

Rtx[®] - XLB

Low Bleed
Capillary Columns



www.restekcorp.com

Ultra-Low-Bleed Rtx®-XLB Columns

- Extremely low bleed, ideal for high-sensitivity GC/MS (stable to 340°C).
- Excellent resolution for semivolatile compounds in water, including environmental pollutants - pesticides - PCBs.
- Proprietary low-polarity phase, similar to DB®-XLB.

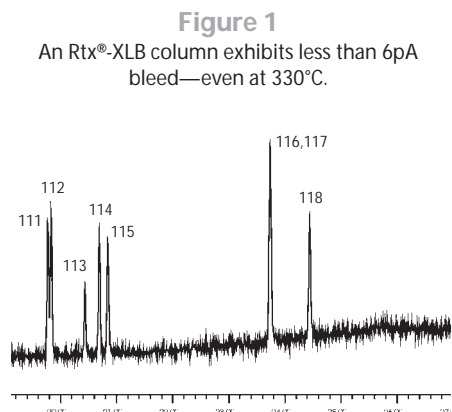
Compared to columns produced through older synthesis technologies, ultra-low-bleed Rtx®-XLB columns help ensure better detection limits and greater instrument stability in semivolatiles analysis. If noisy baselines are keeping you from taking full advantage of your high sensitivity system, or if semivolatile analytes are causing detection or resolution difficulties, an Rtx®-XLB column is your best choice for solving the problem.

Maximize Performance from High-Sensitivity GC/MS Systems

Recent improvements to GC/MS systems design have greatly increased instrument sensitivity. Consequently, column bleed levels that formerly were acceptable now often prevent an analyst from taking full advantage of the capabilities of the system.

To address the growing need for ultra-low-bleed columns, Restek has developed Rtx®-XLB columns. Through a new approach to polymer synthesis, and state-of-the-art tubing deactivation, these columns minimize interference with high temperature analyses of high molecular weight active compounds: our bleed specification for Rtx®-XLB columns is less than 6pA at 340°C!

Figure 1 shows the bleed from an Rtx®-XLB column at 330°C, the ending temperature in US EPA Method 525 analysis of semivolatile pollutants, as observed with an Agilent 6890/5973 GC/MS. Clearly, column bleed is not a factor in this analysis.



Rtx®-XLB 30m, 0.25mm ID, 0.25µm (cat.# 12823)
Sample: US EPA Method 525 standards, 1µL, 2.5ng per analyte on-column
See Figure 2 for conditions.

Semivolatile Pollutants

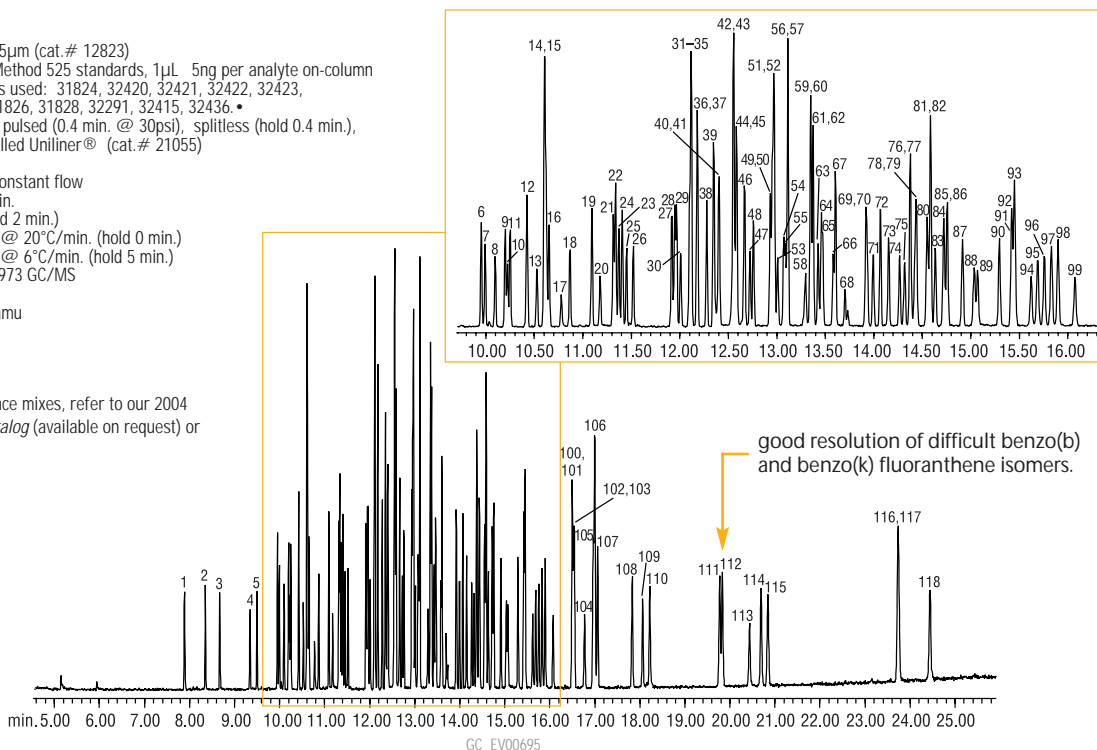
Low Bleed - Excellent Inertness - Isomer Resolution

