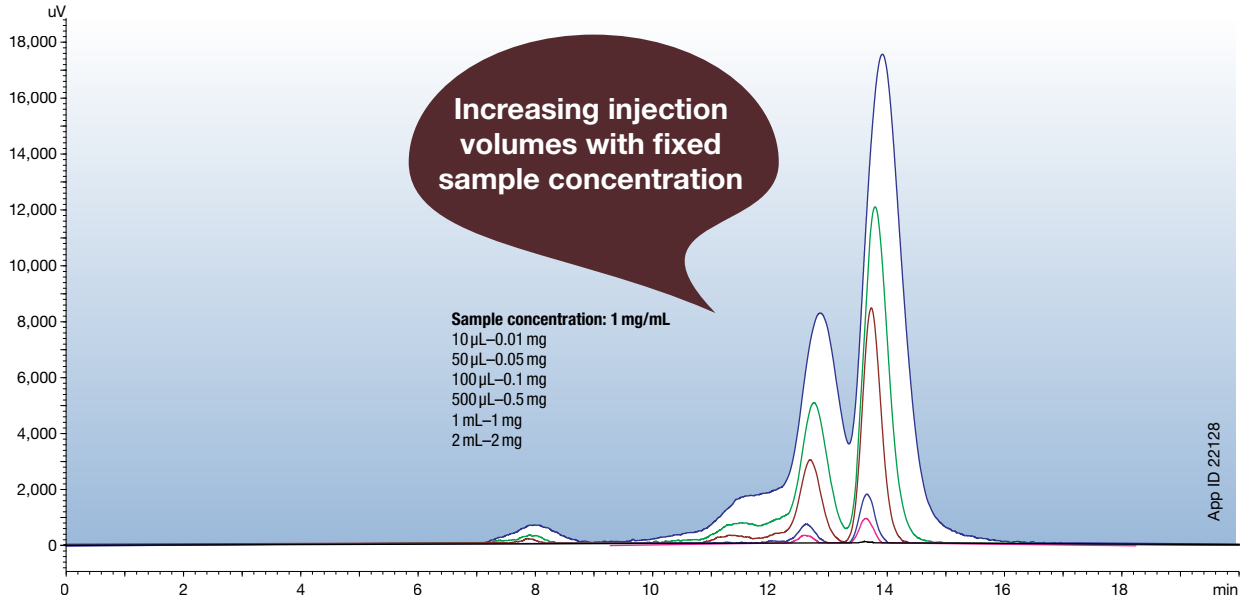


Column: Yarra 3 µm SEC-2000
Dimensions: 300 x 7.8 mm
Part No.: 00H-4512-K0
Guard Cartridge: AJ0-4487
Guard Holder: KJ0-4282,
SecurityGuard Guard Cartridge Kit
Mobile Phase: 100 mM Sodium Phosphate in Water
pH 6.8 + 0.025 % NaN_3
Flow Rate: 1 mL/min
Detection: UV @ 280 nm
Sample: 1. Thyroglobulin (669 kDa)
2. IgA (300 kDa)
3. IgG (150 kDa)
4. Ovalbumin (44 kDa)
5. Myoglobin (17 kDa)
6. Uridine

High Performance Preparative SEC

Enjoy the same selectivity and ultra-high efficiency of Yarra 3 µm for your preparative gel filtration applications. Yarra SEC PREP features a 5 µm particle size version of each Yarra 3 µm chemistry in a 21.2 mm ID column for preparative purification, desalting, and characterization of biomolecules. Yarra 5 µm PREP is available at an affordable price while maintaining the high performance given with the analytical columns.





Conditions for both applications:

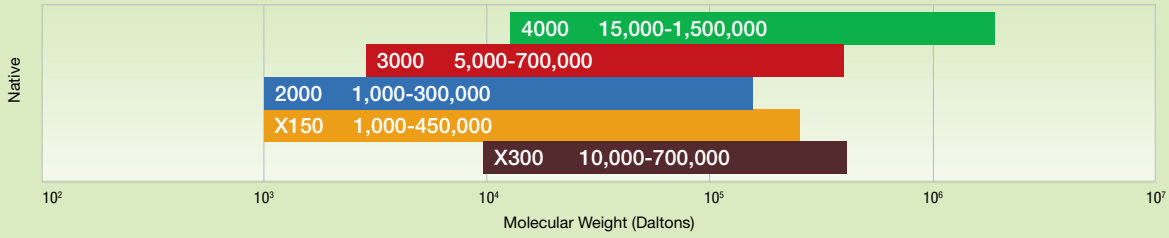
Columns: Yarra 5 µm SEC-2000 PREP
Dimensions: 300 x 21.2 mm
Part No.: 00H-4619-P0
Mobile Phase: 100 mM Sodium Phosphate in Water (pH 6.8)

