

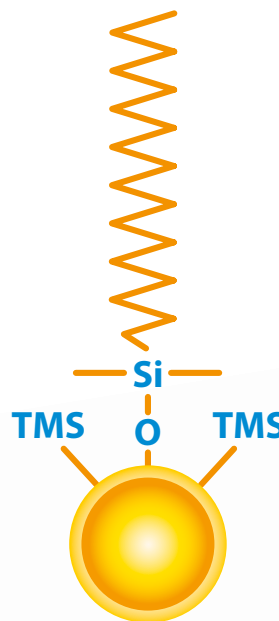
# Raptor

LC Columns

*Selectivity Accelerated*

Raptor Speed, Efficiency,  
and Ruggedness—in C18

Stationary Phase:  
**C18**



**RESTEK**

Pure Chromatography

**BGB** GC|LC  
MS|CE

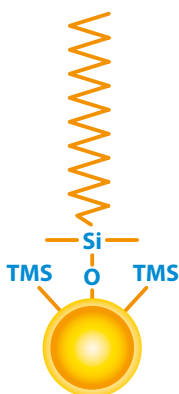
# The Raptor C18 Column

With Raptor LC columns, Restek chemists became the first to combine the speed of 2.7 and 5  $\mu\text{m}$  superficially porous particles (also known as SPP or “core-shell” particles) with the resolution of highly selective USLC technology, improving separations and speeding up analysis times with standard HPLC instruments. Raptor then evolved to bring that same improved speed, efficiency, and selectivity to UHPLC analyses by offering 1.8  $\mu\text{m}$  particle columns. Learn more about Raptor LC columns at [www.bgb-shop.com/raptor](http://www.bgb-shop.com/raptor)

Even though every LC lab has a cache of C18s, not all C18s are created equal. Because the chemistry tends to be similar, the silica support that carries this ubiquitous octadecylsilane phase becomes vitally important. When you need a general-purpose LC column, don't just grab any C18. Choose the speed, efficiency, and long-lasting ruggedness of the Raptor C18 SPP LC column.

The traditional end-capped Raptor C18 offers the highest hydrophobic retention of any Raptor phase, and it is compatible with a wide range of mobile phases from moderately acidic to neutral (pH 2–8). Whether for food safety, environmental, or bioanalytical analyses, this phase offers consistently excellent data quality in less time across myriad reversed-phase applications, matrices, and compound classes.

## Column Description:



### Stationary Phase Category:

C18, octadecylsilane (L1)

### Ligand Type:

End-capped C18

### Particle:

1.8  $\mu\text{m}$ , 2.7  $\mu\text{m}$ , or 5  $\mu\text{m}$  superficially porous silica (SPP or “core-shell”)

### Pore Size:

90 Å

### Surface Area:

125  $\text{m}^2/\text{g}$  (1.8  $\mu\text{m}$ ),  
130  $\text{m}^2/\text{g}$  (2.7  $\mu\text{m}$ ),  
or 100  $\text{m}^2/\text{g}$  (5  $\mu\text{m}$ )

### Recommended Usage:

pH Range: 2.0–8.0

Maximum Temperature: 80 °C

Maximum Pressure: 1,034 bar/15,000 psi\* (1.8  $\mu\text{m}$ ),  
600 bar/8,700 psi (2.7  $\mu\text{m}$ ); 400 bar/5,800 psi (5  $\mu\text{m}$ )

\* For maximum lifetime, recommended maximum pressure for 1.8  $\mu\text{m}$  particles is 830 bar/12,000 psi.

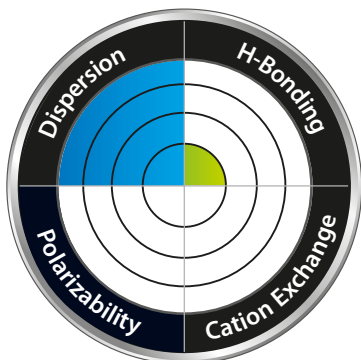
### Properties:

- Compatible with moderately acidic to neutral mobile phases (pH 2–8).
- Excellent data quality in food, environmental, bioanalytical, and other applications.

### Switch to a C18 when:

- You need a general-purpose column for reversed-phase chromatography.
- You need to increase retention of hydrophobic compounds.

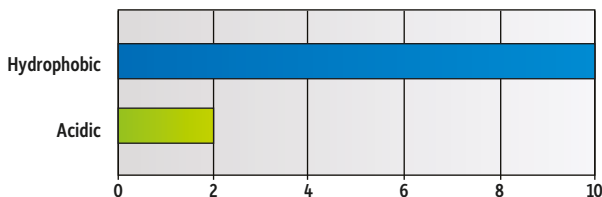
## Column Interaction Profile:



