Increase Lab Efficiency with an Expanded Trace-Level Semivolatiles Method

Exceptionally Inert RMX-5Sil MS Columns Let You Meet Data Quality Objectives for a Wider Range of Compounds

By Erica Pack, Chris English, Ramkumar Dhandapani, Colton Myers

- Groundbreaking TriMax deactivation creates a robust and exceptionally inert sample flow path for 150 compounds, including acids, bases, and neutrals.
- Maximum inertness improves peak shape for a wide range of semivolatiles, allowing method consolidation and picogram-level sensitivity.
- More flexibility—implement our method for 150 semivolatiles or optimize conditions for your own analyte list in seconds with Restek's free *EZ*GC chromatogram modeler.

Semivolatiles analysis is a cornerstone application in environmental testing laboratories around the world. Because semivolatiles vary extensively in compound chemistry and reactivity, they are often analyzed on different columns, which means valuable productivity gains can be made if methods can be consolidated onto a single column. However, successful method consolidation hinges on the effectiveness of the GC column deactivation, and traditional deactivations tend to work well for some compound classes but not for others. Restek has developed a next-generation TriMax deactivation technology that is applied to all RMX columns and has been proven to be broadly effective, outperforming even premium competitor columns [1].

A recent study showed that RMX-5Sil MS columns produced more symmetrical peak shapes across a wider range of semivolatile classes, which resulted in more compounds meeting data requirements for linearity and recovery [2]. The current application expands on that foundational work by optimizing analytical conditions and extending the target compound list to 150 commonly analyzed semivolatiles, including internal standards and surrogates (Figure 1). As shown in Figure 2, excellent chromatographic results were obtained at trace levels (0.1-10 pg on-column) for semivolatiles across all compound classes, including reactive acidic (pentachlorophenol, 2,4-dinitrophenol) and basic (pyridine, benzidine) compounds that often have data quality requirements for system suitability. In addition, the RMX-5Sil MS column adequately separated neutral polycyclic aromatic hydrocarbons that are difficult to resolve (benzo[b] and [k]fluoroanthene).

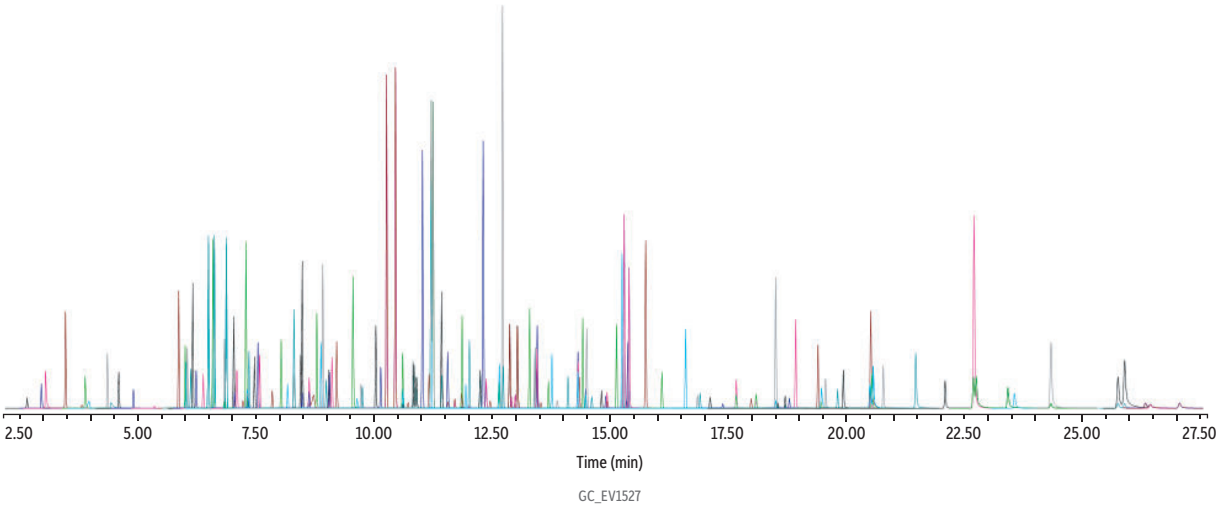
While this consolidated trace-level semivolatiles method demonstrates the effectiveness of an RMX-5Sil MS column across an extensive list of 150 frequently analyzed semivolatiles (cat.# 31907), labs can further adapt it to their needs using free *EZ*GC chromatogram modeling software to instantly create optimized methods for their own specific analyte lists and preferred column dimensions.

