

# APPLICATION

## Impressive Yarra™ 1.8 µm SEC-X150 Column Stability after 100 Hours of Harsh Conditions

Gareth Friedlander and Simon Lomas  
Phenomenex, Inc., 411 Madrid Ave., Torrance, CA 90501 USA

### Overview

With HPLC/UHPLC system versatility, a large separation range, Bio-Inert hardware, and high efficiencies, Yarra 1.8 µm SEC-X150 columns bring an amazing set of performance advantages to the analyses of biomolecules by aqueous size exclusion chromatography (SEC). In the development and manufacturing process of the Yarra SEC-X150, extreme care was dedicated to producing stable performance over longer lifetimes than other size exclusion columns on the market have produced. This extended lifetime affords scientists the potential to save significant time and money in addition to the savings already realized by highly affordable list prices. In the stability investigation illustrated in this application note, a combination of parameters were used to create harsh testing conditions. The switching of mobile phases containing and not containing viscous solvents (10 % IPA or 20 % methanol) was used to simulate stress on the silica bed. In addition, a faster flow rate served to increase the backpressure to atypical levels and the stoppage of flow after each series of steps mimicked the completion of a series of samples. It is important to note that column failure was not actually achieved after this study was completed.

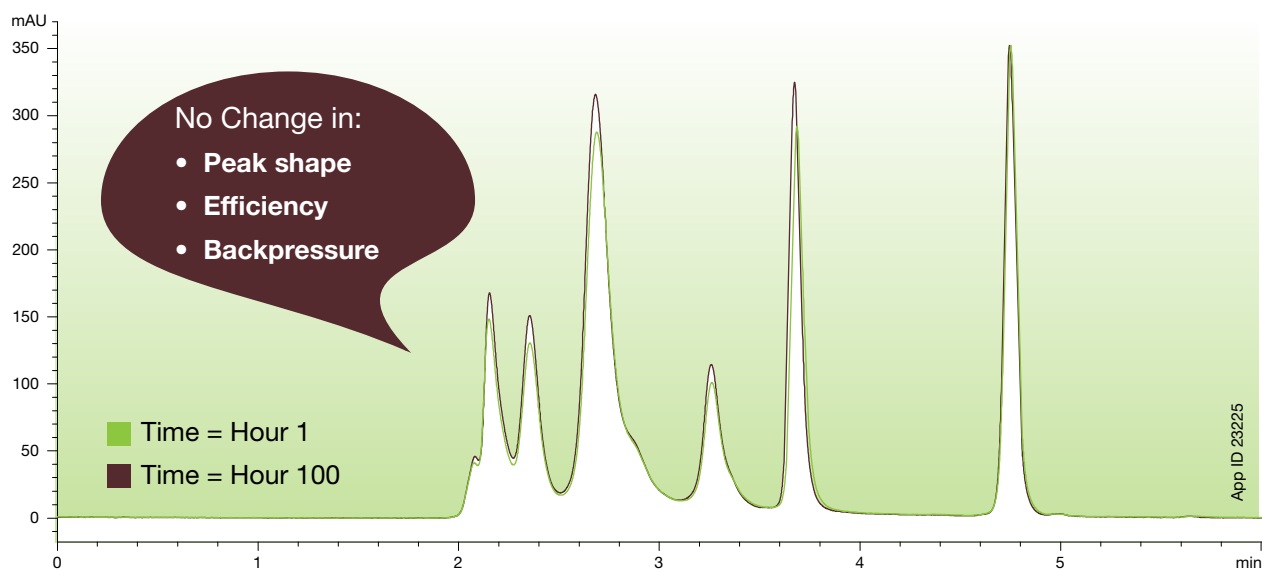
### GFC/UV Conditions

**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<sub>3</sub> + 10 % IPA  
**Flow Rate:** 0.4 mL/min  
**Temperature:** Ambient  
**Detection:** UV @ 280 nm  
**Sample:** 1. Thyroglobulin (669 kDa)  
 2. IgA (300 kDa)  
 3. Imipramine-D3 (IS)  
 4. Ovalbumin (44 kDa)  
 5. Myoglobin (17 kDa)  
 6. Uridine

### Testing Steps

1. Condition for 30 min in buffer
2. 3 injections (6 min run time each)
3. 10/90 IPA/buffer for 2 hours
4. Condition for 30 min in buffer
5. 3 injections (6 min run time each)
6. 10/90 IPA/buffer for 2 hours
7. Condition for 30 min in buffer
8. 3 injections (6 min run time each)
9. 10/90 IPA/buffer for 2 hours
10. Condition for 30 min in buffer
11. 3 injections (6 min run time each)
12. 20/80 MeOH/Water (no buffer) for 30 min
13. Shutoff for 8 hours
14. Repeat the above steps 10 times

