

Application-Specific LC Phases

**Column Characteristics:**

particle size:	4 µm, spherical
pore size:	110 Å
end-cap:	no
pH range:	2.5 to 8
temperature limit:	80 °C

Pinnacle® II PAH HPLC Columns**Chromatographic Properties**

Developed specifically for challenging analyses of polycyclic aromatic hydrocarbons (PAHs). The Pinnacle® II PAH stationary phase incorporates a proprietary C18 bonding that enables unique shape selectivity to baseline-resolve all 16 PAHs listed in U.S. EPA Method 610 plus two other routinely analyzed PAH compounds. Every lot of Pinnacle® II PAH bonded phase material is tested to ensure baseline resolution of the Method 610 PAHs using a simple water/ acetonitrile mobile phase gradient. Further, because we make Pinnacle® II PAH columns using our own silica, we have greater control over quality and reproducibility. If you are analyzing PAHs using HPLC, Pinnacle® II PAH columns are a reliable, cost-effective choice.

Length	2.1 mm ID cat.#	3.0 mm ID cat.#	4.6 mm ID cat.#
4 µm Columns			
50 mm	9219452	921945E	9219455
100 mm	9219412	921941E	9219415
150 mm	9219462	921946E	9219465
200 mm	9219422	921942E	9219425
250 mm	9219472	921947E	9219475

Pinnacle® II PAH Guard Cartridges

Guard Cartridges	3-pk. (10 x 2.1 mm)	3-pk. (10 x 4.0 mm)
Pinnacle II PAH Guard Cartridge	921950212	921950210

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Pinnacle® DB PAH UHPLC Columns

Chromatographic Properties

Specifically designed to resolve complex mixtures of polycyclic aromatic hydrocarbons (PAHs). Get complete resolution of all 16 EPA 610 PAHs, plus two other routinely analyzed PAH compounds, in less than five minutes to greatly reduce run times and increase sample throughput.



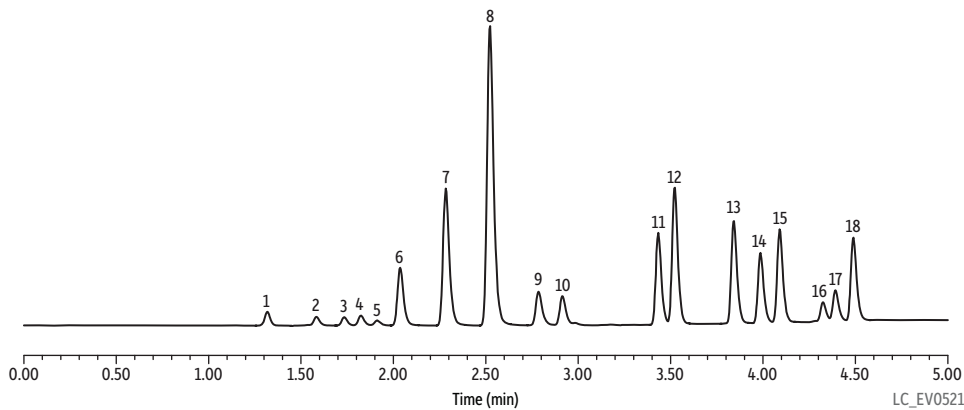
Column Characteristics:

particle size:	1.9 µm, spherical
pore size:	140 Å
end-cap:	no
pH range:	2.5 to 8
temperature limit:	80 °C

Length	2.1 mm ID cat.#
1.9 µm Columns	
30 mm	9470232
50 mm	9470252
100 mm	9470212



PAH Mix on Pinnacle® DB PAH



Column Pinnacle® DB PAH (cat.# 9470252)
Dimensions: 50 mm x 2.1 mm ID
Particle Size: 1.9 µm
Pore Size: 140 Å
Temp.: 30 °C
Sample EPA Method 8310 PAH Mixture (cat.# 31841)
Diluent: acetonitrile
Conc.: 10 µg/mL
Inj. Vol.: 1 µL
Mobile Phase

Time (min)	Flow (mL/min)	%A	%B
0	0.8	60	40
2	0.8	40	60
4	0.8	0	100
4.5	0.8	0	100
4.51	0.8	60	40
5	0.8	60	40