Want to customize a method?

Enter your target analytes into Restek's free Pro *EZ*GC chromatogram modeling software and instantly generate optimized method conditions for your specific compound list.

Try it now!

Figure 1: Expanded Trace-Level Semivolatiles Method for 150 Semivolatiles, Surrogates, and Internal Standards at 100 ppb (10 pg On-Column)



Column	RMX-5Sil MS, 30 m, 0.25 mm ID, 0.25 µm (cat.# 17323)
Standard/Sample	
	SVOC MegaMix 150 kit (cat.# 31907)
	Revised SV internal standard mix (cat.# 31886)
	Base neutral surrogate mix (4/89 SOW) (cat.# 31024)
	Acid surrogate mix (4/89 SOW) (cat.# 31025)
Diluent:	Dichloromethane
Conc.:	100 ppb
Injection	
Inj. Vol.:	1 µL split (split ratio 10:1)
Liner:	Topaz 4.0 mm ID Precision liner w/wool (cat.# 23267)
Inj. Temp.:	280 °C
Split Vent Flow Rate:	12 mL/min

Oven	
Oven Temp.:	40 °C (hold 1 min) to 280 °C at 12 °C/min to 310 °C at 3 °C/min (hold 1 min)
Carrier Gas	He, constant flow
Flow Rate:	1.2 mL/min @ 40 °C
Detector	SRM/MRM
Source Temp.:	330 °C
Transfer Line Temp.:	280 °C
Analyzer Type:	Triple Quadrupole
Ionization Mode:	EI
Collision Gas:	Ar
Tune Type:	PFTBA
Tune Emission Current:	70 µA
Instrument	Thermo Scientific TSQ 8000 Triple Quadrupole GC-MS
Sample Preparation	Standards were combined and diluted to a concentration of 100 ppb.

Peaks	t_R (min)	Conc. (ng/mL)	Mass 1	Product 1	Collision energy 1	Mass 2	Product 2	Collision energy 2
1. 1,4-Dioxane	2.71	10	58	28	6	88	28	14
2. N-Nitrosodimethylamine	3.02	10	74	44	6	74	42	16
3. Pyridine	3.08	10	79	52	12	52	26	18
4. Ethyl methacrylate	3.51	10	69	41	6	99	43	14
5. 2-Picoline	3.91	10	93	66	12	93	65	18
6. N-Nitrosomethylethylamine	4	10	88	71	6	88	42	16
7. Methyl methanesulfonate	4.39	10	80	65	8	80	48	28
8. Acrylamine	4.44	10	71	55	6	71	44	22
9. 2-Fluorophenol	4.62	10	112	92	6	92	63	14
10. N-Nitrosodiethylamine	4.94	10	102	85	6	102	44	10
11. Ethyl methanesulfonate	5.38	10	109	45	10	109	79	6
12. Benzaldehyde	5.88	10	105	77	10	105	51	26
13. Phenol-d6	6.02	10	99	71	8	71	42	16
14. Phenol	6.04	10	94	66	10	94	39	30
15. Aniline	6.07	10	93	66	10	93	65	20
16. Pentachloroethane	6.14	10	167	132	14	167	95	32
17. bis-(2-Chloroethyl)ether	6.18	10	93	63	6	63	27	10
18. 2-Chlorophenol	6.25	10	128	64	14	128	63	24
19. Decane	6.4	10	85	43	6	71	43	6
20. 1,3-Dichlorobenzene	6.51	10	146	111	14	146	75	24
21. 1,4-Dichlorobenzene-d4	6.61	10	150	115	14	150	76	38
22. 1,4-Dichlorobenzene	6.63	10	146	111	14	146	75	24
23. Benzyl alcohol	6.85	10	108	79	12	108	77	24
24. 1,2-Dichlorobenzene	6.89	10	146	111	12	111	50	36
25. Indene	7.05	10	115	89	16	116	89	28
26. 2-Methylphenol	7.06	10	108	80	8	108	77	24
27. 2,2'-oxybis(1-chloropropane)	7.11	10	121	45	6	77	51	14
28. N-Nitrosopyrrolidine	7.28	10	100	43	8	100	55	6
29. Acetophenone	7.31	10	105	77	12	105	51	26
30. 3- and 4-Methylphenol	7.33	10	70	43	6	107	77	26
31. N-Nitrosomorpholine	7.331	10	116	86	6	116	56	10
32. o-Toluidine	7.37	10	106	79	8	107	77	26
33. Hexachloroethane	7.49	10	201	166	12	201	131	30
34. Nitrobenzene-d5	7.57	10	128	82	12	82	54	12
35. Nitrobenzene	7.62	10	123	77	10	123	51	30
36. N-Nitrosopiperidine	7.88	10	114	84	6	114	97	6
37. Isophorone	8.05	10	138	82	8	82	54	6