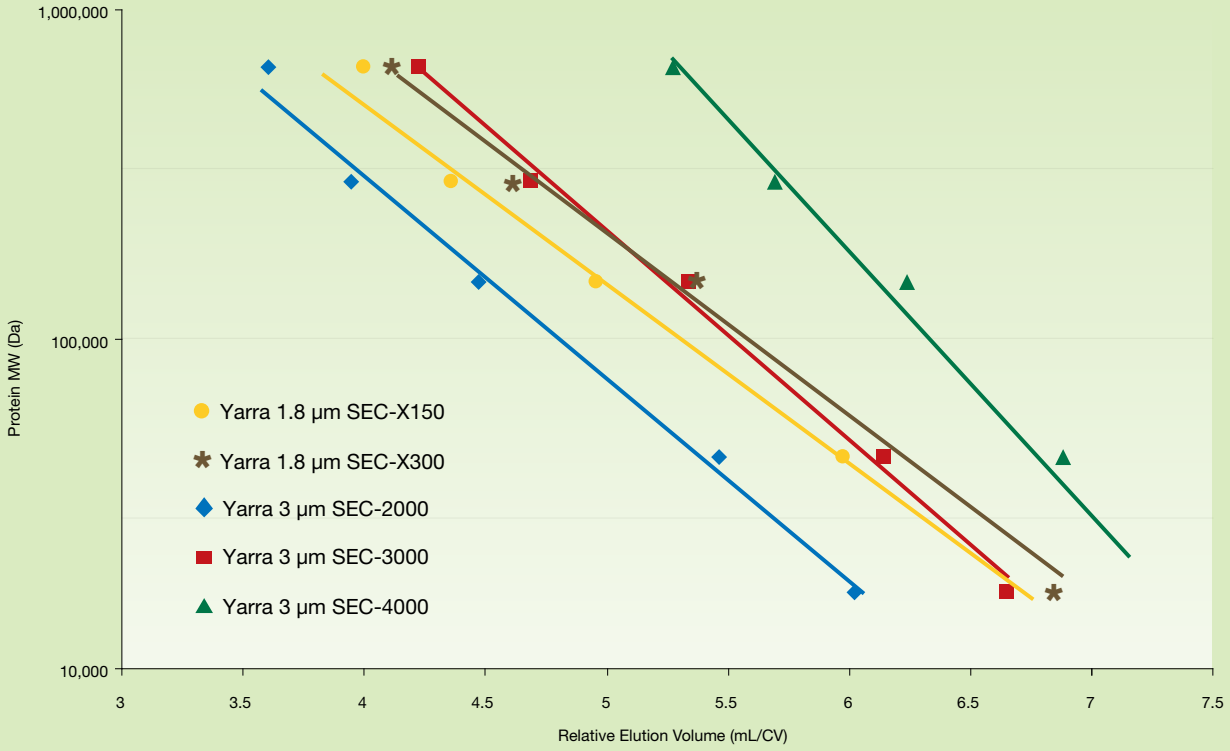
Flow Rate: 5 mL/min
Temperature: Ambient
Detection: UV @ 280 nm (ambient)
Sample: 1. Bovine Serum Albumin (66 kDa)
2. Myoglobin (17 kDa)

Select the Right Yarra Column for Your Application

With five Yarra™ phases covering a large exclusion window, the Yarra product line offers the perfect solution for HPLC/UHPLC size exclusion chromatography of biomolecules.

Molecular Weight (MW) Separation Ranges

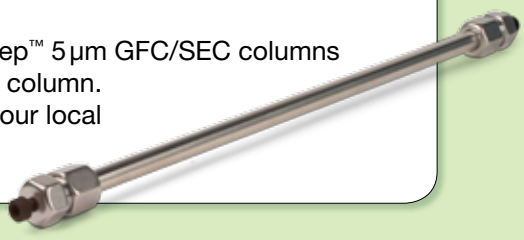




Looking for a Yarra 5 µm Analytical Column?