### Defining Solute Interaction:

- Dispersion

## Solute Retention Profile:



### Target Analyte Structure:

- Hydrocarbons

### Target Analyte Functionalities:

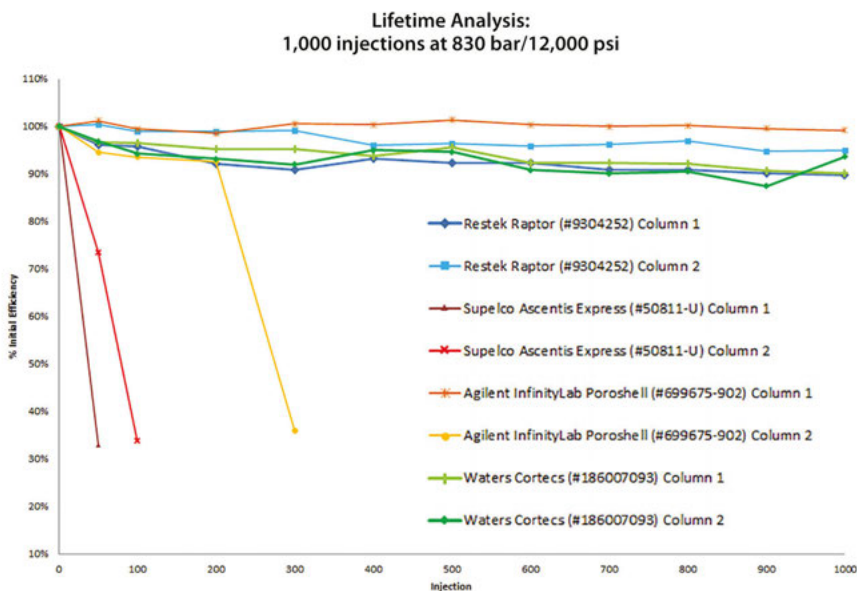
- Hydrophobic compounds

## Raptor C18 Performance: Speed, Efficiency, and Ruggedness in Action

Raptor C18 columns provide outstanding dependability and data quality with high efficiency and peak symmetry, and they are built to exacting specifications that make your columns exceptionally consistent and improve their lifetime. To lower costs and improve profitability, you need columns to last longer, data to be reproducible, and existing HPLC instrumentation to run faster. Get there with the only general-purpose C18 that gives you *Selectivity Accelerated*.

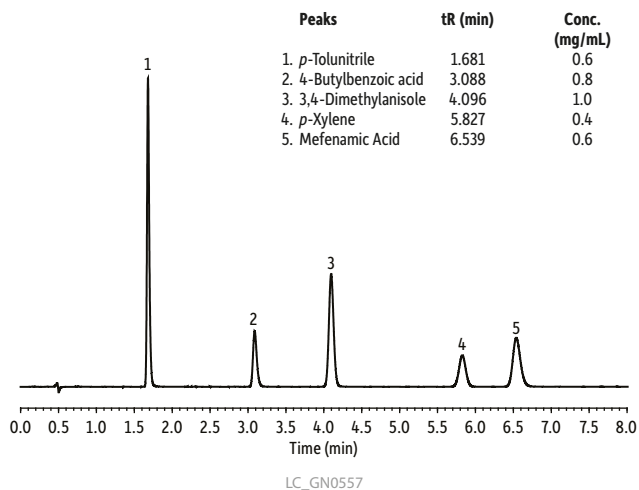
**Figure 1:** Comparing 50 mm x 2.1 mm sub-2 µm C18 columns, Raptor columns maintain reliable performance past 1,000 injections, consistently matching or beating the competition.

Expect consistently high performance over 1,000 injections



**Figure 2:** Raptor columns' stringent quality control (QC) specifications guarantee outstanding peak shape, even with active compounds, for superior data quality.

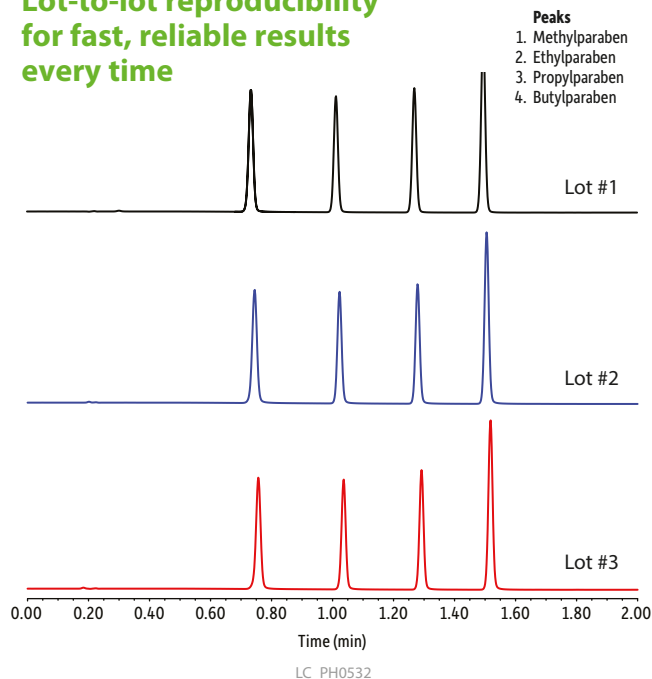
Outstanding peak shapes for top-notch data



**Column:** Raptor C18 (cat.# 9304A1E); Dimensions: 100 mm x 3 mm ID; Particle Size: 2.7 µm; Pore Size: 90 Å; Temp.: 30 °C; **Sample:** Diluent: Acetonitrile:water:phosphoric acid (65:34:1); Inj. Vol.: 1 µL; **Mobile Phase:** A: 0.05% Formic acid in water, B: 0.05% Formic acid in acetonitrile; **Gradient (%B):** 0.00 min (45% B), 8.00 min (45% B); **Flow:** 0.8 mL/min; **Detector:** UV/Vis @ 220 nm; Cell Temp.: 40 °C; **Instrument:** HPLC.

**Figure 3:** Lot-to-lot reproducibility is the key to keeping your productivity high and budget low. You can expect the same exceptional performance from every Raptor C18 column you purchase.

