



TN-1304

PHEN 870: Inertness and Reproducibility of Luna® Omega C18 (3 and 5 µm)

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Introduction

The analysis of a standard reference material (SRM) sample was used to assess the inertness and reproducibility for three different batches of Luna C18(2) and Luna Omega C18 columns with either 3 µm or 5 µm matrix in several different dimensions. These were compared to multiple batches of Waters® XBridge® C18 and the Agilent® ZORBAX® SB-C18 columns, with either 3.5 µm or 5 µm media, in two different dimensions. In this technical note, we show the reproducibility and inertness of the Luna Omega C18 columns compared to competitors with similar dimensions and particle sizes.

NOTE: PHEN 870 is based on the NIST SRM870 column performance test, minus the compound Quinizarin.

LC Conditions

Column: Luna 3 µm C18(2), 50 x 4.6 mm ([00B-4251-E0](#))
Luna Omega 3 µm C18, 50 x 4.6 mm ([00B-4784-E0](#))
Luna 5 µm C18(2), 150 x 4.6 mm ([00F-4252-E0](#))
Luna Omega 5 µm C18, 150 x 4.6 mm ([00F-4785-E0](#))
Luna 3 µm C18(2), 150 x 4.6 mm ([00F-4251-E0](#))
Luna Omega 3 µm C18, 150 x 4.6 mm ([00F-4784-E0](#))
Agilent ZORBAX 3.5 µm SB-C18, 150 x 4.6 mm
Waters XBridge 3.5 µm C18, 150 x 4.6 mm
Luna Omega 5 µm C18, 250 x 4.6 mm ([00G-4785-E0](#))
Agilent ZORBAX 5 µm SB-C18, 250 x 4.6 mm
Waters XBridge 5 µm C18, 250 x 4.6 mm

Mobile Phase: A: 20 mM Potassium Phosphate (K₂HPO₄), pH 7.0
B: Methanol

Gradient: 3 min total time for 50 mm columns at 80% B
8 min total time for 150 mm columns at 80% B
12 min total time for 250 mm columns at 80% B

Flow Rate: 1.8 mL/min for 3 and 3.5 µm columns
1.25 mL/min for 5 µm columns

Injection Volume: 0.5 mL/min

Temperature: 40 °C

Detection: UV @ 254 nm

Instrument: Agilent 1260 (Binary)

- Analytes:**
1. Uracil (1.0 mg/mL in Methanol)
 2. Toluene (100 µL/mL in Methanol)
 3. Ethyl Benzene (100 µL/mL in Methanol)
 4. Amitriptyline (10 mg/mL in Methanol)

Results and Discussion

In **Figure 1**, the Luna Omega 3 µm C18, 50 x 4.6 mm column provided excellent reproducibility between batches when compared to the Luna 3 µm C18(2), 50 x 4.6 mm column. The same results were seen between the Luna 5 µm C18(2), 150 x 4.6 mm column and the Luna Omega 5 µm C18, 150 x 4.6 mm column. In both cases, the Luna Omega columns had slightly shorter elution times compared to the Luna columns.

Figure 2 shows the same reproducibility between batches and shorter elution time was also seen on the Luna Omega 3 µm C18, 150 x 4.6 mm column, as compared to the Luna 3 µm C18(2), 150 x 4.6 mm column. The Agilent ZORBAX 3.5 µm SB-C18, 150 x 4.6 mm had a wider elution window compared to the Luna and Luna Omega columns, and the batch-to-batch reproducibility was lower. The Waters XBridge 3.5 µm C18, 150 x 4.6 mm had similar reproducibility between batches, which was similar to that of the Luna Omega 3 µm C18, 150 x 4.6 mm column, but had a smaller elution window.

