



Ultra II™ LC Columns

The Column Line Designed for Optimal Chromatography
on **Any LC System**, Based on Highly Inert Restek Silica

Available Phases:

- C18
- Silica
- Biphenyl
- PFP Propyl
- Aromax
- Aqueous C18

Available Particle Sizes:

- 1.9µm for UHPLC
- 2.2µm for UFLC and RRLLC
- 3µm and 5µm for HPLC

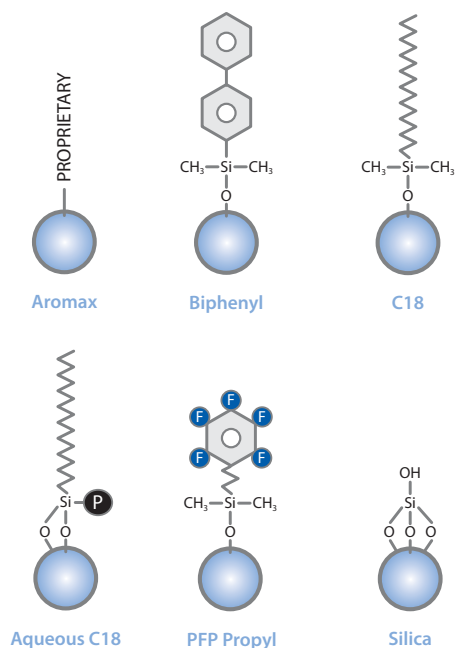
**More phases
coming soon!**



Chromatography Products

www.restek.com 800-356-1688 • 814-353-1300

NEW! Ultra II™ LC Columns



Ultra II™ Aromax Columns (USP L11)

Ultra II Aromax is a unique reversed phase material that exhibits superior retention and selectivity for aromatic and/or unsaturated compounds, compared to conventional alkyl and phenyl phases. This column is a great alternative to our Biphenyl phase when increased retention is required. A very suitable choice for analysis of steroids, tetracyclines, drug metabolites, and other compounds that contain some degree of unsaturation.

Ultra II™ Biphenyl Columns (USP L11)

A unique reversed phase material that exhibits both increased retention and selectivity for aromatic and/or unsaturated compounds, compared to conventional alkyl and phenyl phases. This is a great alternative to a C18 column when alternative selectivity is desired. An excellent choice for the analysis of steroids, tetracyclines, drug metabolites, and other compounds that contain some degree of unsaturation.

Ultra II™ C18 Columns (USP L1)

A retentive, highly pure material that exhibits excellent peak shape for a wide range of compounds. This is a robust and very reproducible general-purpose reversed phase column.

Ultra II™ Aqueous C18 Columns (USP L1)

Highly retentive and selective for reversed phase separations of polar analytes. Highly base-deactivated. Compatible with highly aqueous (up to 100%) mobile phases.

Ultra II™ PFP Propyl Columns (USP L43)

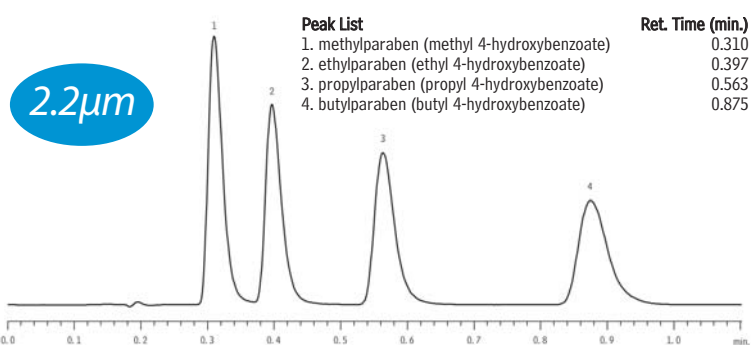
A pentafluorophenyl phase with a propyl spacer. Highly retentive for basic analytes. An excellent phase for separating nucleosides, nucleotides, purines, pyrimidines, and halogenated compounds.

Ultra II™ Silica Columns (USP L3)

High surface area. Type B silica packing.

Ultra II™ is the first LC column line specifically designed for universal application—optimal chromatography on any system. This column line is built on a highly inert, high surface area silica that is completely Restek manufactured, providing excellent column-to-column reproducibility. Only Ultra II™ columns are available in a comprehensive range of particle sizes (1.9µm, 2.2µm, 3µm, and 5µm), creating truly scalable chromatography on any type of LC instrument, from conventional to ultra-high pressure systems. Ultra II™ columns are available in traditional phases (C18, Aqueous C18, Silica) and unique chemistries which provide alternate selectivity (Biphenyl, Aromax, PFP Propyl).

Parabens on Ultra II™ C18

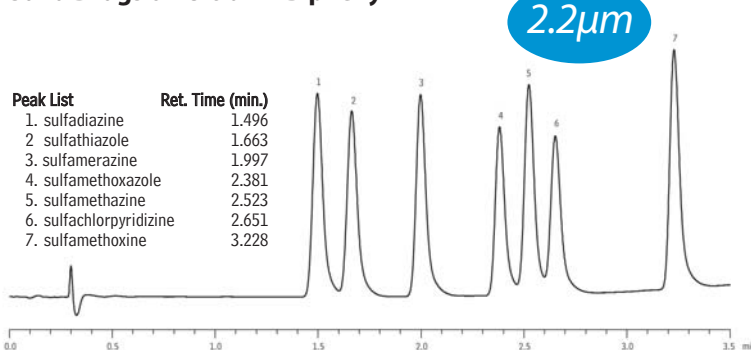


Sample:
 Inj.: 1µL
 Conc.: 50µg/mL each component
 Sample diluent: methanol

Conditions:
 Instrument: Shimadzu Prominence UFLC_{XR}
 Mobile phase: 0.1% formic acid in water:methanol (35:65)
 Flow: 1.5mL/min.
 Temp.: 30°C
 Det.: UV @ 254nm