The new Rtx[®]-XLB stationary phase, in combination with a sensitive GC/MS system, is especially well suited for analyses of high molecular weight active compounds, such as semivolatile environmental pollutants. Analysts using Rtx[®]-XLB columns can achieve low bleed and exceptional sensitivity with on-column concentrations of 5ng, as Figure 2 shows, or less. Figure 2 also shows that Rtx[®]-XLB columns offer excellent resolution of isomer pairs such as benzo(b)fluoranthene and benzo(k)fluoranthene, peaks 111 and 112.

Figure 2
Excellent inertness and selectivity for semivolatile pollutants at 5ng on-column.

Rtx[®]-XLB 30m, 0.25mm ID, 0.25 μ m (cat.# 12823)
 Sample: US EPA Method 525 standards, 1 μ L 5ng per analyte on-column
 standards used: 31824, 32420, 32421, 32422, 32423, 31825, 31826, 31828, 32291, 32415, 32436.
 Inj.: pressure pulsed (0.4 min. @ 30psi), splitless (hold 0.4 min.), 4mm Drilled Uniliner[®] (cat.# 21055)
 Inj. Temp.: 300°C
 Carrier Gas: helium, constant flow
 Flow Rate: 1.0mL/min.
 Oven Temp.: 35°C (hold 2 min.)
 to 260°C @ 20°C/min. (hold 0 min.)
 to 330°C @ 6°C/min. (hold 5 min.)
 Det: Agilent 5973 GC/MS
 Transfer Line Temp.: 280°C
 Scan Range: 45–550 amu
 Solvent Delay: 4.7 min.
 Tune: DFTPP