Finally, in **Figure 3**, the Luna Omega 5 µm C18, 250 x 4.6 mm also showed batch-to-batch reproducibility with great peak shape. However, the Agilent ZORBAX 5 µm SB-C18, 250 x 4.6 mm column had a wider elution window and less reproducibility in the later eluting peaks. The Waters XBridge 5 µm C18, 250 x 4.6 mm column showed a shorter elution of analytes, but more variability between batches, when compared to the Luna Omega 5 µm C18, 250 x 4.6 mm column.



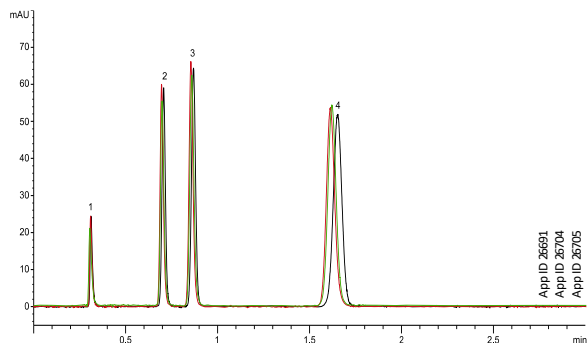
Zeshan Aqeel
Senior Application Scientist

Aside from the lab being his favorite place to be, Zeshan enjoys playing vintage videogames with his twin boys and loves every minute of reliving parenthood with his baby girl.



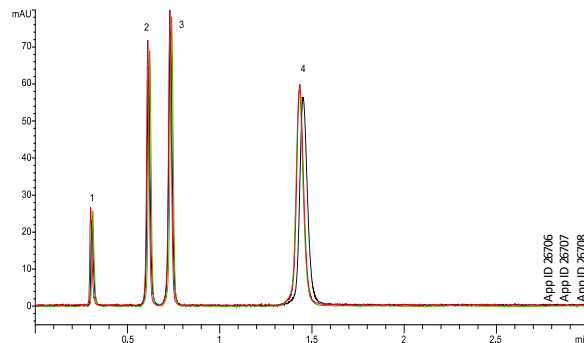
Figure 1.

Luna® 3 µm C18(2), 50 x 4.6 mm



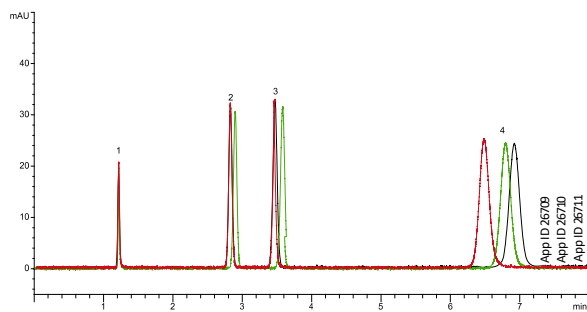
Peak No.	Retention Time %RSD (N=3)
1	0.99
2	0.79
3	0.77
4	1.35

Luna Omega 3 µm C18, 50 x 4.6 mm



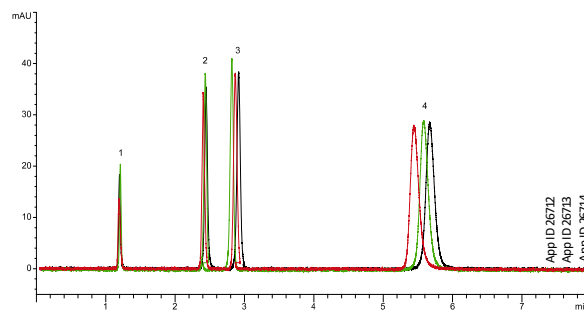
Peak No.	Retention Time %RSD (N=3)
1	1.32
2	0.41
3	0.24
4	0.94