Lot-to-lot reproducibility for fast, reliable results every time

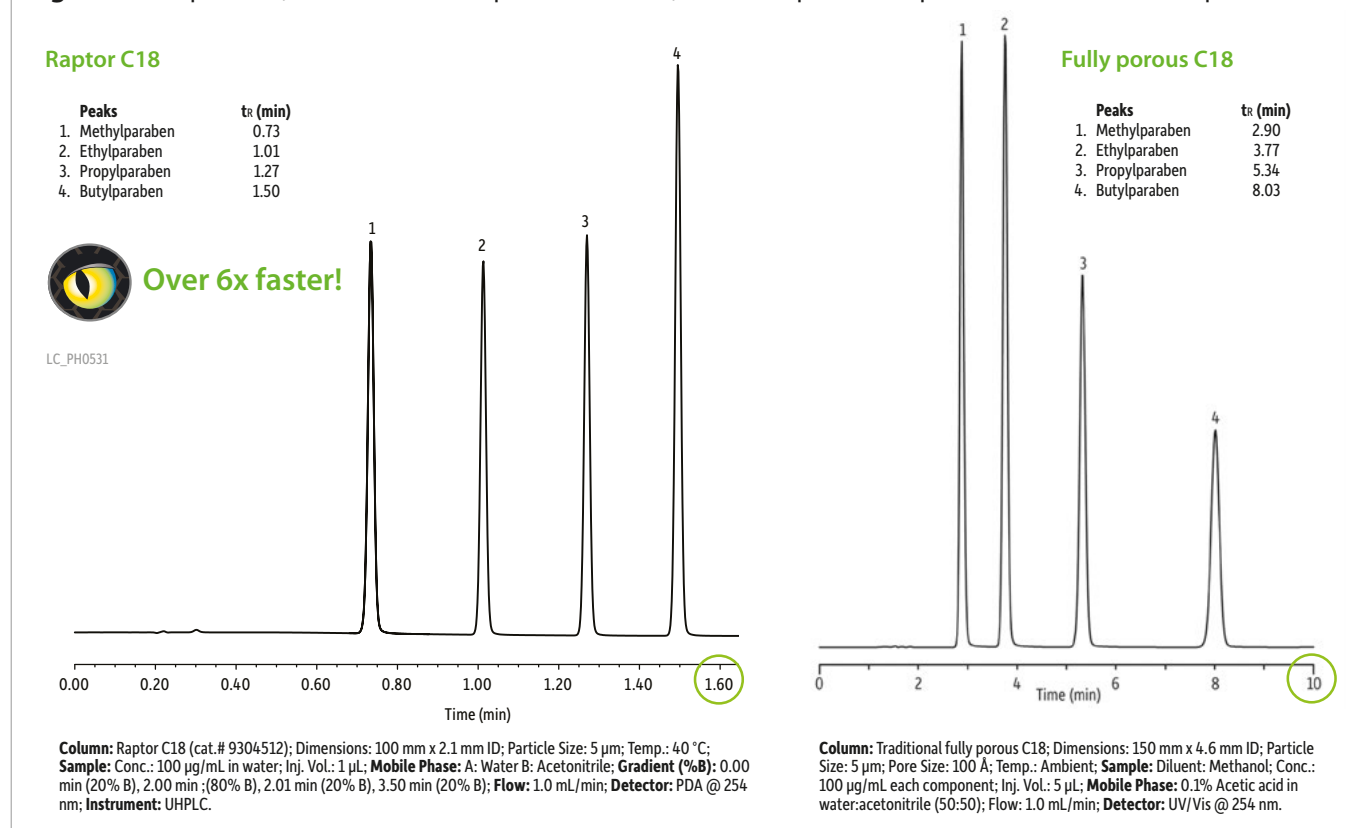


**Column:** Raptor C18 (cat.# 9304512); Dimensions: 100 mm x 2.1 mm ID; Particle Size: 5 µm; Temp.: 40 °C; **Sample:** Conc.: 100 µg/mL in water; Inj. Vol.: 1 µL; **Mobile Phase:** A: Water, B: Acetonitrile; **Gradient (%B):** 0.00 min (20% B), 2.00 min (80% B), 2.01 min (20% B), 3.50 min (20% B); **Flow:** 1.0 mL/min; **Detector:** PDA @ 254 nm; **Instrument:** UHPLC.