Column:
 Ultra II™ C18
 Cat.#: 9604853
 Dimensions: 50mm x 3.0mm
 Particle size: 2.2µm
 Pore size: 100Å

Sulfa Drugs on Ultra II™ Biphenyl



Sample:
 Inj.: 3µL
 Conc.: 25µg/mL each component
 Sample diluent: methanol

Conditions:
 Instrument: Shimadzu Prominence UFLC_{XR}
 Mobile phase: 0.1% formic acid in water:methanol (75:25)
 Flow: 1.0mL/min.
 Temp.: 30°C
 Det.: UV @ 254nm

Column:
 Ultra II™ Biphenyl
 Cat.#: 9609853
 Dimensions: 50mm x 3.0mm
 Particle size: 2.2µm
 Pore size: 100Å

Famotidine on Ultra II™ Aromax

Fast! 5µm

Peak List	Ret. Time (min.)
1. impurity A	3.779
2. famotidine	8.264
3. impurity D	9.180
4. impurity C	9.911
5. impurity B	14.018

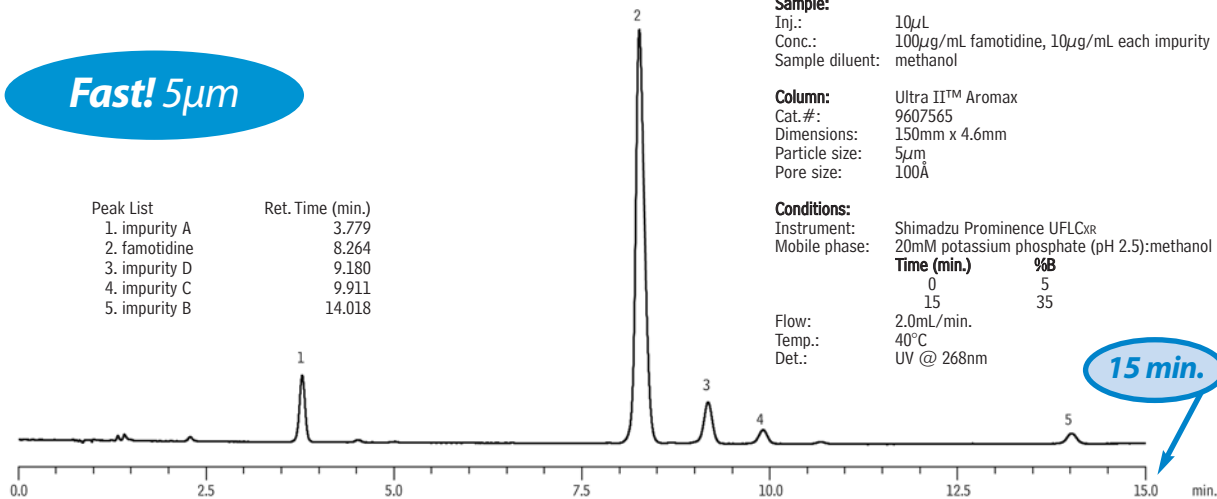
Sample:
 Inj.: 10µL
 Conc.: 100µg/mL famotidine, 10µg/mL each impurity
 Sample diluent: methanol

Column: Ultra II™ Aromax
 Cat.#: 9607565
 Dimensions: 150mm x 4.6mm
 Particle size: 5µm
 Pore size: 100Å

Conditions:
 Instrument: Shimadzu Prominence UFLCXR
 Mobile phase: 20mM potassium phosphate (pH 2.5):methanol

Time (min.)	%B
0	5
15	35

Flow: 2.0mL/min.
 Temp.: 40°C
 Det.: UV @ 268nm



LC_PH0495

Faster! 3µm

Peak List	Ret. Time (min.)
1. impurity A	2.094
2. famotidine	4.460
3. impurity D	4.937
4. impurity C	5.334
5. impurity B	7.480

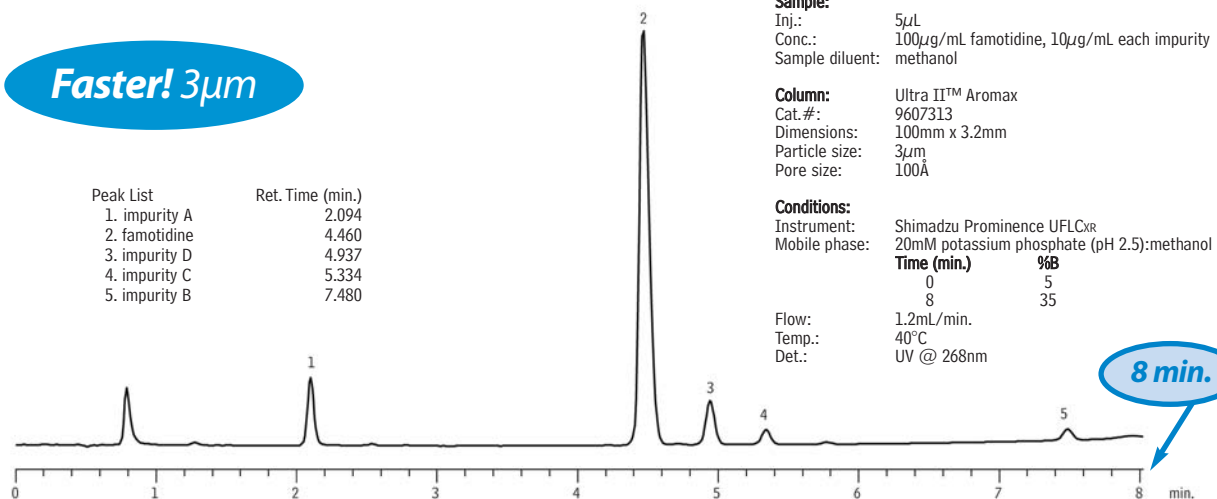
Sample:
 Inj.: 5µL
 Conc.: 100µg/mL famotidine, 10µg/mL each impurity
 Sample diluent: methanol