Max Pressure: 724 bar
Detector Photo diode array @ 254, 4.8 nm
Instrument Waters

- Peaks**
1. Naphthalene
 2. Acenaphthylene
 3. 1-Methylnaphthalene
 4. 2-Methylnaphthalene
 5. Acenaphthene
 6. Fluorene
 7. Phenanthrene
 8. Anthracene
 9. Fluoranthene
 10. Pyrene
 11. Benzo[a]anthracene
 12. Chrysene
 13. Benzo[b]fluoranthene
 14. Benzo[k]fluoranthene
 15. Benzo[a]pyrene
 16. Dibenzo[a,h]anthracene
 17. Benzo[ghi]perylene
 18. Indeno[1,2,3-cd]pyrene

Column Characteristics:particle size: 5 μm , spherical

pore size: 60 Å

end-cap: yes

pH range: 2.5 to 8

temperature limit: 80 °C

Allure® AK Columns**Chromatographic Properties**

This highly retentive, highly selective phase—unique to Restek—was developed specifically for the analysis of aldehydes and ketones as DNPH derivatives. Allure® AK is a reversed-phase HPLC material that has the unique ability to separate all 13 carbonyl compounds specified in California Air Resources Board (CARB) Method #1004 using a simple acetonitrile/water gradient. Other columns require long analysis times or the use of tetrahydrofuran.

Length	3.2 mm ID cat.#	4.6 mm ID cat.#
5 μm Columns with Trident Integral Inlet Fittings		
200 mm	9159523-700	9159525-700

Allure® AK Guard Cartridge

Guard Cartridges	3-pk. (10 x 4.0 mm)
Allure AK Guard Cartridge	915950210



Restek Offers a Full Line of Certified Reference Materials

Learn more on **pages 464–465**.

www.restek.com/iso

Allure® Organic Acids Columns

Chromatographic Properties

Allure® Organic Acids columns provide enhanced retention and selectivity for polar organic acids, allowing the separation to be performed on a single 30 cm column. An Allure® Organic Acids column effectively resolves key organic acids such as tartaric and quinic acids using the chromatographic conditions specified in AOAC method 986.13. Retention is stable and reproducible, even with the 100% aqueous mobile phase specified in the AOAC method.

Column Characteristics:

particle size:	5 µm, spherical
pore size:	60 Å
end-cap:	no
pH range:	2.5 to 8
temperature limit:	80 °C

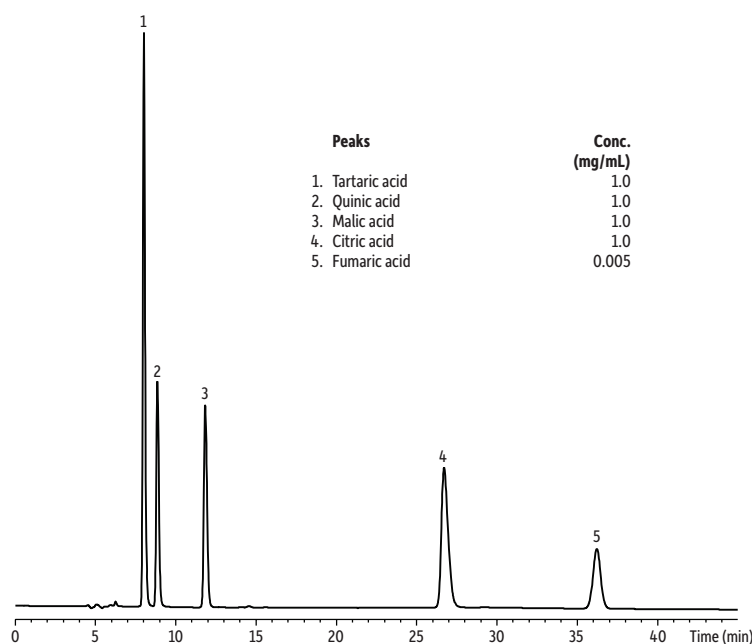
Length	3.0 mm ID cat.#	4.6 mm ID cat.#
5 µm Column		
150 mm	916556E	9165565
250 mm	—	9165575
300 mm	—	9165585



Allure® Organic Acids Guard Cartridges

Guard Cartridges	3-pk. (10 x 2.1 mm)	3-pk. (10 x 4.0 mm)
Allure Organic Acids Guard Cartridge	916550212	916550210