### Stability Study – Increased Organic, Flow Rate, and Backpressure



# APPLICATION

## Yarra™ Ordering Information and 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	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

### Yarra 1.8 µm SEC Stainless Steel Columns (mm)

Phases	Analytical 150 x 4.6	Analytical 300 x 4.6 mm	SecurityGuard ULTRA Cartridges***
Yarra 1.8 µm SEC-X150	00F-4631-E0-SS	00H-4631-E0-SS	AJO-9512
Yarra 1.8 µm SEC-X300	00F-4743-E0-SS	00H-4743-E0-SS	AJO-9513

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

For Stainless Steel Only

### 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	AJO-4487
Yarra 3 µm SEC-3000	00H-4513-E0	00F-4513-K0	00H-4513-K0	AJO-4488
Yarra 3 µm SEC-4000	00H-4514-E0	—	00H-4514-K0	AJO-4489

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

for ID 4.6–7.8 mm

### 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	AJO-8588
Yarra 5 µm SEC-3000 PREP	00H-4620-P0	AJO-8589
Yarra 5 µm SEC-4000 PREP	00H-4621-P0	AJO-8950

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

for ID 18–29 mm



If Phenomenex products in this technical note do not provide at least an equivalent separation as compared to other products of the same phase and dimensions, return the product with comparative data within 45 days for a FULL REFUND.

#### Australia

t: +61 (0)2-9428-6444  
f: +61 (0)2-9428-6445  
auiinfo@phenomenex.com

#### Austria

t: +43 (0)1-319-1301  
f: +43 (0)1-319-1300  
anfrage@phenomenex.com

#### Belgium

t: +32 (0)2 503 4015 (French)  
t: +32 (0)2 511 8666 (Dutch)  
f: +31 (0)30-2383749  
beinfo@phenomenex.com

#### Canada

t: +1 (800) 543-3681  
f: +1 (310) 328-7768  
info@phenomenex.com

#### China

t: +86 (0)20 2282-6668  
f: +86 (0)20 2809-8130  
chinainfo@phenomenex.com

#### Denmark

t: +45 4824 8048  
f: +45 4810 6265  
nordicinfo@phenomenex.com

#### Finland

t: +358 (0)9 4789 0063  
f: +45 4810 6265  
nordicinfo@phenomenex.com

#### France

t: +33 (0)1 30 09 21 10  
f: +33 (0)1 30 09 21 11  
franceinfo@phenomenex.com

#### Germany

t: +49 (0)6021-58830-0  
f: +49 (0)6021-58830-11  
anfrage@phenomenex.com

#### India

t: +91 (0)40-3012 2400  
f: +91 (0)40-3012 2411  
indiainfo@phenomenex.com

#### Ireland

t: +353 (0)1 247 5405  
f: +44 1625-501796  
eireinfo@phenomenex.com

#### Italy

t: +39 051 6327511  
f: +39 051 6327555  
italiainfo@phenomenex.com

#### Luxembourg

t: +31 (0)30-2418700  
f: +31 (0)30-2383749  
nlinfo@phenomenex.com

#### Mexico

t: 01-800-844-5226  
f: 001-310-328-7768  
tecnicomx@phenomenex.com

#### The Netherlands

t: +31 (0)30-2418700  
f: +31 (0)30-2383749  
nlinfo@phenomenex.com

#### New Zealand

t: +64 (0)9-4780951  
f: +64 (0)9-4780952  
nzinfo@phenomenex.com

#### Norway

t: +47 810 02 005  
f: +45 4810 6265  
nordicinfo@phenomenex.com

#### Puerto Rico

t: +1 (800) 541-HPLC  
f: +1 (310) 328-7768  
info@phenomenex.com

#### Spain

t: +34 91-413-8613  
f: +34 91-413-2290  
espinfo@phenomenex.com

#### Sweden

t: +46 (0)8 611 6950  
f: +45 4810 6265  
nordicinfo@phenomenex.com

#### United Kingdom

t: +44 (0)1625-501367  
f: +44 (0)1625-501796  
ukinfo@phenomenex.com

#### USA

t: +1 (310) 212-0555  
f: +1 (310) 328-7768  
info@phenomenex.com

#### All other countries Corporate Office USA

t: +1 (310) 212-0555  
f: +1 (310) 328-7768  
info@phenomenex.com

#### Terms and Conditions

Subject to Phenomenex Standard Terms and Conditions, which may be viewed at <http://www.phenomenex.com/TermsAndConditions>.

#### Trademarks

Yarra and SecurityGuard are trademarks of Phenomenex.

#### Disclaimer

Comparative separations may not be representative of all applications.

© 2016 Phenomenex, Inc. All rights reserved.