Column: Ultra II™ Aromax
 Cat.#: 9607313
 Dimensions: 100mm x 3.2mm
 Particle size: 3µm
 Pore size: 100Å

Conditions:
 Instrument: Shimadzu Prominence UFLCXR
 Mobile phase: 20mM potassium phosphate (pH 2.5):methanol

Time (min.)	%B
0	5
8	35

Flow: 1.2mL/min.
 Temp.: 40°C
 Det.: UV @ 268nm



LC_PH0494

Fastest! 2.2µm

Peak List	Ret. Time (min.)
1. impurity A	0.892
2. famotidine	2.082
3. impurity D	2.292
4. impurity C	2.517
5. impurity B	3.540

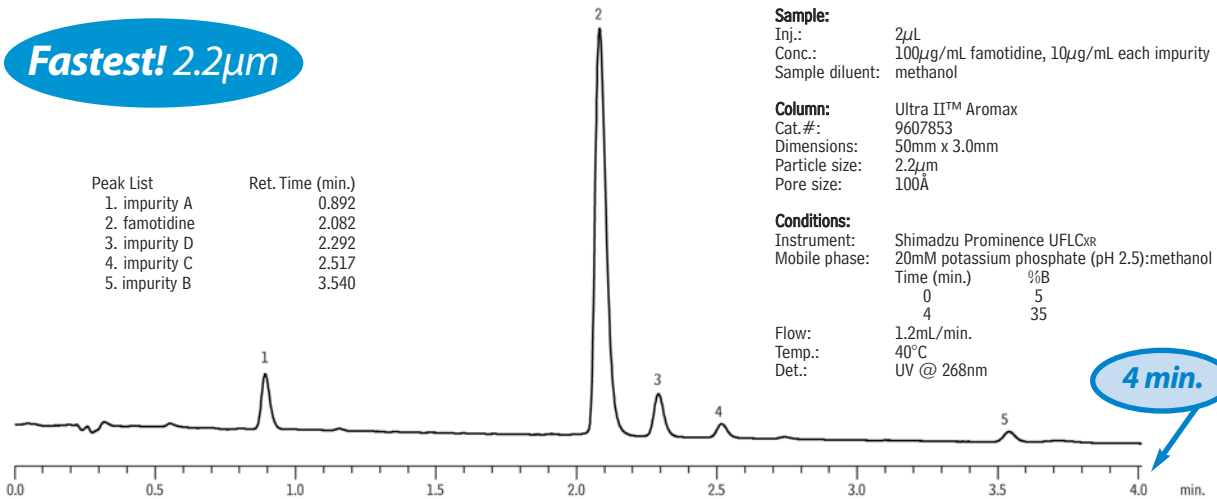
Sample:
 Inj.: 2µL
 Conc.: 100µg/mL famotidine, 10µg/mL each impurity
 Sample diluent: methanol

Column: Ultra II™ Aromax
 Cat.#: 9607853
 Dimensions: 50mm x 3.0mm
 Particle size: 2.2µm
 Pore size: 100Å

Conditions:
 Instrument: Shimadzu Prominence UFLCXR
 Mobile phase: 20mM potassium phosphate (pH 2.5):methanol

Time (min.)	%B
0	5
4	35

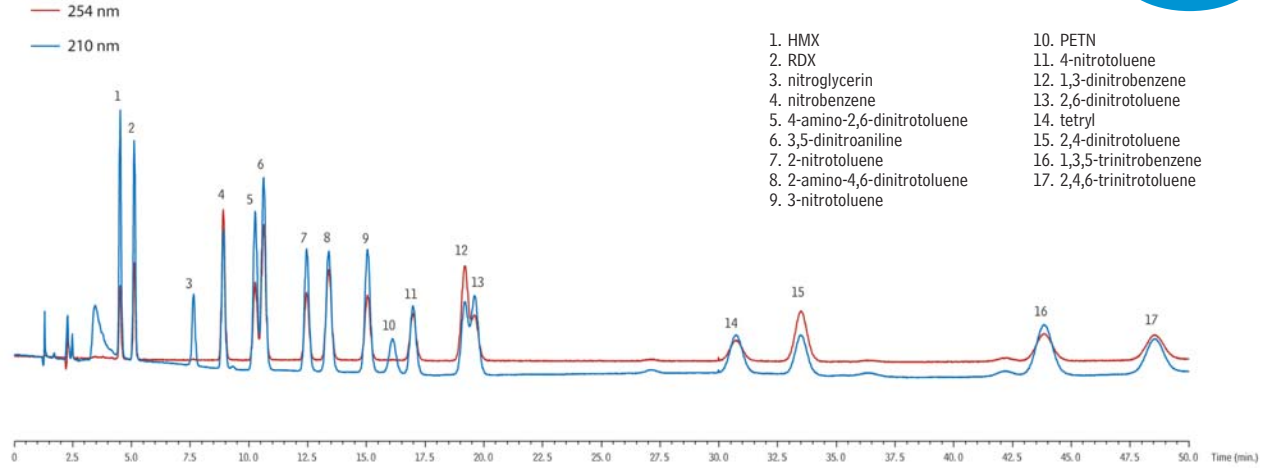
Flow: 1.2mL/min.
 Temp.: 40°C
 Det.: UV @ 268nm