Organic Acids Standard on Allure® Organic Acids



LC_0238

Column Allure® Organic Acids (cat.# 9165585)
Dimensions: 300 mm x 4.6 mm ID
Particle Size: 5 µm
Pore Size: 60 Å
Temp.: ambient
Sample standard solution
Diluent: water
Inj. Vol.: 10.0 µL
Mobile Phase 100 mM phosphate buffer, pH 2.5
Flow: 0.5 mL/min
Detector UV/Vis @ 226 nm

Column Characteristics:

particle size:	3 µm or 5 µm, spherical
pore size:	100 Å
pH range:	2.5 to 8
temperature limit:	80 °C

Ultra Carbamate Columns

Chromatographic Properties

Restek chemists developed the Ultra Carbamate column specifically for carbamates analysis. The unique packing separates 10 target carbamates in just over 10 minutes. The column is compatible with fluorescence or LC-MS detection.* An Ultra Carbamate column can process as many as three samples per hour, versus less than two samples per hour on a general-purpose C18 column. In addition to increased sample throughput, this much faster analysis will significantly reduce solvent usage—and the costs of disposing of solvent waste.

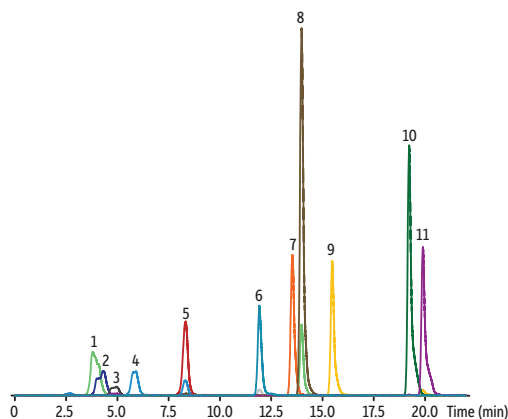
Length	2.1 mm ID cat.#	3.0 mm ID cat.#	4.0 mm ID cat.#	4.6 mm ID cat.#
3 µm Columns				
50 mm	9177352	917735E	9177354	9177355
100 mm	9177312	917731E	—	9177315
5 µm Columns				
250 mm	—	—	—	9177575

*For post-column derivatization/fluorescence detection applications using a 4.6 mm ID column, the total system dead volume, including the post-column reactor, must be less than 650 µL. For standard post-column reactor systems, we recommend a 250 mm x 4.6 mm, 5 µm column. Contact Restek® Technical Service or your local Restek® representative for more information.

Ultra Carbamate Guard Cartridges

Guard Cartridges	3-pk. (10 x 2.1 mm)	3-pk. (10 x 4.0 mm)
Ultra Carbamate Guard Cartridge	917750212	917750210

Carbamates on Ultra Carbamate



- Peaks**
1. Aldicarb sulfone
 2. Aldicarb sulfoxide
 3. Oxamyl
 4. Methomyl
 5. 3-Hydroxycarbofuran
 6. Aldicarb
 7. Propoxur
 8. Carbofuran
 9. Carbaryl
 10. Methiocarb
 11. BDMC (IS)

Column Ultra Carbamate (cat.# 9177352)
Dimensions: 50 mm x 2.1 mm ID
Particle Size: 3 µm
Pore Size: 100 Å
Temp.: ambient
Sample 531.1 Carbamate Pesticide Calibration Mixture (cat.# 32273)
 4-bromo-3,5-dimethylphenyl-N-methylcarbamate (BDMC) (cat.# 32274)
Diluent: methanol
Conc.: 50 µg/mL
Inj. Vol.: 1 µL
Mobile Phase
 A: 2 mM ammonium acetate:methanol (v/v, 90/10)
 B: 2 mM ammonium acetate:methanol (v/v, 10/90)

Time (min)	%A	%B
0.00	80	20
20	0	100
25	0	100

Flow: 0.2 mL/min
Detector LECO Unique® TOFMS
Run Length: 25 min
Ionization Source Type: high flow ESI
Ion Mode: positive
Desolvation Temp.: 130 °C
Nebulizing Pressure: 100 kPa
Desolvation Gas (N₂): 4 L/min
Interface Temp.: 120 °C
Nozzle Voltage: 62 V
Capillary Voltage: 2.75 kV
Instrument Agilent 1100
Acknowledgement LECO Corporation

Ultra Quat Columns

Chromatographic Properties

A retentive, high-purity, base-deactivated, reversed-phase packing. Ideal for the analysis of paraquat and diquat or other quaternary amines.