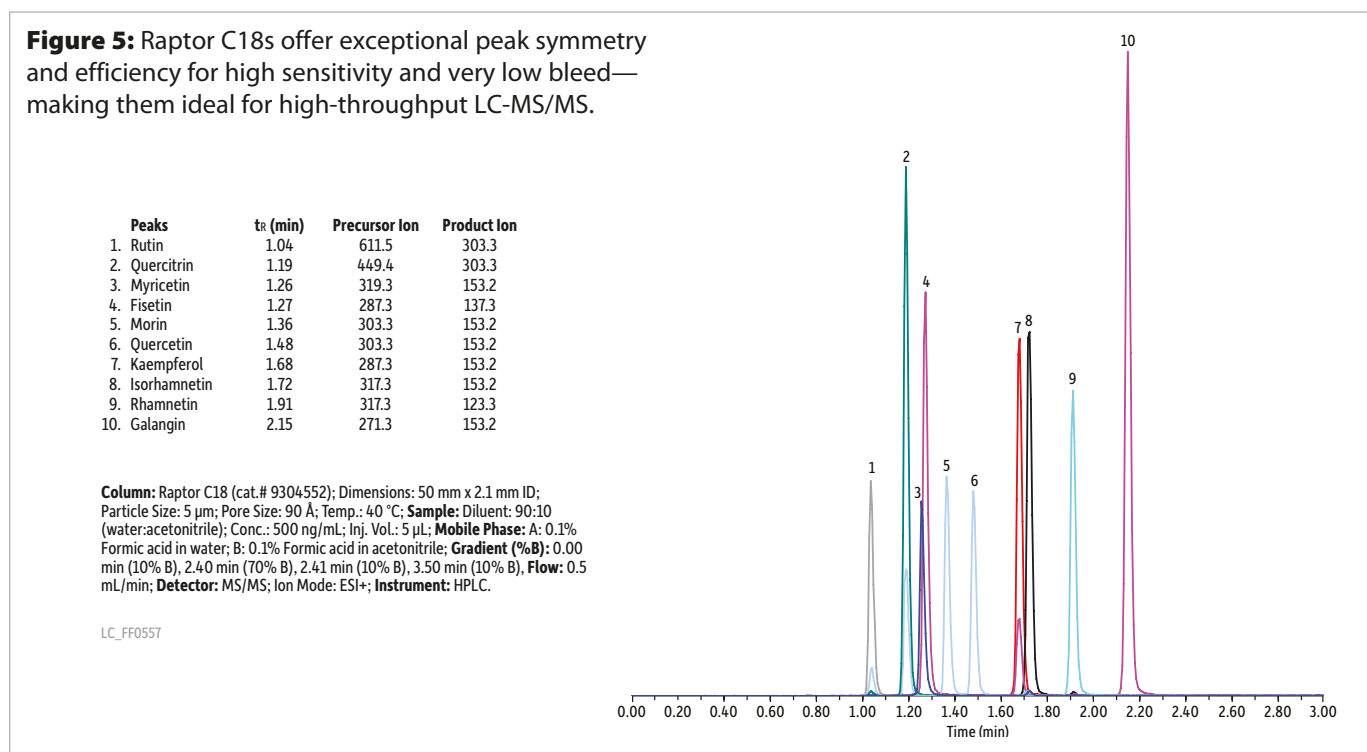
## Boost Your Productivity with Raptor C18 Columns

When developing an assay, it is important to consider how productive your method will be. Because superficially porous, or “core-shell” particles are well known for very high efficiency with minimal backpressure, they are ideal for decreasing analysis time (Figure 4). With its general-purpose applicability and SPP core-shell particles, the Raptor C18 column lets you quickly develop faster methods, thereby boosting your productivity.

**Figure 4:** SPP particles, like those in the Raptor C18 column, are one important step towards total method optimization.



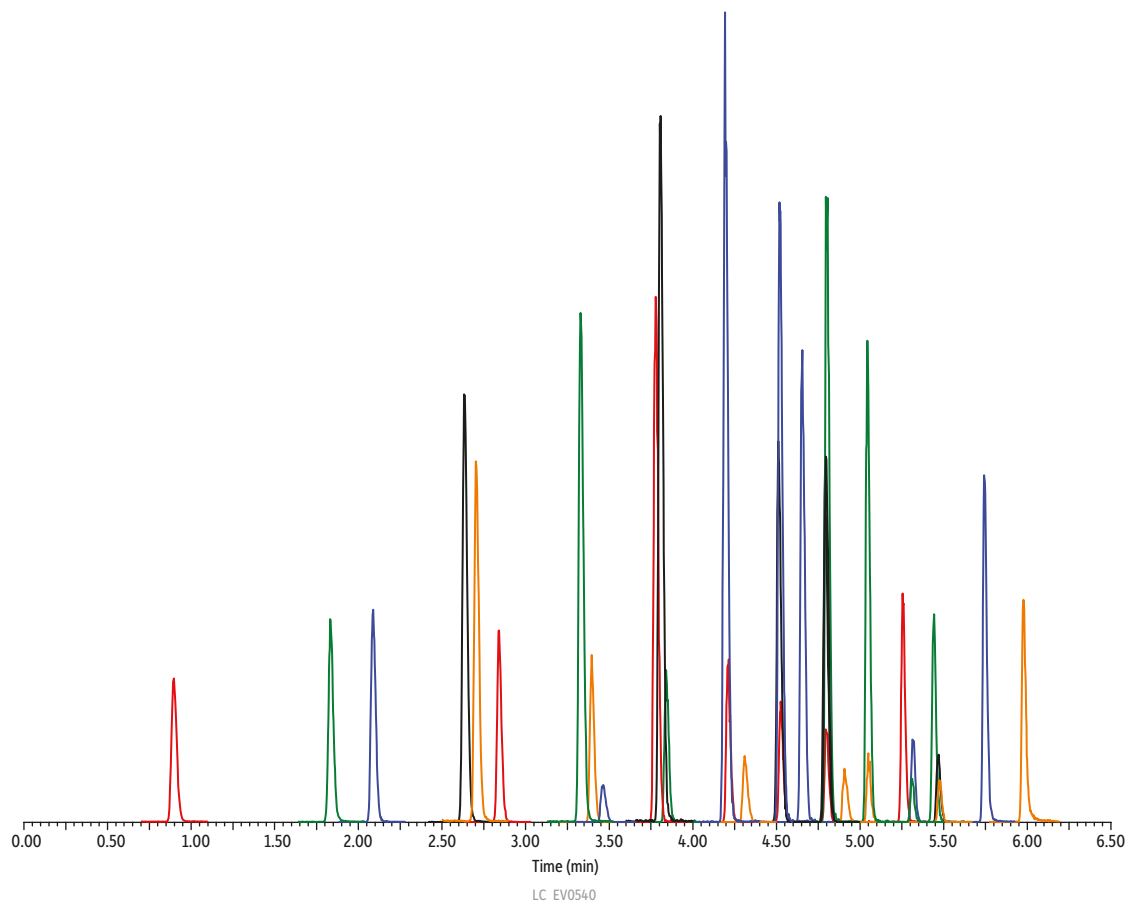
**Figure 5:** Raptor C18s offer exceptional peak symmetry and efficiency for high sensitivity and very low bleed—making them ideal for high-throughput LC-MS/MS.