We recommend using a 3 µm column to improve the resolution/sensitivity of your 5 µm method.

If method optimization is not an option, our BioSep™ 5 µm GFC/SEC columns are a guaranteed alternative to your current 5 µm column. Visit www.phenomenex.com/biosep or contact your local representative for more details.



Ordering Information

Yarra™ Ultra-High Efficiency GFC/SEC

Yarra Column Specifications

	SEC-X150	SEC-X300	SEC-2000	SEC-3000	SEC-4000	SEC-2000 PREP	SEC-3000 PREP	SEC-4000 PREP
Resin Type	Silica	Silica	Silica	Silica	Silica	Silica	Silica	Silica
Particle Size (µm)	1.8	1.8	3	3	3	5	5	5
Pore Size (Å)	150	300	145	290	500	145	290	500
MW Range (Da)	1K-450K	10K-700K	1K-300K	5K-700K	15K-1500K	1K-300K	5K-700K	15K-1500K
pH Range	1.5 - 8.5	1.5 - 8.5	2.5 - 7.5	2.5 - 7.5	2.5 - 7.5	2.5 - 7.5	2.5 - 7.5	2.5 - 7.5
Typical Backpressure (psi)	3,250	3,250	1,300	1,300	1,000	800	800	800
Max Backpressure (psi)	7,000	7,000	3,000	3,000	1,700	1,500	1,500	1,500
Typical Efficiency	> 30,000 (150 x 4.6 mm)	> 30,000 (150 x 4.6 mm)	48,000 (300 x 7.8 mm)	48,000 (300 x 7.8 mm)	38,000 (300 x 7.8 mm)	30,000 (300 x 21.2 mm)	30,000 (300 x 21.2 mm)	30,000 (300 x 21.2 mm)
Max. Flow Rate (mL/min)	0.4	0.4	1.5	1.5	1.2	10	10	10

Yarra 1.8 µm SEC Bio-Inert Columns (mm)

Phases	Analytical 150 x 4.6 mm	Analytical 300 x 4.6 mm
Yarra 1.8 µm SEC-X150	00F-4631-E0	00H-4631-E0
Yarra 1.8 µm SEC-X300	00F-4743-E0	00H-4743-E0

guarantee

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.

Yarra 1.8 µm SEC Stainless Steel Columns (mm)

Phases	Analytical 150 x 4.6	Analytical 300 x 4.6	SecurityGuard ULTRA Cartridges*** 3/pk
Yarra 1.8 µm SEC-X150	00F-4631-E0-SS	00H-4631-E0-SS	AJ0-9512
Yarra 1.8 µm SEC-X300	00F-4743-E0-SS	00H-4743-E0-SS	AJ0-9513
			For Stainless Steel Only

***SecurityGuard ULTRA cartridges require holder, Part No.: AJ0-9000

Yarra 3 µm SEC Columns (mm)

Phases	Narrow Bore 300 x 4.6	Analytical 150 x 7.8	Analytical 300 x 7.8	SecurityGuard™ Cartridges (mm) 4 x 3.0*
				/10 pk
Yarra 3 µm SEC-2000	00H-4512-E0	00F-4512-K0	00H-4512-K0	AJ0-4487
Yarra 3 µm SEC-3000	00H-4513-E0	00F-4513-K0	00H-4513-K0	AJ0-4488
Yarra 3 µm SEC-4000	00H-4514-E0	—	00H-4514-K0	AJ0-4489
				for ID 4.6–7.8 mm

*SecurityGuard Analytical cartridges require holder, Part No.: KJ0-4282

Yarra 5 µm PREP SEC Columns (mm)

Phases	Preparative 300 x 21.2	SecurityGuard™ Cartridges (mm) 15 x 21.2**
		/ea
Yarra 5 µm SEC-2000 PREP	00H-4619-P0	AJ0-8588
Yarra 5 µm SEC-3000 PREP	00H-4620-P0	AJ0-8589
Yarra 5 µm SEC-4000 PREP	00H-4621-P0	AJ0-8950
		for ID 18–29 mm

**PREP SecurityGuard™ Cartridges require holder, Part No.: AJ0-8223