Rtx®-XLB

Low Bleed Capillary Columns

Lit. Cat.# 59957-INT

RESTEK

20 YEARS

Turning Visions into Reality™

www.restek.com

Ultra-Low-Bleed Rtx®-XLB Columns

- Extremely low bleed, ideal for high-sensitivity GC/MS (stable to 340oC).
- 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.

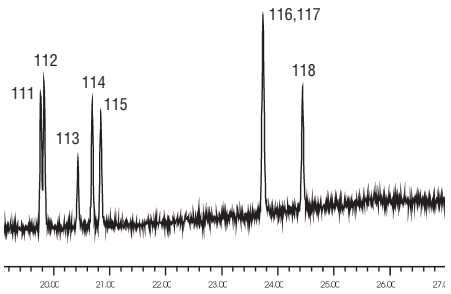
Maximize Performance from High-Sensitivity GC/MS Systems

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.

Figure 1 An Rtx®-XLB column exhibits less than 6pA bleed—even at 330°C.



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.

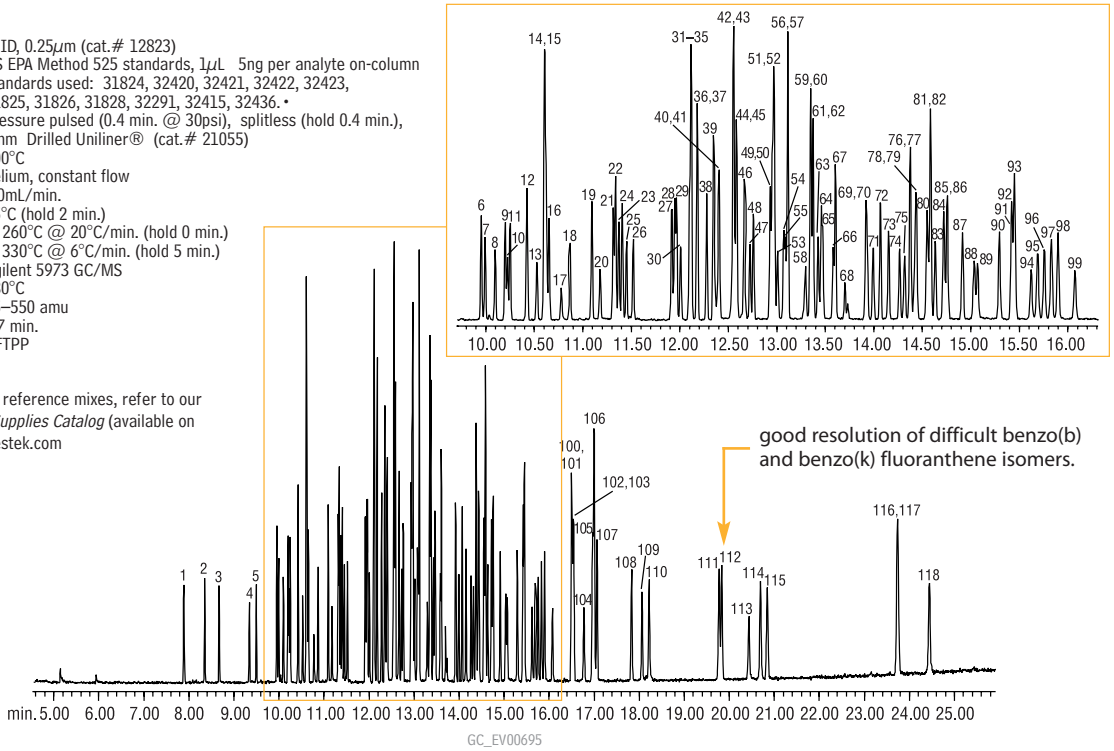
Low Bleed - Excellent Inertness - Isomer Resolution

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, 0.25µm (cat.# 12823)	
Sample:	US EPA Method 525 standards, 1µL 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 2006 *Chromatography Supplies Catalog* (available on request) or visit www.restek.com

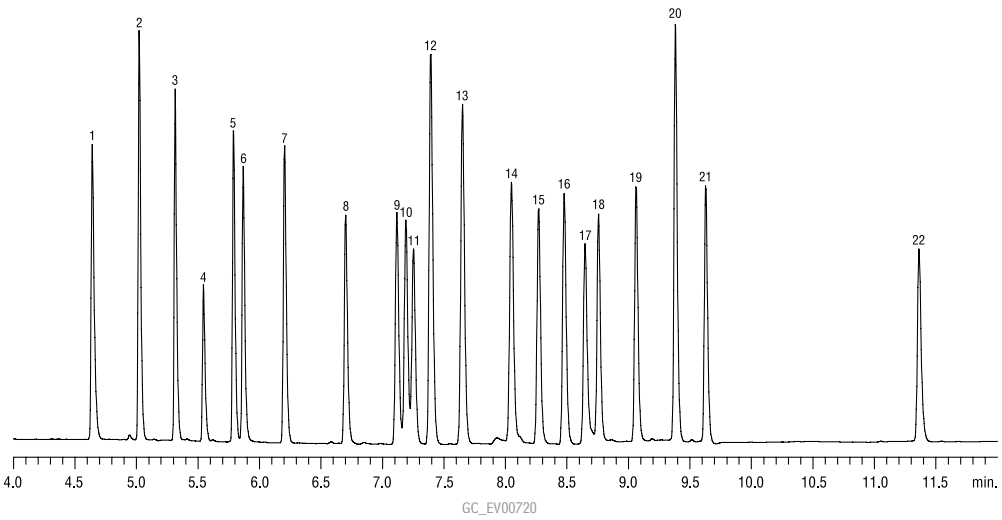


1. isophorone
2. 2-nitro-*m*-xylene
3. dichlorvos
4. hexachlorocyclopentadiene
5. EPTC
6. butylate
7. mevinphos
8. vernolate
9. pebulate
10. etridiazole (Terrazole®)
11. dimethylphthalate
12. acenaphthylene
13. 2,6-dinitrotoluene
14. acenaphthene-d10
15. 2-chlorobiphenyl (BZ#1)
16. chloroneb
17. tebuthiuron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

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.