Luna 5 µm C18(2), 150 x 4.6 mm



Peak No.	Retention Time %RSD (N=3)
1	0.90
2	1.24
3	1.70
4	3.28

Luna Omega 5 µm C18, 150 x 4.6 mm

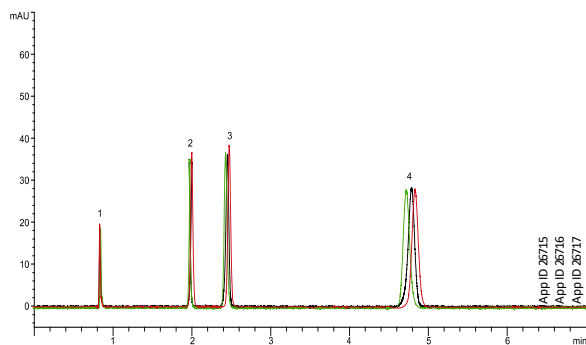


Peak No.	Retention Time %RSD (N=3)
1	0.36
2	0.75
3	0.86
4	2.14



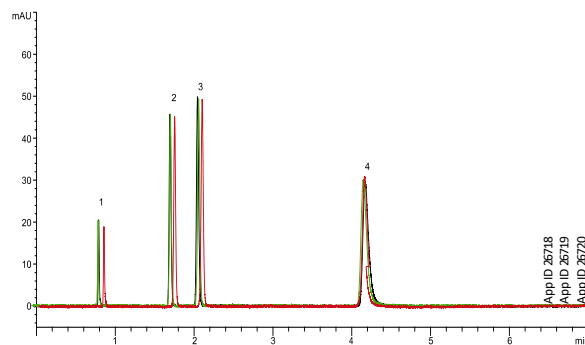
Figure 2.

Luna® 3 µm C18(2), 150 x 4.6 mm



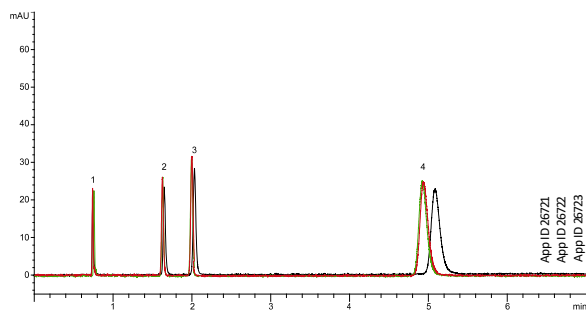
Peak No.	Retention Time %RSD (N=3)
1	0.69
2	0.57
3	0.81
4	1.09

Luna Omega 3 µm C18, 150 x 4.6 mm



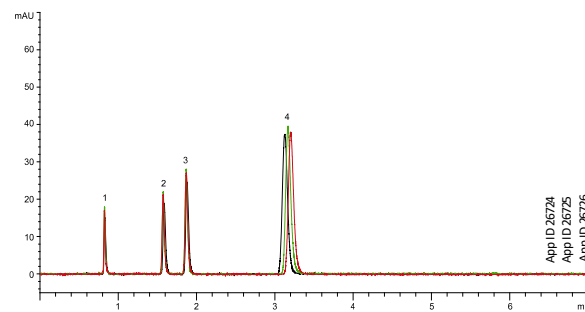
Peak No.	Retention Time %RSD (N=3)
1	1.25
2	0.74
3	0.71
4	0.42