LC_PH0493

Explosives on Ultra II™ Aromax

5µm



- | | |
|-------------------------------|---------------------------|
| 1. HMX | 10. PETN |
| 2. RDX | 11. 4-nitrotoluene |
| 3. nitroglycerin | 12. 1,3-dinitrobenzene |
| 4. nitrobenzene | 13. 2,6-dinitrotoluene |
| 5. 4-amino-2,6-dinitrotoluene | 14. tetryl |
| 6. 3,5-dinitroaniline | 15. 2,4-dinitrotoluene |
| 7. 2-nitrotoluene | 16. 1,3,5-trinitrobenzene |
| 8. 2-amino-4,6-dinitrotoluene | 17. 2,4,6-trinitrotoluene |
| 9. 3-nitrotoluene | |

LC_EV0484

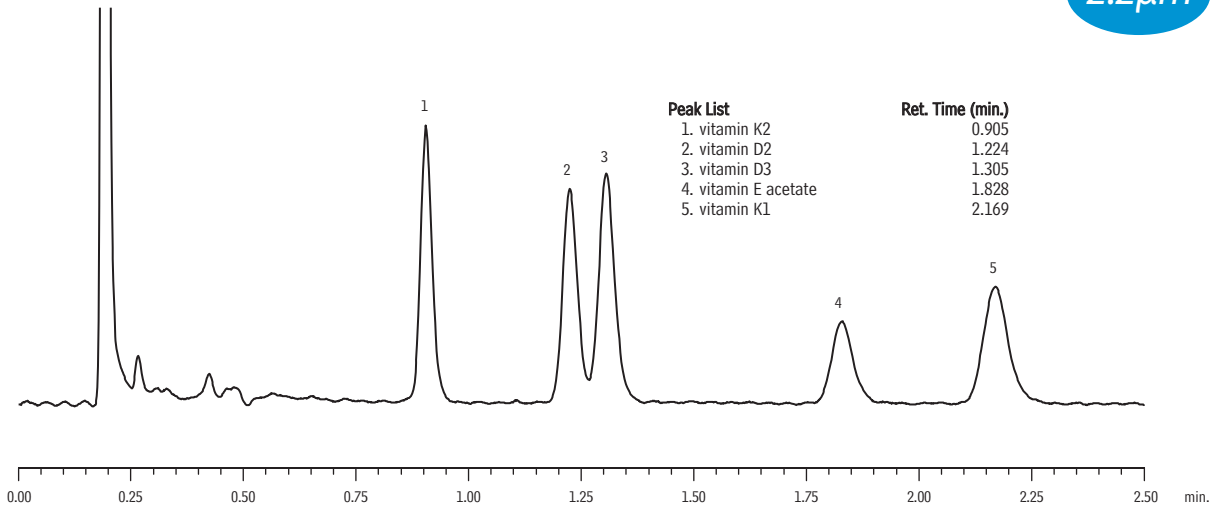
Sample: Nitroaromatics and Nitramine Explosives by HPLC, EPA 8330B (cat.# 33204)
Inj.: 10µL
Conc.: 10µg/mL each component
Sample diluent: methanol

Conditions:
Instrument: Shimadzu Prominence UFLCXR
Mobile phase: water:methanol, 35:65 (v/v)
Flow: 1.2mL/min.
Temp.: 30°C
Det.: UV @ 254nm and 210nm

Column: Ultra II™ Aromax
Cat.#: 9607575
Dimensions: 250mm x 4.6mm
Particle size: 5µm
Pore size: 100Å

Fat Soluble Vitamins on Ultra II™ C18

2.2µm



Peak List	Ret. Time (min.)
1. vitamin K2	0.905
2. vitamin D2	1.224
3. vitamin D3	1.305
4. vitamin E acetate	1.828
5. vitamin K1	2.169

LC_PH0492

Sample:
Inj.: 1µL
Conc.: 100µg/mL each component
Sample diluent: acetone

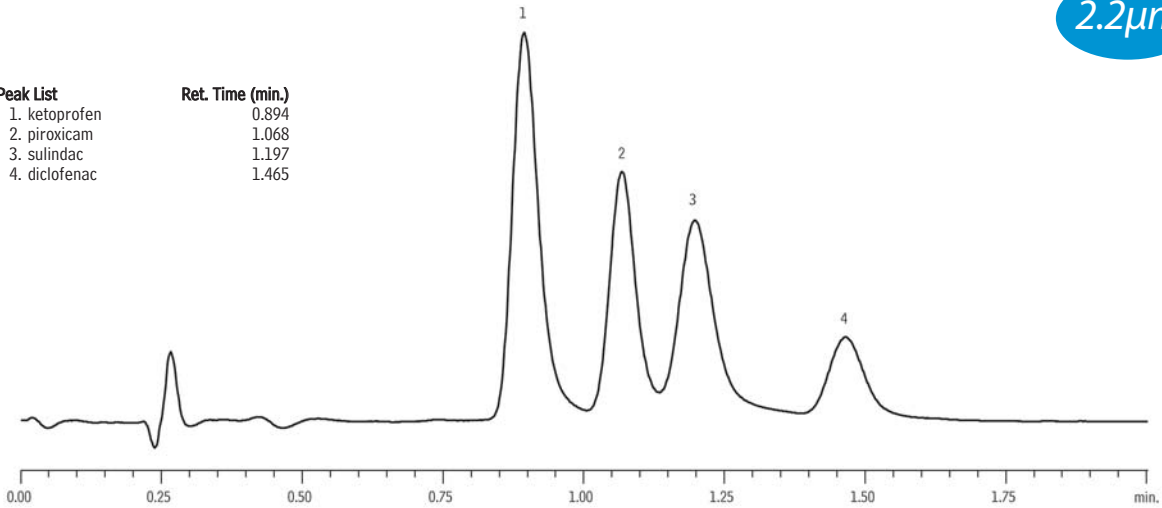
Conditions:
Instrument: Shimadzu Prominence UFLCXR
Mobile phase: acetonitrile:methanol (85:15)
Flow: 1.5mL/min.
Temp.: ambient
Det.: UV @ 230nm