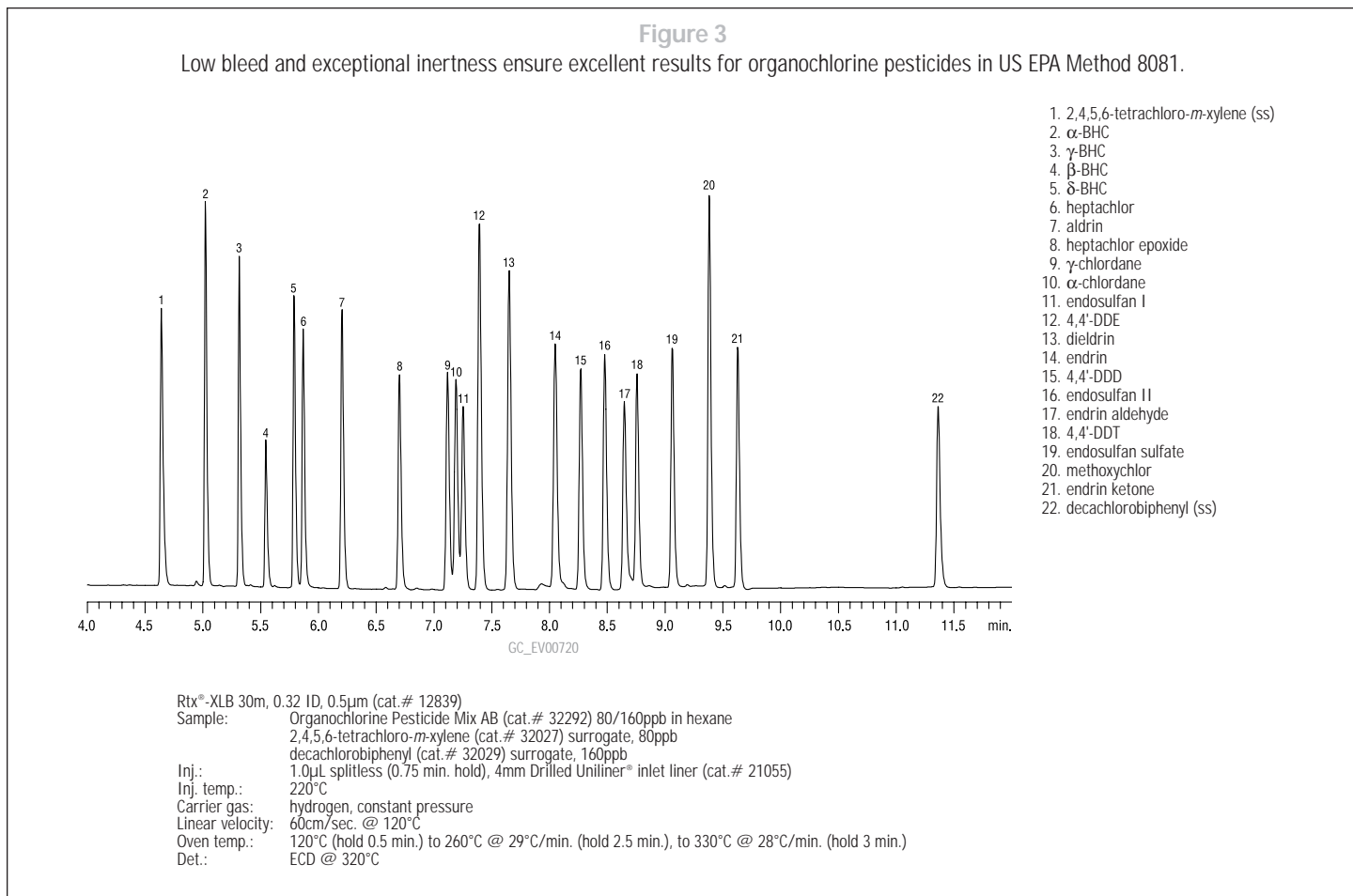
• For information about reference mixes, refer to our 2004 *Chromatography Supplies Catalog* (available on request) or visit www.restekcorp.com



- | | | | | |
|---|-------------------------------------|---|--|--|
| 1. isophorone | 26. chlorpropham | 50. prometryne | 72. butachlor | 96. 4,4'-DDT |
| 2. 2-nitro- <i>m</i> -xylene | 27. 2,3-dichlorobiphenyl (BZ#5) | 51. ametryn | 73. stirofos (tetrachlorvinphos) | 97. triphenylphosphate |
| 3. dichlorvos | 28. atraton | 52. simetryn | 74. fenamiphos | 98. hexazinone |
| 4. hexachlorocyclopentadiene | 29. prometon | 53. δ -BHC | 75. α -chlordane | 99. endosulfan sulfate |
| 5. EPTC | 30. α -BHC | 54. heptachlor | 76. napropamide | 100. bis(2-ethylhexyl)phthalate |
| 6. butylate | 31. hexachlorobenzene | 55. chlorothalonil | 77. γ -chlordane | 101. methoxychlor |
| 7. mevinphos | 32. propazine | 56. di- <i>n</i> -butylphthalate | 78. endosulfan I | 102. 2,2',3,3',4,5',6,6'-octachlorobiphenyl (BZ#207) |
| 8. vernolate | 33. simazine | 57. terbutryn | 79. <i>trans</i> -nonachlor | 103. 2,2',3,3',4,4',6-heptachlorobiphenyl (BZ#171) |
| 9. pebulate | 34. atrazine | 58. bromacil | 80. pyrene-d10 | 104. endrin ketone |
| 10. etridiazole (Terrazole [®]) | 35. metribuzin | 59. chlorpyrifos | 81. pyrene | 105. benzo(a)anthracene |
| 11. dimethylphthalate | 36. diazinon | 60. metolachlor | 82. 4,4'-DDE | 106. chrysene-d12 |
| 12. acenaphthylene | 37. terbufos | 61. DCPA methyl ester (Dacthal [™]) | 83. 2,2',4,4',5,6'-hexachlorobiphenyl (BZ#154) | 107. chrysene |
| 13. 2,6-dinitrotoluene | 38. pronamide | 62. 2,2',4,4'-tetrachlorobiphenyl (BZ#47) | 84. <i>p</i> -terphenyl-d14 | 108. fenarimol |
| 14. acenaphthene-d10 | 39. pentachlorophenol | 63. aldrin | 85. dieldrin | 109. <i>cis</i> -permethrin |
| 15. 2-chlorobiphenyl (BZ#1) | 40. β -BHC | 64. triadimefon | 86. carboxin | 110. <i>trans</i> -permethrin |
| 16. chloroneb | 41. disulfoton | 65. cyanazine (Bladex) | 87. chlorbenzilate | 111. benzo(b)fluoranthene |
| 17. tebutiuron | 42. terbacil | 66. MGK-264 | 88. tricyclazole | 112. benzo(k)fluoranthene |
| 18. molinate | 43. phenanthrene-d10 | 67. diphenamid | 89. endrin | 113. fluridone (Sonar [™]) |
| 19. diethyl phthalate | 44. methyl parathion OA | 68. merphos | 90. 4,4'-DDD | 114. benzo(a)pyrene |
| 20. 2,4-dinitrotoluene | 45. phenanthrene | 69. 2,2',3',4,6-pentachlorobiphenyl (BZ#98) | 91. bis(2-ethylhexyl)adipate | 115. perylene-d12 |
| 21. propachlor | 46. anthracene | 70. heptachlor epoxide (isomer B) | 92. butyl benzyl phthalate | 116. dibenzo(a,h)anthracene |
| 22. fluorene | 47. γ -BHC (lindane) | 71. heptachlor epoxide (isomer A) | 93. endosulfan II | 117. indeno(1,2,3-cd)pyrene |
| 23. ethoprop | 48. 2,4,5-trichlorobiphenyl (BZ#29) | | 94. endrin aldehyde | 118. benzo(ghi)perylene |
| 24. cycloate | 49. alachlor | | 95. norflurazon | |