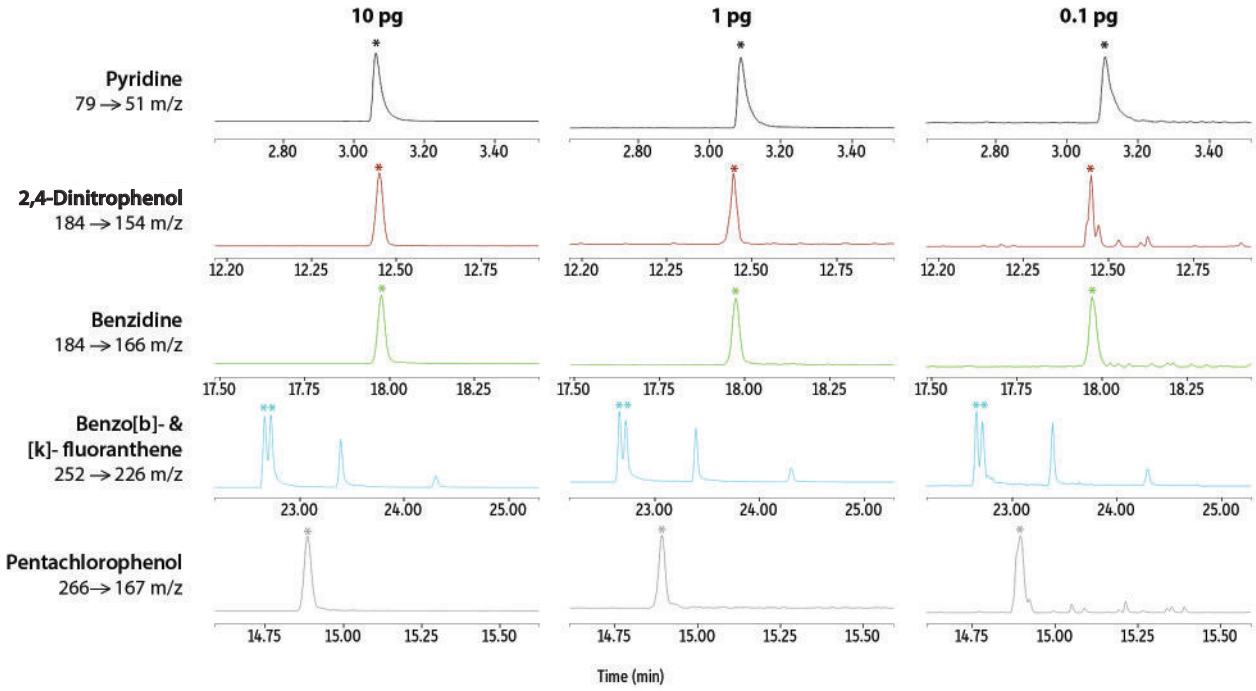
Figure 1: (continued)