Column: Ultra II™ C18
Cat.#: 9604853
Dimensions: 50mm x 3.0mm
Particle size: 2.2µm
Pore size: 100Å

NSAIDs on Ultra II™ Biphenyl

2.2μm

Peak List	Ret. Time (min.)
1. ketoprofen	0.894
2. piroxicam	1.068
3. sulindac	1.197
4. diclofenac	1.465



LC_PH0487

Sample:
 Inj.: 5μL
 Conc.: 15μg/mL each component
 Sample diluent: methanol

Column: Ultra II™ Biphenyl
 Cat.#: 9609853
 Dimensions: 50mm x 3.0mm
 Particle size: 2.2μm
 Pore size: 100Å

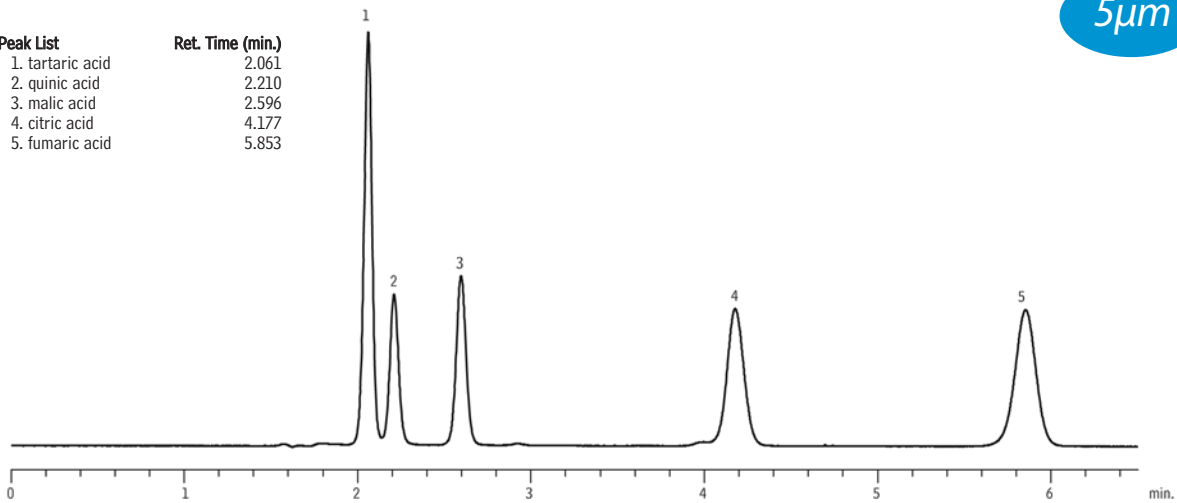
Conditions:
 Instrument: Shimadzu Prominence UFLCXR
 Mobile phase: 20mM potassium phosphate, pH 2.5 with H₃PO₄:methanol (30:70)

Flow: 1.2mL/min.
 Temp.: 40°C
 Det.: UV @ 254nm

Organic Acids on Ultra II™ Aqueous C18

5μm

Peak List	Ret. Time (min.)
1. tartaric acid	2.061
2. quinic acid	2.210
3. malic acid	2.596
4. citric acid	4.177
5. fumaric acid	5.853



LC_PH0498

Sample:
 Inj.: 5μL
 Conc.: 10μg/mL fumaric acid, 2,000μg/mL each other acids
 Sample diluent: water

Column: Ultra II™ Aqueous C18
 Cat.#: 9608565
 Dimensions: 150mm x 4.6mm
 Particle size: 5μm
 Pore size: 100Å

Conditions:
 Instrument: Shimadzu Prominence UFLCXR
 Mobile phase: 100% 20mM potassium phosphate (pH 2.5)
 Flow: 1.0mL/min.
 Temp.: 30°C
 Det.: UV @ 226nm

Alcohol Metabolites on Ultra II™ Biphenyl

5µm

Sample:
 Inj.: 5µL
 Conc.: 5µg/mL each component
 Sample diluent: urine diluted 1:10 with mobile phase