Excellent Choice for Organochlorine Pesticides

In many environmental and food laboratories, samples are analyzed for organochlorine pesticides using highly sensitive electron capture detectors (ECDs). In order to take full advantage of the detector's sensitivity, the analytical column must exhibit low bleed, to minimize background noise, and exceptional inertness, to prevent loss of labile pesticides, in addition to the selectivity necessary to separate complex mixtures. Low bleed and excellent inertness make an Rtx®-XLB column the perfect choice for this application. Figure 3 and Figure 4 (overside) show an Rtx®-XLB column will separate complex mixtures of organochlorine pesticides. Table I lists retention times for the extended list of analytes.



HOT Tip!

In combination with an Rtx®-XLB column, a few simple adjustments to injection conditions can greatly improve sensitivity for active and high molecular weight target compounds:

* By eliminating contact between the sample and the hot metal surfaces in the injection port, a Drilled Uniliner® inlet liner prevents analytes from degrading in the injection port. For information about Drilled Uniliner® inlet liners, request lit. cat. # 59877, or refer to our current chromatography supplies catalog.

* Pulsed injection also helps minimize breakdown, by reducing the time the analytes spend in the injection port. A 30psi/0.5 min. pulse was used to obtain Figure 2. To avoid breaking the seal between the column and a Drilled Uniliner® inlet liner, do not exceed 50psi.