## Your Go-To Column for Fast and Dependable Analyses on Any Instrument

C18 columns are often a method developer's first choice, not only for their trusted performance but also for their effectiveness with many types of compound and instrument. The Raptor C18 was designed to build on that foundation, offering usability, peak symmetry, efficiency, and dependability—with the unmatched reproducibility, speed, and reliability of a Raptor SPP LC column. Whether you are doing environmental, food safety, or bioanalytical work (Figures 5 and 6), you will finish your work faster if you choose the right column the first time. For general-purpose applications, the Raptor C18 is your best first choice.

**Figure 6:** Get the data quality and short analysis times you need with Raptor C18 columns, as shown here with perfluorinated compounds (PFCs).



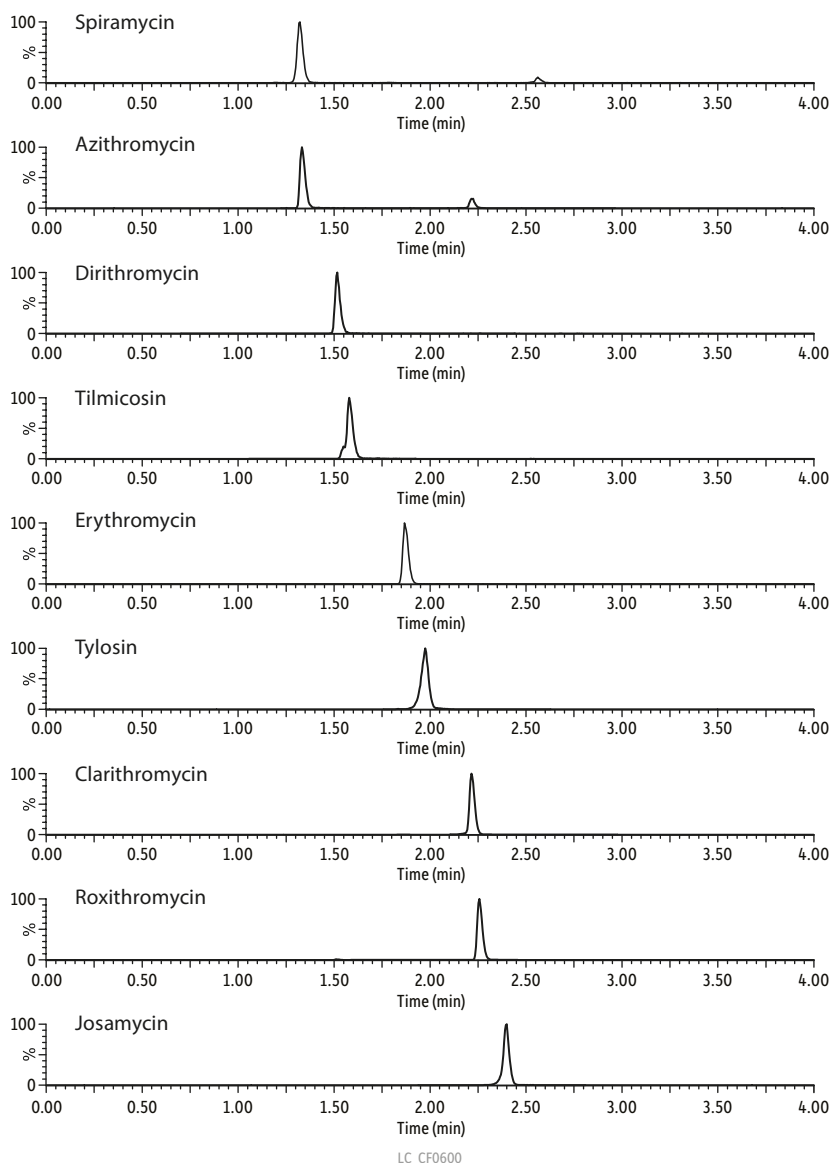
Peaks	Conc. (ng/mL)	Precursor Ion	Product Ion	Peaks	Conc. (ng/mL)	Precursor Ion	Product Ion		
1. Perfluorobutanoic acid (PFBA)	0.90	5	213.07	169.07	18. Perfluorononane sulfonic acid (PFNS)	4.53	5	549.17	79.98
2. Perfluoropentanoic acid (PFPeA)	1.83	5	263.10	219.11	19. N-methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	4.66	5	570.20	419.17
3. Perfluorobutane sulfonic acid (PFBS)	2.09	5	299.10	79.99	20. Perfluorododecane sulfonic acid (PFDS)	4.79	5	599.17	79.98
4. 1H, 1H, 2H, 2H-perfluorohexane sulfonic acid (4:2 FTS)	2.63	5	327.10	307.08	21. N-ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	4.79	5	584.20	419.18
5. Perfluorohexanoic acid (PFHxA)	2.70	5	313.10	269.12	22. Perfluorooctane sulfonamide (FOSA)	4.79	5	498.17	77.97
6. Perfluoropentane sulfonic acid (PFPeS)	2.84	5	349.10	79.98	23. Perfluoroundecanoic acid (PFUNA)	4.80	5	563.23	519.24
7. Perfluoroheptanoic acid (PFHpA)	3.33	5	363.16	319.09	24. 2-Perfluorodecyl ethanoic acid (FDEA)	4.91	250	577.23	493.18
8. Perfluorohexane sulfonic acid (PFHxS)	3.39	5	399.13	79.98	25. Perfluorododecanoic acid (PFDoA)	5.04	5	613.23	569.19
9. 2-Perfluorohexyl ethanoic acid (FHEA)	3.46	250	377.13	293.07	26. 1H, 1H, 2H, 2H-perfluorododecane sulfonic acid (10:2 FTS)	5.05	5	627.23	607.20
10. 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	3.78	5	427.17	407.18	27. Perfluorotridecanoic acid (PFTrDA)	5.25	5	663.23	619.21
11. Perfluorooctanoic acid (PFOA)	3.81	5	413.16	369.10	28. N-methyl perfluorooctane sulfonamide (N-MeFOSA)	5.31	5	512.17	169.07
12. Perfluoroheptane sulfonic acid (PFHpS)	3.84	5	449.17	79.98	29. N-methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	5.31	50	616.27	59.11
13. Perfluorononanoic acid (PFNA)	4.19	5	463.16	419.19	30. Perfluorotetradecanoic acid (PFTeDA)	5.44	5	713.23	669.23
14. Perfluorooctane sulfonic acid (PFOS)	4.21	5	499.17	79.98	31. N-ethyl perfluorooctane sulfonamide (N-EtFOSA)	5.47	5	526.23	169.06
15. 2-Perfluorooctyl ethanoic acid (FOEA)	4.31	250	477.17	393.15	32. N-ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	5.47	50	630.33	59.11
16. 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	4.51	5	527.17	507.16	33. Perfluorohexadecanoic acid (PFHxDA)	5.74	5	813.30	769.28
17. Perfluorodecanoic acid (PFDA)	4.52	5	513.17	469.16	34. Perfluorooctadecanoic acid (PFODA)	5.98	5	913.30	869.32