Peaks	t_R (min)	Conc. (ng/mL)	Mass 1	Product 1	Collision energy 1	Mass 2	Product 2	Collision energy 2
38. 2-Nitrophenol	8.19	10	139	109	8	139	81	12
39. Benzoic acid	8.31	10	122	77	20	105	77	10
40. 2,4-Dimethylphenol	8.32	10	122	107	12	122	77	26
41. O,O,O-Triethyl phosphorothioate	8.46	10	121	65	10	198	114	12
42. Bis(2-chloroethoxy)methane	8.5	10	63	27	12	93	63	6
43. 2,4-Dichlorophenol	8.64	10	98	63	8	162	98	12
44. Phentermine	8.78	10	58	42	22	134	91	20
45. 1,2,4-Trichlorobenzene	8.8	10	180	145	12	180	109	24
46. Naphthalene-d8	8.89	10	136	134	14	136	84	20
47. Naphthalene	8.92	10	128	102	16	129	103	14
48. α-Terpineol	9	10	136	121	8	136	93	10
49. 4-Chloroaniline	9.06	10	127	100	10	127	65	20
50. 2,6-Dichlorophenol	9.07	10	162	126	8	164	63	26
51. Hexachloropropene	9.12	10	213	119	18	215	119	18
52. Hexachlorobutadiene	9.21	10	225	190	14	260	190	26
53. Quinoline	9.56	10	129	102	16	129	76	26
54. Caprolactam	9.65	10	113	85	6	113	56	10
55. 1,4-Phenylenediamine	9.73	10	108	81	10	108	80	20
56. N-Nitrosodibutylamine	9.76	10	116	99	6	116	74	8
57. 4-Chloro-3-methylphenol	10.05	10	142	107	12	142	77	26
58. Isosafrole I	10.14	10	131	103	8	162	104	12
59. 2-Methylnaphthalene	10.27	10	141	115	16	141	89	30
60. 1-Methylnaphthalene	10.46	10	141	115	16	141	89	30
61. 1,2,4,5-Tetrachlorobenzene	10.61	10	216	181	14	216	108	36
62. Hexachloropentadiene	10.62	10	272	237	12	237	143	22
63. 2,3-Dichloroaniline	10.83	10	161	90	16	163	90	18
64. 2,4,6-Trichlorophenol	10.85	10	132	97	10	196	97	24
65. 2,4,5-Trichlorophenol	10.95	10	132	97	10	196	97	24
66. 2-Fluorobiphenyl	11.03	10	172	171	12	172	170	22
67. 2-Chloronaphthalene	11.15	10	162	127	16	162	77	30
68. Isosafrole II	11.17	10	131	103	10	162	104	12
69. Safrole	11.2	10	162	127	16	131	103	10
70. Biphenyl	11.21	10	154	152	22	153	126	32
71. 1-Chloronaphthalene	11.25	10	162	127	16	127	77	16
72. o-Nitroaniline	11.43	10	138	92	12	138	65	22
73. Diphenyl ether	11.43	10	170	142	10	141	115	14
74. 1,4-Naphthoquinone	11.57	10	158	130	8	158	102	14
75. 1,2-Dinitrobenzene	11.86	10	122	75	12	168	75	20
76. 1,3-Dinitrobenzene	11.87	10	168	75	20	76	50	10
77. Diphenyl phthalate	11.87	10	163	133	8	163	77	20
78. 1,6-Dinitrotoluene	11.95	10	165	148	8	165	63	20
79. 1,4-Dinitrobenzene	12.01	10	168	51	14	76	63	6
80. Acenaphthylene	12.02	10	152	126	24	152	76	36
81. 3-Nitroaniline	12.25	10	92	65	8	138	65	20
82. Acenaphthene-d10	12.32	10	164	162	14	164	160	32
83. Acenaphthene	12.37	10	153	126	36	153	77	38
84. 2,4-Dinitrophenol	12.46	10	184	154	6	184	107	10
85. 4-Nitrophenol	12.65	10	139	109	6	139	81	14
86. Pentachlorobenzene	12.66	10	250	215	16	250	142	38
87. Dibenzofuran	12.73	10	168	139	22	139	63	30
88. 2,4-Dinitrotoluene	12.74	10	165	119	6	165	63	22
89. 1-Naphthylamine	12.88	10	143	116	10	143	115	22
90. 2,3,5,6-Tetrachlorophenol	12.91	10	232	168	12	234	133	26
91. 2,3,4,6-Tetrachlorophenol	13	10	232	168	12	234	131	24
92. 2-Naphthylamine	13.03	10	143	116	10	143	115	22
93. Diethyl Phthalate	13.3	10	177	149	8	149	65	20
94. Hexadecane	13.41	10	85	43	6	99	41	14
95. Fluorene	13.41	10	165	139	26	167	166	14
96. Zinophos	13.45	10	143	79	10	107	52	20
97. 5-Nitro-o-toluidine	13.45	10	152	106	10	152	77	24
98. 4-Nitroaniline	13.46	10	138	108	8	138	80	18
99. 4-Chlorophenyl phenyl ether	13.46	10	204	77	22	141	115	14
100. 4,6-Dinitro-2-methylphenol	13.54	10	198	168	6	198	121	10
101. Diphenylamine	13.7	10	169	66	22	169	77	30
102. Azobenzene	13.76	10	182	105	6	182	77	12
103. 2,4,6-Tribromophenol	13.88	10	330	222	20	332	143	34
104. Sulfotepp	14.1	10	202	146	10	322	146	24
105. 1,3,5-Trinitrobenzene	14.23	10	213	167	8	213	74	38
106. Diallate 1	14.31	10	86	43	6	234	150	16
107. Phorate	14.32	10	75	47	8	121	47	26
108. Phenacetin	14.35	10	179	137	8	179	109	14
109. 4-Bromophenyl phenyl ether	14.41	10	248	141	14	141	115	12
110. Diallate 2	14.48	10	234	150	16	86	43	6
111. Hexachlorobenzene	14.5	10	284	249	14	288	216	26
112. Dimethoate	14.6	10	93	63	8	125	47	14
113. Atrazine	14.82	10	200	122	8	215	200	8
114. Pentachlorophenol	14.9	10	266	167	22	270	169	22
115. 4-Aminobiphenyl	14.93	10	168	141	8	168	167	10