Agilent® ZORBAX® 3.5 µm SB-C18, 150 x 4.6 mm



Peak No.	Retention Time %RSD (N=3)
1	1.31
2	1.24
3	1.35
4	1.82

Waters® XBridge® 3.5 µm C18, 150 x 4.6 mm

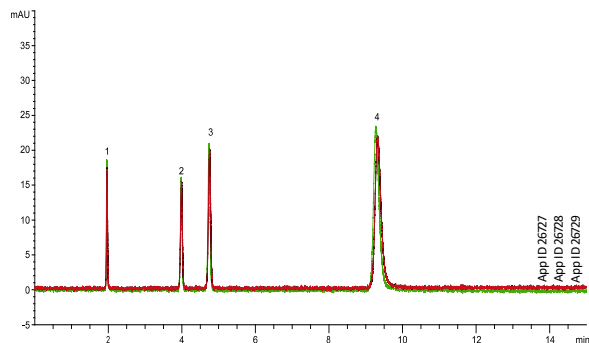


Peak No.	Retention Time %RSD (N=3)
1	0.37
2	0.42
3	0.32
4	1.19



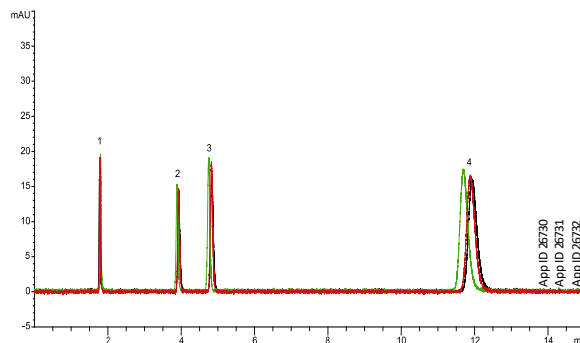
Figure 3.

Luna® Omega 5 µm C18, 250 x 4.6 mm



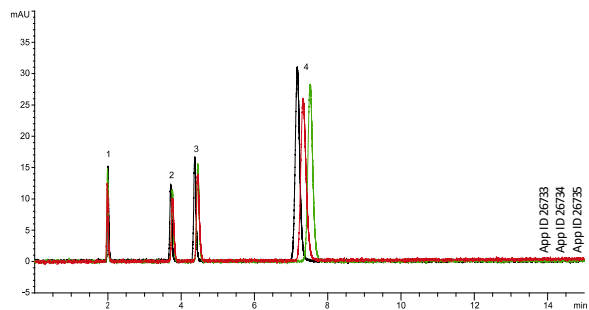
Peak No.	Retention Time %RSD (N=3)
1	0.63
2	1.47
3	2.07
4	0.27

Agilent® ZORBAX® 5 µm SB-C18, 250 x 4.6 mm



Peak No.	Retention Time %RSD (N=3)
1	0.84
2	0.70
3	0.95
4	1.02

Waters® XBridge® 5 µm C18, 250 x 4.6 mm



Peak No.	Retention Time %RSD (N=3)
1	0.52
2	0.76
3	1.05
4	2.39

Conclusion

The data presented here shows the inertness of the Luna Omega C18 columns due to peak shape that is seen in all dimensions analyzed. This is indicative of inertness because the basic compounds were run at a low pH. It also shows the particle size scalability of the Luna Omega C18 columns. The same peak separation, shape, and reproducibility are seen on both the 3 µm UHPLC and 5 µm HPLC Luna Omega C18 columns.



Luna® Ordering Information

3 µm MidBore™ and Analytical Columns (mm)									SecurityGuard™ Cartridges* (mm)	
Phases	30 x 3.0	50 x 3.0	150 x 3.0	30 x 4.6	50 x 4.6	75 x 4.6	100 x 4.6	150 x 4.6	4 x 2.0* /10pk	4 x 3.0* /10pk
Silica(2)	—	00B-4162-YO	00F-4162-YO	00A-4162-EO	00B-4162-EO	—	00D-4162-EO	00F-4162-EO	AJ0-4347	AJ0-4348
C8(2)	00A-4248-YO	00B-4248-YO	00F-4248-YO	00A-4248-EO	00B-4248-EO	00C-4248-EO	00D-4248-EO	00F-4248-EO	AJ0-4289	AJ0-4290
C18(2)	00A-4251-YO	00B-4251-YO	00F-4251-YO	00A-4251-EO	00B-4251-EO	00C-4251-EO	00D-4251-EO	00F-4251-EO	AJ0-4286	AJ0-4287
CN	—	00B-4254-YO	00F-4254-YO	00A-4254-EO	00B-4254-EO	00C-4254-EO	00D-4254-EO	00F-4254-EO	AJ0-4304	AJ0-4305
Phenyl-Hexyl	—	00B-4256-YO	00F-4256-YO	—	00B-4256-EO	00C-4256-EO	00D-4256-EO	00F-4256-EO	AJ0-4350	AJ0-4351
NH ₂	—	00B-4377-YO	00F-4377-YO	—	00B-4377-EO	—	00D-4377-EO	00F-4377-EO	AJ0-4301	AJ0-4302
HILIC	—	00B-4449-YO	00F-4449-YO	—	—	—	00D-4449-EO	00F-4449-EO	AJ0-8328	AJ0-8329
PFP(2)	—	00B-4447-YO	00F-4447-YO	—	00B-4447-EO	—	00D-4447-EO	00F-4447-EO	AJ0-8326	AJ0-8327