Length	2.1 mm ID cat.#	4.6 mm ID cat.#
3 µm Column		
50 mm	9181352	—
5 µm Column		
150 mm	—	9181565

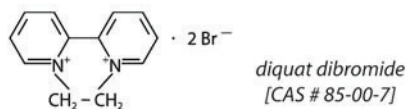
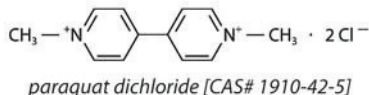
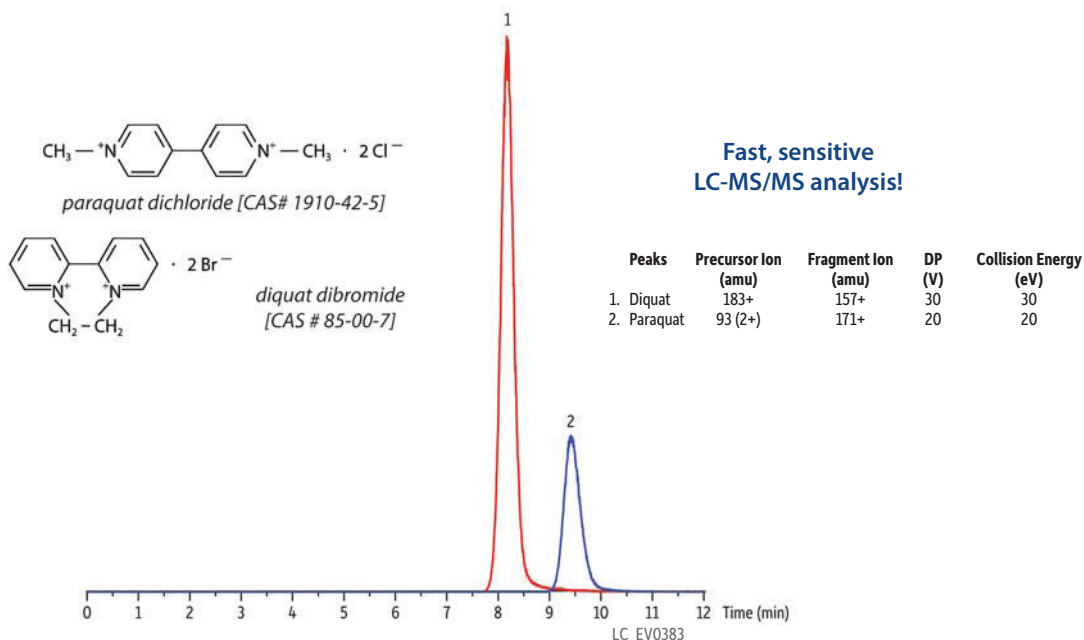
Column Characteristics:

particle size:	3 µm or 5 µm, spherical
pore size:	100 Å
pH range:	2.5 to 8
temperature limit:	80 °C

Ultra Quat Guard Cartridges

Guard Cartridges	3-pk. (10 x 2.1 mm)	3-pk. (10 x 4.0 mm)
Ultra Quat Guard Cartridge	918150212	918150210

Paraquat and Diquat on Ultra Quat



Column Ultra Quat (cat.# 9181352)
Dimensions: 50 mm x 2.1 mm ID
Particle Size: 3 µm
Pore Size: 100 Å
Temp.: ambient
Sample
Diluent: DI Water
Conc.: 5 µg/mL each component
Inj. Vol.: 10 µL
Mobile Phase
Flow: 10 mM heptafluorobutyric acid:acetonitrile (95:5)
Flow: 0.3 mL/min
Detector Applied Biosystems/MDS Sciex LC-MS/MS
Model #: API 3200™ MS/MS system
Ion Source: Electrospray
Ion Mode: ESI+
Ion Spray Voltage: 5.5 kV
Curtain Gas: 15 psi (103.4 kPa)
Gas 1: 70 psi (482.6 kPa)
Gas 2: 60 psi (413.7 kPa)
Source Temp.: 600 °C
Mode: MRM
Dwell Time: 200 ms
Instrument Applied Biosystems/MDS Sciex LC-MS/MS System
Notes Collision exit potential: 3V
 Q1/Q3: unit resolution
Acknowledgement Data courtesy of Houssain El Aribi, Ph.D., LC/MS Product and Application Specialist, MDS SCIEX, 71 Four Valley Drive, Concord, Ontario, Canada, L4K 4V8