Figure 1: (continued)

Peaks	t_R (min)	Conc. (ng/mL)	Mass 1	Product 1	Collision energy 1	Mass 2	Product 2	Collision energy 2
116. Pentachloronitrobenzene	14.93	10	295	265	8	237	143	20
117. Propyzamide	15.13	10	173	145	14	254	191	16
118. Phenanthrene-d10	15.24	10	188	160	20	184	154	32
119. Octadecane	15.27	10	85	43	6	99	41	14
120. Phenanthrene	15.29	10	178	152	18	178	151	32
121. Dinoseb	15.34	10	163	116	14	240	117	24
122. Disulfoton	15.36	10	88	60	6	97	65	16
123. Anthracene	15.39	10	178	152	18	178	151	32
124. Carbazole	15.741	10	167	166	12	167	139	24
125. Methyl Parathion	16.08	10	263	109	10	263	79	24
126. di-n-Butyl phthalate	16.58	10	149	121	12	149	65	20
127. 4-Nitroquinoline-N-oxide	16.83	10	190	160	8	101	75	10
128. Ethyl Parathion	16.89	10	109	81	10	291	81	26
129. Methapyrilene	17.1	10	97	53	16	190	97	14
130. Isodrin	17.36	10	261	226	16	261	191	28
131. Fluoranthene	17.65	10	202	176	26	184	156	18
132. Fluoranthene	17.65	10	202	152	30	200	174	22
133. Benzidine	17.99	10	184	166	16	200	149	34
134. Pyrene	18.08	10	200	150	26	212	208	36
135. p-Terphenyl-d14	18.5	10	244	242	14	244	240	22
136. Aramite 1	18.55	10	319	185	6	175	107	14
137. Aramite 2	18.7	10	185	63	12	319	185	6
138. p-Dimethylaminoazobenzene	18.79	10	225	148	6	120	77	16
139. Chlorobenzilate	18.93	10	251	139	12	251	111	30
140. Famfur	19.4	10	218	109	14	125	79	6
141. 3,3'-Dimethylbenzidine	19.46	10	211	196	8	211	195	16
142. Kepone	19.47	10	272	237	12	237	143	22
143. Benzyl butyl phthalate	19.56	10	206	149	8	149	121	10
144. Bis(2-ethylhexyl) adipate	19.81	10	129	55	14	129	83	8
145. 2-Acetylaminofluorene	19.93	10	223	181	10	181	152	34
146. Benz[a]anthracene	20.5	10	228	202	22	226	200	28
147. Chrysene-d12	20.51	10	240	238	14	240	236	30
148. 3,3'-Dichlorobenzidine	20.51	10	252	181	22	252	182	20
149. 4,4'-Methylenebis(2-chloroaniline)	20.53	10	231	195	16	266	231	12
150. Chrysene	20.56	10	228	202	22	228	201	36
151. Bis(2-ethylhexyl) phthalate	20.78	10	167	149	8	149	121	14
152. 6-Methylchrysene	21.46	10	242	226	28	239	213	26
153. Di-n-octyl phthalate	22.08	10	149	121	12	149	93	16
154. Benzo[b]fluoranthene	22.68	10	252	226	22	250	224	24
155. 7,12-Dimethylbenz[a]anthracene	22.69	10	256	241	12	241	226	14
156. Benzo[k]fluoranthene	22.74	10	252	226	22	250	224	24
157. Benzo[a]pyrene	23.41	10	252	226	22	250	224	26
158. Perylene-d12	23.55	10	264	262	20	264	260	34
159. 3-Methylcholanthrene	24.32	10	268	253	14	252	226	22
160. Dibenz(a,h)acridine	25.8	10	279	252	34	278	250	24
161. Dibenz[a,j]acridine	25.88	10	279	277	30	278	250	26
162. Indeno[1,2,3-cd]pyrene	26.32	10	138	125	12	276	250	30
163. Dibenz[a,h]anthracene	26.43	10	139	126	8	139	113	14
164. Benzo[ghi]perylene	27.05	10	138	125	12	138	124	28