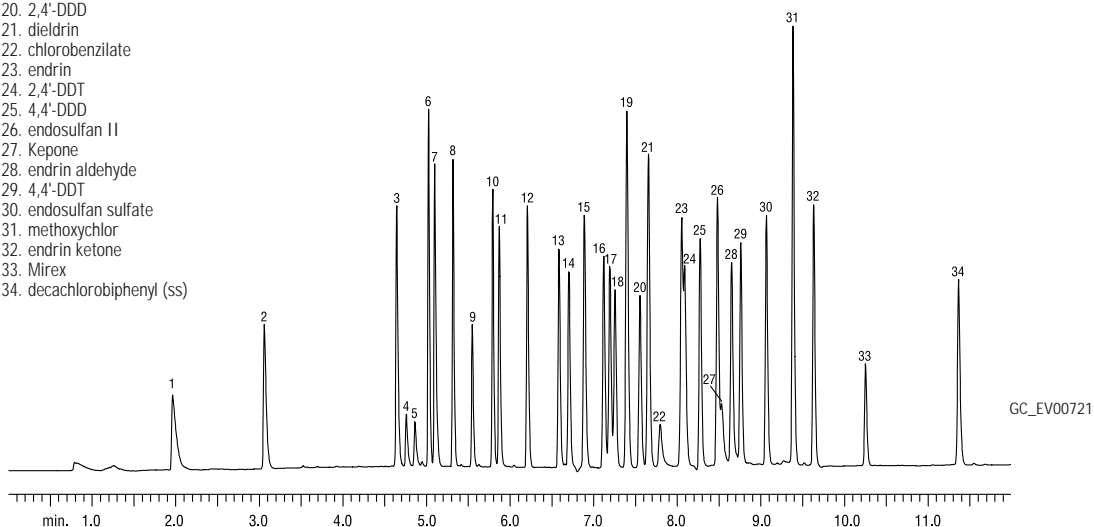
* When analyzing semivolatiles compounds, a 35°C initial temperature helps ensure sharp, symmetric peaks for early-eluting analytes (Figure 2).

Resolve Complex Mixtures of Organochlorine Pesticides

Figure 4

Complex mix of organochlorine pesticides resolved on an Rtx®-XLB column.

- | | |
|---|-----------------------------|
| 1. 1,2-dibromo-3-chloropropane | 19. 4,4'-DDE |
| 2. hexachlorocyclopentadiene | 20. 2,4'-DDD |
| 3. 2,4,5,6-tetrachloro- <i>m</i> -xylene (ss) | 21. dieldrin |
| 4. <i>cis</i> -diallate | 22. chlorobenzilate |
| 5. <i>trans</i> -diallate | 23. endrin |
| 6. α-BHC | 24. 2,4'-DDT |
| 7. hexachlorobenzene | 25. 4,4'-DDD |
| 8. γ-BHC | 26. endosulfan II |
| 9. β-BHC | 27. Kepone |
| 10. δ-BHC | 28. endrin aldehyde |
| 11. heptachlor | 29. 4,4'-DDT |
| 12. aldrin | 30. endosulfan sulfate |
| 13. isodrin | 31. methoxychlor |
| 14. heptachlor epoxide | 32. endrin ketone |
| 15. 2,4'-DDE | 33. Mirex |
| 16. γ-chlordane | 34. decachlorobiphenyl (ss) |
| 17. α-chlordane | |
| 18. endosulfan I | |



Rtx®-XLB 30m, 0.32mm ID, 0.5µm (cat.# 12839)
 Sample: 8081A pesticides, 80-160ppb in hexane
 Inj.: 1.0µL splitless (hold 0.75 min.), 4mm Drilled Uniliner® inlet liner (cat.# 21055)
 Inj. temp.: 220°C
 Carrier gas: hydrogen, constant pressure
 Linear velocity: 60cm/sec. @ 120°C
 Oven temp.: 120°C (hold 0.5 min.) to 260°C @ 29°C/min. (hold 2.5 min.),
 to 330°C @ 28°C/min. (hold 3 min.)
 Det.: ECD @ 320°C

Sample Components
 8081A Pesticides/Surrogates (cat.# 32292)
 8080 Organochlorine Pesticide Mix AB #2 (20 components) (cat.# 32295)
 8081a Organochlorine Pesticide Mix C #2 (7 components) (cat.# 32200)
 2,4'-DDT (cat.# 32098)
 2,4'-DDD (cat.# 32099)
 2,4'-DDE (custom)
 Kepone (custom)
 Mirex (cat.# 32027)
 2,4,5,6-tetrachloro-*m*-xylene (ss, 20ppb) (cat.# 32029)
 decachlorobiphenyl (ss, 40ppb) (cat.# 32029)

Table 1

Retention times for extended list of organochlorine pesticides on an Rtx®-XLB column.