**Column:** Raptor C18 (cat.# 9304565); Dimensions: 150 mm x 4.6 mm ID; Particle Size: 5 µm; Temp.: 30 °C; **Sample:** Phenylurea pesticide mixture (cat.# 32434); Inj. Vol.: 2 µL; **Mobile Phase:** A: 0.1% Formic acid in water; B: 0.1% Formic acid in acetonitrile; **Gradient (%B)** 0.00 min (30% B), 7.00 min (55% B), 7.01 min (30% B), 10.00 min (30% B), **Flow:** 2 (mL/min); **Detector:** PDA @ 245 nm; **Instrument:** HPLC; **Notes:** This method is not EPA 532 tested or compliant.

## The Perfect Complement to High-Throughput Mass Spec

Fast LC-MS/MS screens with their exacting MRM transitions place severe demands on your LC column. The Raptor C18 can easily and dependably handle mass spec analysis of closely related compounds like macrolide antibiotics, which are widely used in human and veterinary medicine (Figure 7). Because it's a Raptor LC column, this C18 provides the reproducibility and consistent retention required for precise MRM analyses (see p. 3).

**Figure 7:** Confidently analyze closely eluting compounds, like macrolide antibiotics in this bioanalytical analysis, by LC-MS/MS.



Peaks	tr (min)	Precursor Ion	Product Ion
1. Spiramycin	1.32	844.21	174.28
2. Azithromycin	1.33	750.14	591.83
3. Dirithromycin	1.52	836.26	158.23
4. Tilmicosin	1.58	870.23	174.29
5. Erythromycin	1.87	735.09	158.23
6. Tylosin	1.98	917.26	174.28
7. Clarithromycin	2.22	749.11	158.22
8. Roxithromycin	2.26	838.21	158.23
9. Josamycin	2.40	829.15	109.18

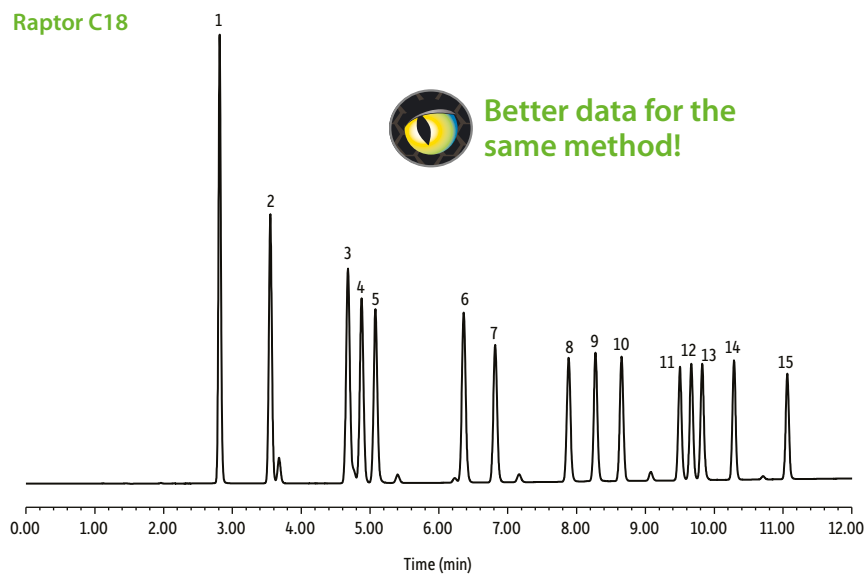
**Column:** Raptor C18 (cat.# 9304512); Dimensions: 100 mm x 2.1 mm ID; Particle Size: 5 µm; Pore Size: 90 Å; Temp.: 40 °C; **Sample:** Diluent: Water:acetonitrile (50:50); Conc.: 100 ng/mL; Inj. Vol.: 5 µL; **Mobile Phase:** A: 0.1% Formic acid in water; B: 0.1% Formic acid in acetonitrile; **Gradient (%B)** 0.00 min (20% B), 3.00 min (65% B), 3.01 min (20% B), 4.50 min (20% B); **Flow:** 0.4 mL/min; **Detector:** MS/MS; Ion Mode: ESI+; **Instrument:** UHPLC.