Figure 2: Highly inert RMX-5Sil MS columns help you meet data requirements for a wide range of challenging semivolatiles at extremely low levels.



Column	RMX-5Sil MS, 30 m, 0.25 mm ID, 0.25 µm (cat.# 17323)
Standard/Sample	
	SVOC MegaMix 150 kit (cat.# 31907)
	Revised SV internal standard mix (cat.# 31886)
	Base neutral surrogate mix (4/89 SOW) (cat.# 31024)
	Acid surrogate mix (4/89 SOW) (cat.# 31025)
Diluent:	Dichloromethane
Conc.:	1, 10, 100 ppb
Injection	
Inj. Vol.:	1 µL split (split ratio 10:1)
Liner:	Topaz 4.0 mm ID Precision liner w/wool (cat.# 23267)
Inj. Temp.:	280 °C
Split Vent Flow Rate:	12 mL/min
Oven	
Oven Temp.:	40 °C (hold 1 min) to 280 °C at 12 °C/min to 310 °C at 3 °C/min (hold 1 min)
Carrier Gas	He, constant flow
Flow Rate:	1.2 mL/min @ 40 °C
Detector	SRM/MRM
Source Temp.:	330 °C
Transfer Line Temp.:	280 °C
Analyzer Type:	Triple Quadrupole
Ionization Mode:	EI
Collision Gas:	Ar
Tune Type:	PFTBA
Tune Emission Current:	70 µA
Instrument	Thermo Scientific TSQ 8000 Triple Quadrupole GC-MS

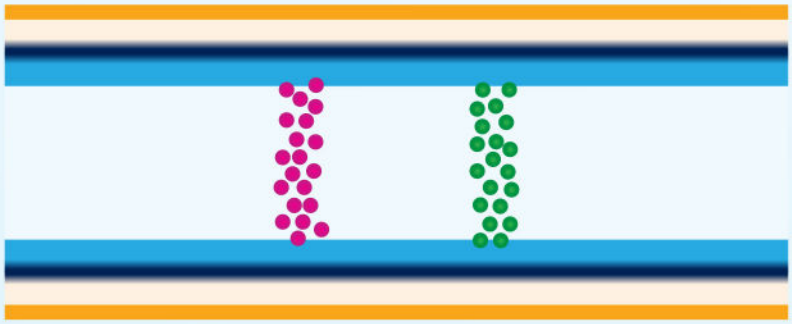
References

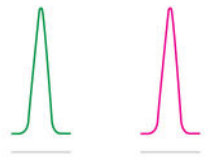
1. RMX GC columns brochure, GNBR4923-UNV, Restek Corporation, 2026.
2. E. Pack, J. Hoisington, C. English, R. Dhandapani, and C. Myers, Comprehensive trace-level semivolatiles analysis by GC-MS/MS (EPA Method 8270E), Application note, EVAN4919-US, Restek Corporation, 2025.