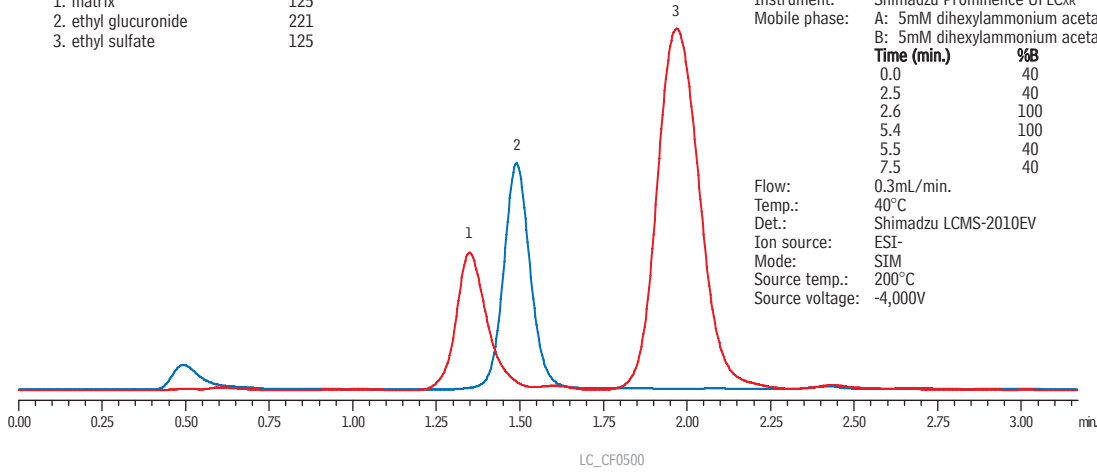
Column: Ultra II™ Biphenyl
 Cat.#: 9609552
 Dimensions: 50mm x 2.1mm
 Particle size: 5µm
 Pore size: 100Å

Conditions:
 Instrument: Shimadzu Prominence UFLC_R
 Mobile phase: A: 5mM dihexylammonium acetate in water
 B: 5mM dihexylammonium acetate in methanol

Time (min.)	%B
0.0	40
2.5	40
2.6	100
5.4	100
5.5	40
7.5	40

Flow: 0.3mL/min.
 Temp.: 40°C
 Det.: Shimadzu LCMS-2010EV
 Ion source: EST-
 Mode: SIM
 Source temp.: 200°C
 Source voltage: -4,000V

Peak List	m/z
1. matrix	125
2. ethyl glucuronide	221
3. ethyl sulfate	125



Cannabinoids on Ultra II™ Biphenyl

2.2µm

Sample:
 Inj.: 20µL
 Conc.: 300ng/mL urine sample with 50ng/mL internal standard

Column: Ultra II™ Biphenyl
 Cat.#: 9609853
 Dimensions: 50mm x 3.0mm
 Particle size: 2.2µm
 Pore size: 100Å

Conditions:
 Instrument: Shimadzu Prominence UFLC_R
 Mobile phase: A: 0.1% formic acid in water
 B: 0.1% formic acid in methanol

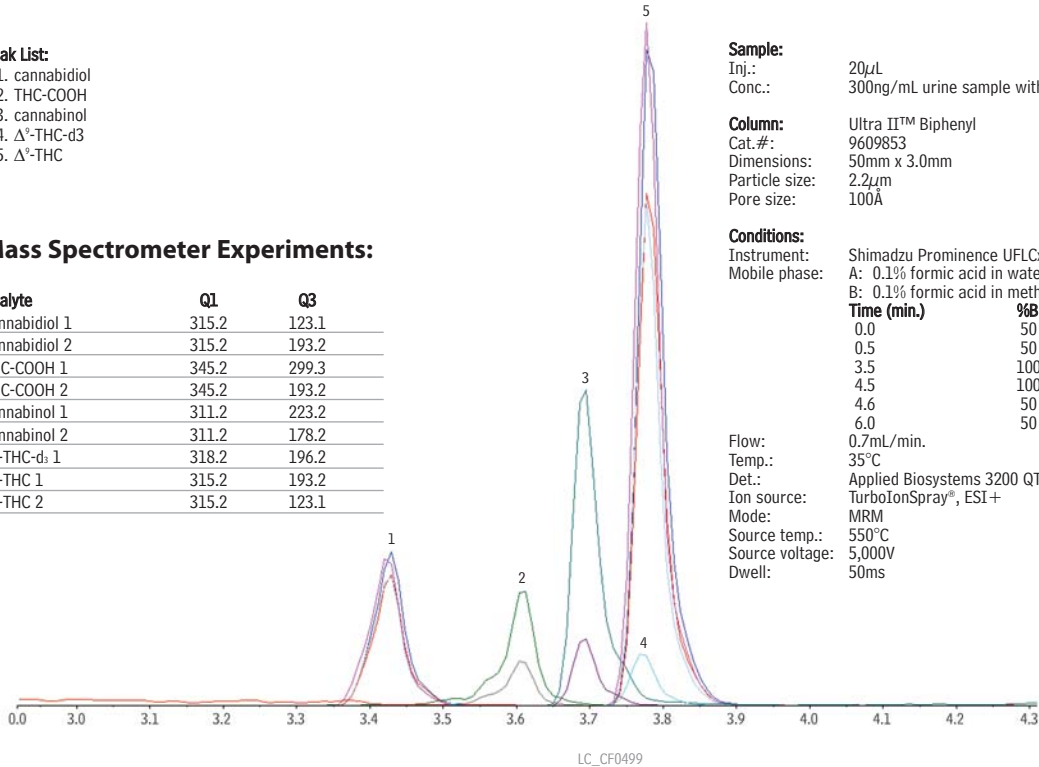
Time (min.)	%B
0.0	50
0.5	50
3.5	100
4.5	100
4.6	50
6.0	50

Flow: 0.7mL/min.
 Temp.: 35°C
 Det.: Applied Biosystems 3200 QTRAP™ LC/MS/MS system
 Ion source: TurboIonSpray®, ESI+
 Mode: MRM
 Source temp.: 550°C
 Source voltage: 5,000V
 Dwell: 50ms

- Peak List:**
- cannabidiol
 - THC-COOH
 - cannabinol
 - Δ⁹-THC-d₃
 - Δ⁹-THC

Mass Spectrometer Experiments:

Analyte	Q1	Q3
cannabidiol 1	315.2	123.1
cannabidiol 2	315.2	193.2
THC-COOH 1	345.2	299.3
THC-COOH 2	345.2	193.2
cannabinol 1	311.2	223.2
cannabinol 2	311.2	178.2
Δ ⁹ -THC-d ₃ 1	318.2	196.2
Δ ⁹ -THC 1	315.2	193.2
Δ ⁹ -THC 2	315.2	123.1



Ultra II™ Silica Columns (USP L3)

Physical Characteristics:

particle size: 1.9µm, 2.2µm, 3µm or 5µm, spherical
pore size: 100Å
carbon load: 0%

endcap: no
pH range: 2.5 to 7.5
temperature limit: 80°C

Column	cat. #
1.9µm Column, 2.1mm	
30mm	9600232
50mm	9600252
100mm	9600212
2.2µm Column, 3.0mm	
30mm	9600833
50mm	9600853
100mm	9600813
3µm Column, 1.0mm	
30mm	9600331
50mm	9600351
100mm	9600311
150mm	9600361
3µm Column, 2.1mm	
30mm	9600332
50mm	9600352
100mm	9600312
150mm	9600362
3µm Column, 3.2mm	
30mm	9600333
50mm	9600353
100mm	9600313
150mm	9600363
3µm Column, 4.6mm	
30mm	9600335
50mm	9600355
100mm	9600315
150mm	9600365
5µm Column, 1.0mm	
30mm	9600531
50mm	9600551
100mm	9600511
150mm	9600561
200mm	9600521
250mm	9600571
5µm Column, 2.1mm	
30mm	9600532
50mm	9600552
100mm	9600512
150mm	9600562
200mm	9600522
250mm	9600572
5µm Column, 3.2mm	
30mm	9600533
50mm	9600553
100mm	9600513
150mm	9600563
200mm	9600523
250mm	9600573
5µm Column, 4.6mm	
30mm	9600535
50mm	9600555
100mm	9600515
150mm	9600565
200mm	9600525
250mm	9600575

Ultra II™ Biphenyl Columns (USP L11)

Physical Characteristics:

particle size: 2.2µm, 3µm or 5µm, spherical
pore size: 100Å
carbon load: 15%

endcap: fully endcapped
pH range: 2.5 to 7.5
temperature limit: 80°C

Column	cat. #
2.2µm Column, 3.0mm	
30mm	9609833
50mm	9609853
100mm	9609813
3µm Column, 1.0mm	
30mm	9609331
50mm	9609351
100mm	9609311
150mm	9609361
3µm Column, 2.1mm	
30mm	9609332
50mm	9609352
100mm	9609312
150mm	9609362
3µm Column, 3.2mm	
30mm	9609333
50mm	9609353
100mm	9609313
150mm	9609363
3µm Column, 4.6mm	
30mm	9609335
50mm	9609355
100mm	9609315
150mm	9609365
5µm Column, 1.0mm	
30mm	9609531
50mm	9609551
100mm	9609511
150mm	9609561
200mm	9609521
250mm	9609571
5µm Column, 2.1mm	
30mm	9609532
50mm	9609552
100mm	9609512
150mm	9609562
200mm	9609522
250mm	9609572
5µm Column, 3.2mm	
30mm	9609533
50mm	9609553
100mm	9609513
150mm	9609563
200mm	9609523
250mm	9609573
5µm Column, 4.6mm	
30mm	9609535
50mm	9609555
100mm	9609515
150mm	9609565
200mm	9609525
250mm	9609575

1.9µm coming soon!

Ultra II™ Aromax Columns (USP L11)

Physical Characteristics:

particle size: 3µm or 5µm, spherical
pore size: 100Å
carbon load: 17%

endcap: fully endcapped
pH range: 2.5 to 7.5
temperature limit: 80°C

Column	cat. #
3µm Column, 1.0mm	
30mm	9607331
50mm	9607351
100mm	9607311
150mm	9607361
3µm Column, 2.1mm	
30mm	9607332
50mm	9607352
100mm	9607312
150mm	9607362
3µm Column, 3.2mm	
30mm	9607333
50mm	9607353
100mm	9607313
150mm	9607363
3µm Column, 4.6mm	
30mm	9607335
50mm	9607355
100mm	9607315
150mm	9607365
5µm Column, 1.0mm	
30mm	9607531
50mm	9607551
100mm	9607511
150mm	9607561
200mm	9607521
250mm	9607571
5µm Column, 2.1mm	
30mm	9607532
50mm	9607552
100mm	9607512
150mm	9607562
200mm	9607522
250mm	9607572
5µm Column, 3.2mm	
30mm	9607533
50mm	9607553
100mm	9607513
150mm	9607563
200mm	9607523
250mm	9607573
5µm Column, 4.6mm	
30mm	9607535
50mm	9607555
100mm	9607515
150mm	9607565
200mm	9607525
250mm	9607575

1.9µm & 2.2µm coming soon!

ordering note

For guard cartridges for these columns, visit our website at www.restek.com.

Visit us at www.restek.com/ultra2 for our most complete listing of Ultra II™ columns.