Figure 3 Low bleed and exceptional inertness ensure excellent results for organochlorine pesticides in US EPA Method 8081.



1. 2,4,5,6-tetrachloro-*m*-xylene (ss)
2. α-BHC
3. γ-BHC
4. β-BHC
5. δ-BHC
6. heptachlor
7. aldrin
8. heptachlor epoxide
9. γ-chlordane
10. α-chlordane
11. endosulfan I
12. 4,4'-DDE
13. dieldrin
14. endrin
15. 4,4'-DDD
16. endosulfan II
17. endrin aldehyde
18. 4,4'-DDT
19. endosulfan sulfate
20. methoxychlor
21. endrin ketone
22. decachlorobiphenyl (ss)

Rtx®-XLB 30m, 0.32 ID, 0.5μm (cat.# 12839)

Sample:	Organochlorine Pesticide Mix AB (cat.# 32292) 80/160ppb in hexane 2,4,5,6-tetrachloro-*m*-xylene (cat.# 32027) surrogate, 80ppb decachlorobiphenyl (cat.# 32029) surrogate, 160ppb
Inj.:	1.0μL splitless (0.75 min. hold), 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

tech 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:

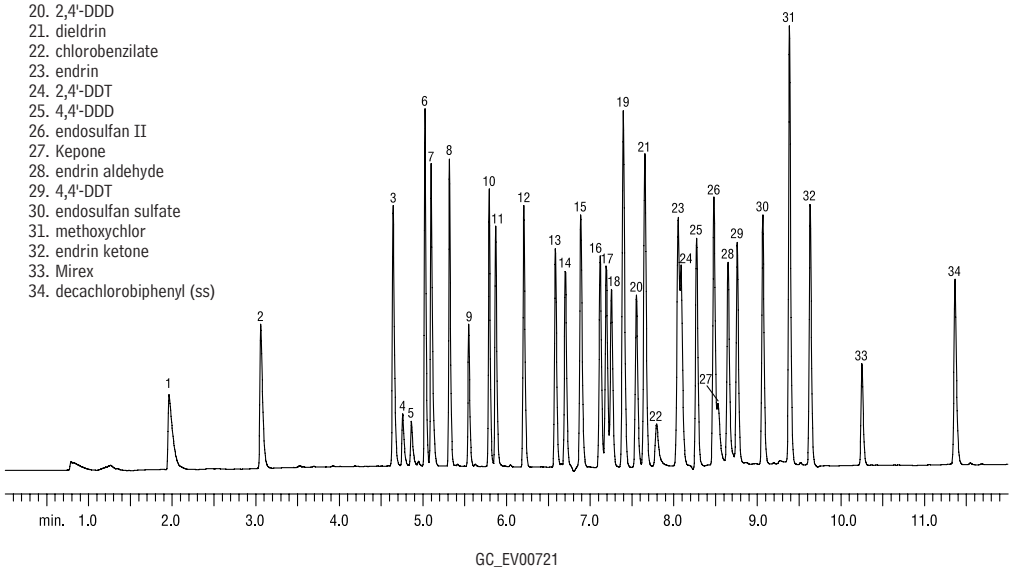
* By eliminating contact between the sample and the hot metal surfaces in the injection port, a Drilled Uniliner® inlet liner prevents analytes from degrading in the injection port. For information about Drilled Uniliner® inlet liners, request lit. cat. # 59877, or refer to our current chromatography 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 semivolatile compounds, a 35ºC initial temperature helps ensure sharp, symmetric peaks for early-eluting analytes (Figure 2).

Figure 4 Complex mix of organochlorine pesticides resolved on an Rtx®-XLB column.

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



GC_EV00721

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	
8080 Organochlorine Pesticide Mix AB #2 (20 components)	(cat.# 32292)
8081a Organochlorine Pesticide Mix C #2 (7 components)	(cat.# 32295)
2,4'-DDT	(cat.# 32200)
2,4'-DDD	(cat.# 32098)
2,4'-DDE	(cat.# 32099)
Kepone	(custom)
Mirex	(custom)
2,4,5,6-tetrachloro-*m*-xylene (ss, 20ppb)	(cat.# 32027)
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-*m*-xylene (ss)	4.64	isodrin	6.58	endrin	8.05
cis-diallate	4.76	heptachlor epoxide	6.70	2,4'-DDT	8.09
trans-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

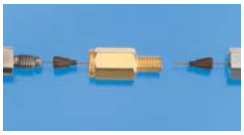
Product Listing

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.



Change columns in minutes—without venting!

EZ No-Vent™ GC Column-Mass Spectrometer Connector

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.restek.com***