## Improve Resolution on Your Current Methods

To quickly improve your data quality without altering conditions, add a Raptor C18 SPP column to your existing C18 methods. As exemplified in Figure 8 with EPA method TO-11A, which determines toxic compounds in ambient air, the Raptor C18 offers better peak separation than a traditional fully porous C18 under the same conditions.

**Figure 8:** Make a good method even better with improved resolution by switching your traditional fully porous C18 for a Raptor C18 column.

### Raptor C18

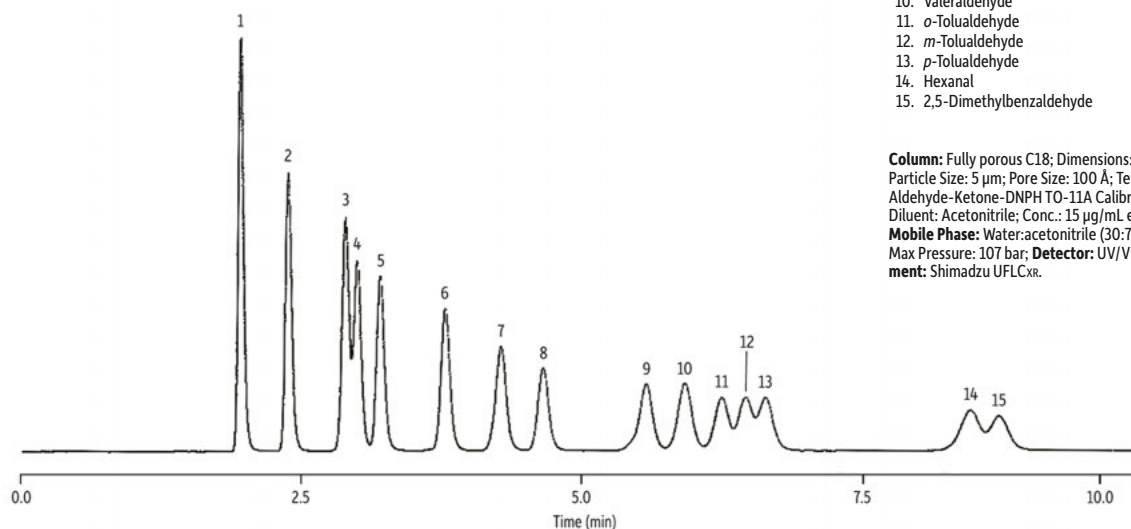


Peaks	tr (min)
1. Formaldehyde	2.814
2. Acetaldehyde	3.551
3. Acrolein	4.678
4. Acetone	4.877
5. Propionaldehyde	5.078
6. Crotonaldehyde	6.361
7. Butyraldehyde	6.818
8. Benzaldehyde	7.884
9. Isovaleraldehyde	8.276
10. Valeraldehyde	8.653
11. o-Tolualdehyde	9.502
12. m-Tolualdehyde	9.667
13. p-Tolualdehyde	9.825
14. Hexanal	10.287
15. 2,5-Dimethylbenzaldehyde	11.064

**Column:** Raptor C18 (cat.# 9304A65); Dimensions: 150 mm x 4.6 mm ID; Particle Size: 2.7 µm; Pore Size: 90 Å; Temp.: 30 °C; **Sample:** Aldehyde-ketone-DNPH TO-11A calibration mix (cat.# 31808); Diluent: Acetonitrile; Conc.: 15 µg/mL; Inj. Vol.: 2 µL; **Mobile Phase:** A: Water; B: Methanol: acetonitrile (650:50)\*; **Gradient (%B)** 0.00 min (70% B), 5.00 min (75% B), 11.00 min (90% B), 11.01 min (100% B), 12.00 min (100% B), 12.01 min (70% B), 14.00 min (70% B); **Flow:** 0.8 mL/min; **Detector:** UV/Vis @ 365, 4.8 nm; **Instrument:** UHPLC; **Notes:** \*Mobile phase B was prepared by combining 650 mL methanol and 50 mL acetonitrile.