Ultra II™ C18 Columns (USP L1)

Physical Characteristics:

particle size: 1.9µm, 2.2µm, 3µm or 5µm, spherical
pore size: 100Å
carbon load: 19%
endcap: fully endcapped
pH range: 2.5 to 7.5
temperature limit: 80°C

1.9µm Column, 2.1mm	cat. #
30mm	9604232
50mm	9604252
100mm	9604212
2.2µm Column, 3.0mm	cat. #
30mm	9604833
50mm	9604853
100mm	9604813
3µm Column, 1.0mm	cat. #
30mm	9604331
50mm	9604351
100mm	9604311
150mm	9604361
3µm Column, 2.1mm	cat. #
30mm	9604332
50mm	9604352
100mm	9604312
150mm	9604362
3µm Column, 3.2mm	cat. #
30mm	9604333
50mm	9604353
100mm	9604313
150mm	9604363
3µm Column, 4.6mm	cat. #
30mm	9604335
50mm	9604355
100mm	9604315
150mm	9604365
5µm Column, 1.0mm	cat. #
30mm	9604531
50mm	9604551
100mm	9604511
150mm	9604561
200mm	9604521
250mm	9604571
5µm Column, 2.1mm	cat. #
30mm	9604532
50mm	9604552
100mm	9604512
150mm	9604562
200mm	9604522
250mm	9604572
5µm Column, 3.2mm	cat. #
30mm	9604533
50mm	9604553
100mm	9604513
150mm	9604563
200mm	9604523
250mm	9604573
5µm Column, 4.6mm	cat. #
30mm	9604535
50mm	9604555
100mm	9604515
150mm	9604565
200mm	9604525
250mm	9604575

Ultra II™ Aqueous C18 Columns (USP L1)

Physical Characteristics:

particle size: 2.2µm, 3µm or 5µm, spherical
pore size: 100Å
carbon load: 15%
endcap: no
pH range: 2.5 to 7.5
temperature limit: 80°C

2.2µm Column, 3.0mm	cat. #
30mm	9608833
50mm	9608853
100mm	9608813
3µm Column, 1.0mm	cat. #
30mm	9608331
50mm	9608351
100mm	9608311
150mm	9608361
3µm Column, 2.1mm	cat. #
30mm	9608332
50mm	9608352
100mm	9608312
150mm	9608362
3µm Column, 3.2mm	cat. #
30mm	9608333
50mm	9608353
100mm	9608313
150mm	9608363
3µm Column, 4.6mm	cat. #
30mm	9608335
50mm	9608355
100mm	9608315
150mm	9608365
5µm Column, 1.0mm	cat. #
30mm	9608531
50mm	9608551
100mm	9608511
150mm	9608561
200mm	9608521
250mm	9608571
5µm Column, 2.1mm	cat. #
30mm	9608532
50mm	9608552
100mm	9608512
150mm	9608562
200mm	9608522
250mm	9608572
5µm Column, 3.2mm	cat. #
30mm	9608533
50mm	9608553
100mm	9608513
150mm	9608563
200mm	9608523
250mm	9608573
5µm Column, 4.6mm	cat. #
30mm	9608535
50mm	9608555
100mm	9608515
150mm	9608565
200mm	9608525
250mm	9608575

1.9µm coming soon!

PATENTS & TRADEMARKS

Restek patents and trademarks are the property of Restek Corporation. Other trademarks appearing in Restek literature or on its website are the property of their respective owners.

Ultra II™ PFP Propyl Columns (USP L43)

Physical Characteristics:

particle size: 2.2µm, 3µm or 5µm, spherical
pore size: 100Å
carbon load: 11%
endcap: fully endcapped
pH range: 2.5 to 7.5
temperature limit: 80°C

2.2µm Column, 3.0mm	cat. #
30mm	9606833
50mm	9606853
100mm	9606813
3µm Column, 1.0mm	cat. #
30mm	9606331
50mm	9606351
100mm	9606311
150mm	9606361
3µm Column, 2.1mm	cat. #
30mm	9606332
50mm	9606352
100mm	9606312
150mm	9606362
3µm Column, 3.2mm	cat. #
30mm	9606333
50mm	9606353
100mm	9606313
150mm	9606363
3µm Column, 4.6mm	cat. #
30mm	9606335
50mm	9606355
100mm	9606315
150mm	9606365
5µm Column, 1.0mm	cat. #
30mm	9606531
50mm	9606551
100mm	9606511
150mm	9606561
200mm	9606521
250mm	9606571
5µm Column, 2.1mm	cat. #
30mm	9606532
50mm	9606552
100mm	9606512
150mm	9606562
200mm	9606522
250mm	9606572
5µm Column, 3.2mm	cat. #
30mm	9606533
50mm	9606553
100mm	9606513
150mm	9606563
200mm	9606523
250mm	9606573
5µm Column, 4.6mm	cat. #
30mm	9606535
50mm	9606555
100mm	9606515
150mm	9606565
200mm	9606525
250mm	9606575

1.9µm coming soon!



Lit. Cat.# GNTS1177-INT

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Restek U.S. • 110 Benner Circle • Bellefonte, PA 16823 • 814-353-1300 • 800-356-1688 • fax: 814-353-1309 • www.restek.com

Restek France • phone: +33 (0)1 60 78 32 10 • fax: +33 (0)1 60 78 70 90 • e-mail: restek@restekfrance.fr

Restek GmbH • phone: +49 (0)6172 2797 0 • fax: +49 (0)6172 2797 77 • e-mail: info@restekgmbh.de

Restek Ireland • phone: +44 (0)2890 814576 • fax: +44 (0)2890 814576 • e-mail: restekurope@aol.com

Restek Japan • phone: +81 (3)6459 0025 • fax: +81 (3)6459 0025 • e-mail: ryosei.kanaguchi@restek.com

Thames Restek U.K. LTD • phone: +44 (0)1494 563377 • fax: +44 (0)1494 564990 • e-mail: sales@thamesrestek.co.uk