| Pesticide | Retention Time (min.) | Pesticide | Retention Time (min.) | Pesticide | Retention Time (min.) |
|--|-----------------------|--------------------|-----------------------|-------------------------|-----------------------|
| 1,2-dibromo-3-chloropropane | 1.96 | heptachlor | 5.87 | dieldrin | 7.65 |
| hexachlorocyclopentadiene | 3.06 | aldrin | 6.21 | chlorobenzilate | 7.80 |
| 2,4,5,6-tetrachloro- <i>m</i> -xylene (ss) | 4.64 | isodrin | 6.58 | endrin | 8.05 |
| <i>cis</i> -diallate | 4.76 | heptachlor epoxide | 6.70 | 2,4'-DDT | 8.09 |
| <i>trans</i> -diallate | 4.86 | 2,4'-DDE | 6.89 | 4,4'-DDD | 8.27 |
| α-BHC | 5.02 | γ-chlordane | 7.12 | endosulfan II | 8.48 |
| hexachlorobenzene | 5.10 | α-chlordane | 7.19 | Kepone | 8.53 |
| γ-BHC | 5.32 | endosulfan I | 7.26 | endrin aldehyde | 8.65 |
| β-BHC | 5.55 | 4,4'-DDE | 7.40 | 4,4'-DDT | 8.76 |
| δ-BHC | 5.79 | 2,4'-DDD | 7.55 | endosulfan sulfate | 9.07 |
| | | | | methoxychlor | 9.38 |
| | | | | endrin ketone | 9.63 |
| | | | | Mirex | 10.25 |
| | | | | decachlorobiphenyl (ss) | 11.36 |

Rtx®-XLB 30m, 0.32mm ID, 0.5µm (cat.# 12839)
 Sample: US EPA Method 8081A pesticides, 80-160ppb in hexane
 Inj.: 1.0µL splitless (hold 0.75 min.), 4mm Drilled Uniliner® inlet liner (cat.# 21055)
 Inj. temp.: 220°C
 Carrier gas: hydrogen, constant pressure
 Linear velocity: 60cm/sec. @ 120°C
 Oven temp.: 120°C (hold 0.5 min.) to 260°C @ 29°C/min. (hold 2.5 min.), to 330°C @ 28°C/min. (hold 3 min.)
 Det.: ECD @ 320°C

Product Listing



Rtx®-XLB Columns (fused silica)

(proprietary low-polarity phase)

| ID | df (µm) | temp. limits* | 15-Meter | 30-Meter | 60-Meter |
|--------|---------|-----------------|----------|----------|----------|
| 0.25mm | 0.10 | 30 to 340/360°C | | 12808 | |
| | 0.25 | 30 to 340/360°C | 12820 | 12823 | 12826 |
| | 0.50 | 30 to 340/360°C | | 12838 | |
| | 1.00 | 30 to 340/360°C | 12850 | 12853 | |
| 0.32mm | 0.10 | 30 to 340/360°C | | 12809 | |
| | 0.25 | 30 to 340/360°C | 12821 | 12824 | 12827 |
| | 0.50 | 30 to 340/360°C | | 12839 | |
| | 1.00 | 30 to 340/360°C | | 12854 | |
| 0.53mm | 1.50 | 30 to 340/360°C | 12867 | 12870 | |
| ID | df (µm) | temp. limits | 12-Meter | 20-Meter | 25-Meter |
| 0.18mm | 0.18 | 30 to 340/360°C | | 42802 | |
| 0.20mm | 0.33 | 30 to 340/360°C | 42815 | | 42820 |

*Maximum temperatures listed are for 15- and 30-meter lengths. Longer lengths may have a slightly reduced maximum temperature.

EZ No-Vent™ GC Column-Mass Spectrometer Connector



Change columns in minutes—without venting!

| Description | qty. | cat.# |
|---|-------|-------|
| EZ No-Vent™ Connector Kit for Agilent 5971/5972 and 5973 GC/MS Kit includes: EZ No-Vent™ Connector, two 0.4mm ID ferrules for capillary column, two 0.4mm ID ferrules for transfer line, 100µm deactivated transfer line (3 ft.), column plug, column nut. | kit | 21323 |
| Replacement ferrules for connecting capillary column to EZ No-Vent™: 0.4mm ID | 2-pk. | 21015 |
| 0.5mm ID | 2-pk. | 21016 |
| Replacement ferrules for connecting transfer line to EZ No-Vent™: 0.4mm ID | 2-pk. | 21043 |
| Replacement 100µm deactivated transfer line | 3 ft. | 21018 |
| Replacement EZ No-Vent™ Column Nut | 5-pk. | 21900 |
| Replacement EZ No-Vent™ Plug | 2-pk. | 21915 |
| Open-End Wrenches (1/4" x 5/16") | 2-pk. | 20110 |

For reference standards, please visit our website, www.restekcorp.com

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