LC\_EV0532

### Fully porous C18



Peaks	tr (min)
1. Formaldehyde	1.954
2. Acetaldehyde	2.376
3. Acrolein	2.884
4. Acetone	2.987
5. Propionaldehyde	3.190
6. Crotonaldehyde	3.777
7. Butyraldehyde	4.273
8. Benzaldehyde	4.653
9. Isovaleraldehyde	5.572
10. Valeraldehyde	5.919
11. o-Tolualdehyde	6.242
12. m-Tolualdehyde	6.454
13. p-Tolualdehyde	6.634
14. Hexanal	8.450
15. 2,5-Dimethylbenzaldehyde	8.715

**Column:** Fully porous C18; Dimensions: 150 mm x 4.6 mm ID; Particle Size: 5 µm; Pore Size: 100 Å; Temp.: 25 °C; **Sample:** Aldehyde-Ketone-DNPH TO-11A Calibration Mix (cat.# 31808); Diluent: Acetonitrile; Conc.: 15 µg/mL each; Inj. Vol.: 10 µL; **Mobile Phase:** Water:acetonitrile (30:70); Flow: 1.5 mL/min; Max Pressure: 107 bar; **Detector:** UV/Vis @ 365, 1 nm; **Instrument:** Shimadzu UFLCXR.

# Lower Costs and Improve Profitability with the Only General-Purpose C18 That Gives You Selectivity Accelerated

## Raptor C18 LC Columns



Length	2.1 mm cat.#	3.0 mm cat.#	4.6 mm cat.#
<b>1.8 µm Columns</b>			
30 mm	9304232	—	—
50 mm	9304252	930425E	—
100 mm	9304212	930421E	—
150 mm	9304262	—	—
<b>2.7 µm Columns</b>			
30 mm	9304A32	9304A3E	9304A35
50 mm	9304A52	9304A5E	9304A55
100 mm	9304A12	9304A1E	9304A15
150 mm	9304A62	9304A6E	9304A65
<b>5 µm Columns</b>			
30 mm	—	930453E	—
50 mm	9304552	930455E	9304555
100 mm	9304512	930451E	9304515
150 mm	9304562	930456E	9304565
250 mm	—	—	9304575

## EXP Reusable Fittings for HPLC & UHPLC for 10-32 fittings and 1/16" tubing

Effortlessly achieve 8,700+ psi HPLC seals by hand! (Wrench tighten to 20,000+ psi.) Hybrid titanium/PEEK seal can be installed repeatedly without compromising your seal.

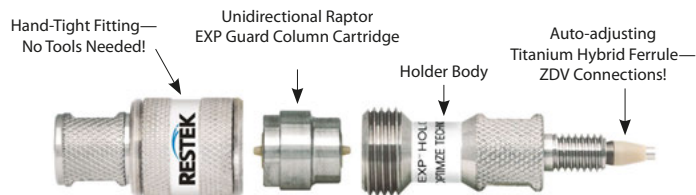


Description	qty.	cat.#
EXP Hand-Tight Fitting (Nut w/Ferrule)	ea.	25937
EXP Hand-Tight Fitting (Nut w/Ferrule)	10-pk.	25938
EXP Hand-Tight Nut (w/o Ferrule)	ea.	25939

Hybrid Ferrule U.S. Patent No. 8201854, EXP Holders U.S. Patent No. 8696902, EXP2 Wrench U.S. Patent No. D766055. Other U.S. and Foreign Patents Pending. The EXP, Free-Turn, and the Opti- prefix are registered trademarks of Optimize Technologies, Inc.

Experience *Selectivity Accelerated*.  
Order the Raptor C18 today at  
[www.bgb-shop.com/raptor](http://www.bgb-shop.com/raptor)

## Raptor EXP Guard Cartridges—for All Raptor Columns



Protect your investment, extend the life of our already-rugged LC columns, and change guard column cartridges by hand without breaking fluid connections—no tools needed! Great with any Raptor column to get ultimate protection from particulates and matrix contamination, especially when using dilute-and-shoot or other minimal sample preparation techniques.

### EXP Direct Connect Holder

Description	qty.	cat.#
EXP Direct Connect Holder for EXP Guard Cartridges (includes hex-head fitting & 2 ferrules)	ea.	25808

Maximum holder pressure: 20,000 psi (1,400 bar)

### Raptor EXP Guard Column Cartridges

Description	Particle Size	qty.	5 x 2.1 mm cat.#	5 x 3.0 mm cat.#	5 x 4.6 mm cat.#
Raptor C18 EXP Guard Column Cartridge	UHPLC	3-pk.	9304U0252	9304U0253	—
Raptor C18 EXP Guard Column Cartridge	2.7 µm	3-pk.	9304A0252	9304A0253	9304A0250
Raptor C18 EXP Guard Column Cartridge	5 µm	3-pk.	930450252	930450253	930450250

1,034 bar/15,000 psi\* (UHPLC), 600 bar/8,700 psi (2.7 µm); 400 bar/5,800 psi (5 µm).  
\* For maximum lifetime, recommended maximum pressure for 1.8 µm particles is 830 bar/12,000 psi.

Raptor SPP LC columns combine the speed of SPP with the resolution of USLC technology.  
Learn more at [www.bgb-shop.com/raptor](http://www.bgb-shop.com/raptor)

## UltraShield UHPLC PreColumn Filter—for 1.8 µm Raptor Columns

Pair 1.8 µm Raptor columns with an UltraShield filter instead of a guard cartridge to protect against particulates, minimize extra column volume, and maximize UHPLC sample throughput when using SPE, SLE, or other extensive sample preparations.



Description	Filter Porosity	qty.	cat.#
UltraShield UHPLC PreColumn Filter	0.2 µm frit	ea.	25809
		5-pk.	25810
		10-pk.	25811