for ID: 2.0-3.0 mm 3.2-8.0 mm

5 µm Analytical and Semi-Prep Columns (mm)					SecurityGuard™ Cartridges** (mm)	
Phases	100 x 4.6	150 x 4.6	250 x 4.6	250 x 10	4 x 3.0* /10pk	10 x 10 ³ /3pk
Silica(2)	00D-4274-EO	00F-4274-EO	00G-4274-EO	00G-4274-NO	AJ0-4348	AJ0-7223
C5	00D-4043-EO	00F-4043-EO	00G-4043-EO	00G-4043-NO	AJ0-4293	AJ0-7372
C8(2)	00D-4249-EO	00F-4249-EO	00G-4249-EO	00G-4249-NO	AJ0-4290	AJ0-7222
C18(2)	00D-4252-EO	00F-4252-EO	00G-4252-EO	00G-4252-NO	AJ0-4287	AJ0-7221
CN	00D-4255-EO	00F-4255-EO	00G-4255-EO	00G-4255-NO	AJ0-4305	AJ0-7313
Phenyl-Hexyl	00D-4257-EO	00F-4257-EO	00G-4257-EO	00G-4257-NO	AJ0-4351	AJ0-7314
NH ₂	00D-4378-EO	00F-4378-EO	00G-4378-EO	00G-4378-NO	AJ0-4302	AJ0-7364
SCX	00D-4398-EO	00F-4398-EO	00G-4398-EO	00G-4398-NO	AJ0-4308	AJ0-7369
HILIC	00D-4450-EO	00F-4450-EO	00G-4450-EO	00G-4450-NO	AJ0-8329	AJ0-8902
PFP(2)	00D-4448-EO	00F-4448-EO	00G-4448-EO	00G-4448-NO	AJ0-8327	AJ0-8376

for ID: 3.2-8.0 mm 9-16 mm

*SecurityGuard™ Analytical Cartridges require holder, Part No.: [KJ0-4282](#)†SemiPrep SecurityGuard™ Cartridges require holder, Part No.: [AJ0-9281](#)

Luna Omega Ordering Information

3 µm Analytical Columns (mm)					SecurityGuard Cartridges* (mm)
Phases	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	4 x 3.0* /10 pk
Polar C18	00B-4760-EO	00D-4760-EO	00F-4760-EO	00G-4760-EO	AJ0-7601
PS C18	00B-4758-EO	00D-4758-EO	00F-4758-EO	00G-4758-EO	AJ0-7606
C18	00B-4784-EO	00D-4784-EO	00F-4784-EO	00G-4784-EO	AJ0-7612
SUGAR	—	00D-4775-EO	00F-4775-EO	00G-4775-EO	AJ0-4495

for ID: 3.2-8.0 mm

5 µm Analytical Columns (mm)					SecurityGuard Cartridges* (mm)
Phases	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	4 x 3.0* /10 pk
Polar C18	00B-4754-EO	00D-4754-EO	00F-4754-EO	00G-4754-EO	AJ0-7601
PS C18	00B-4753-EO	00D-4753-EO	00F-4753-EO	00G-4753-EO	AJ0-7606
C18	00B-4785-EO	00D-4785-EO	00F-4785-EO	00G-4785-EO	AJ0-7612

for ID: 3.2-8.0 mm

* SecurityGuard Analytical Cartridges require holder, Part No.: [KJ0-4282](#)

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