What Makes RMX Columns Better?

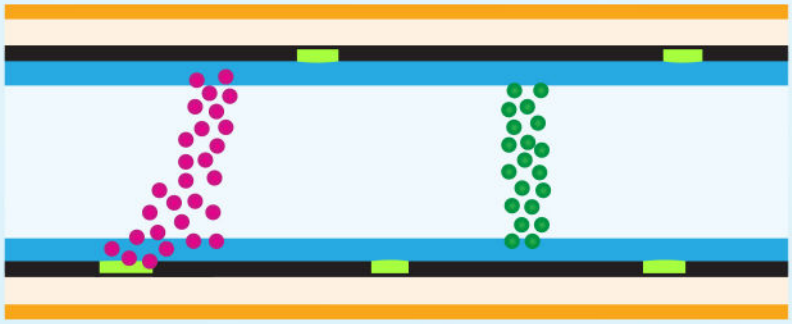
Highly Effective TriMax Deactivation Protects Analytes From Surface Interactions, Improving Peak Shape and Sensitivity for a Wide Range of Compound Chemistries

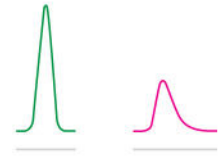
TriMax Deactivation

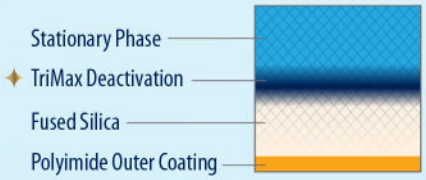




Non-TriMax Deactivation







- Inactive compounds: *alkanes, alkenes, alkynes, etc.*
- Active compounds: *acids, bases, alcohols, esters, ethers, etc.*
- Residual active site

Learn More About RMX Columns Today!

Featured Products

RMX-5Sil MS GC Capillary Column

Catalog No.	Product name	Units
17323	RMX-5Sil MS GC Capillary Column, 30 m, 0.25 mm ID, 0.25 µm	ea.

Topaz Precision Inlet Liner

Catalog No.	Product Name	Units
23267	Topaz, Precision Inlet Liner, 4.0 mm x 6.3 x 78.5, for Thermo TRACE 1300/1310, 1600/1610 GCs w/SSL Inlets, w/Quartz Wool, Premium Deactivation	5-pk.

Restek Electronic Leak Detector

Catalog No.	Product Name	Units
28500	Restek Electronic Leak Detector (includes carrying case; universal AC power adaptor [U.S., UK, Europe, Australia, Japan]; 6-ft USB charging cable)	ea.

Need support with applications or product selection?

Contact Technical Service!

SVOC MegaMix 150 Kit, 1 mL/ampul; 6 ampuls/kit

Contains one ampul of each of the following.

Cat.# 31850: 8270 MegaMix
1000 µg/mL each in methylene chloride (3-methylphenol and 4-methylphenol at 500 µg/mL), 1 mL/ampul
Acenaphthene (83-32-9)
Acenaphthylene (208-96-8)
Aniline (62-53-3)
Anthracene (120-12-7)
Azobenzene (103-33-3)*
Benz[a]anthracene (56-55-3)
Benzo[a]pyrene (50-32-8)
Benzo[b]fluoranthene (205-99-2)
Benzo[g,h,i]perylene (191-24-2)
Benzo[k]fluoranthene (207-08-9)
Benzyl alcohol (100-51-6)
Benzyl butyl phthalate (85-68-7)
Bis(2-chloroethoxy)methane (111-91-1)
Bis(2-chloroethyl)ether (111-44-4)
Bis(2-ethylhexyl)adipate (103-23-1)
Bis(2-ethylhexyl)phthalate (117-81-7)
4-Bromophenyl phenyl ether (101-55-3)
Carbazole (86-74-8)
4-Chloroaniline (106-47-8)
4-Chloro-3-methylphenol (59-50-7)
2-Chloronaphthalene (91-58-7)
2-Chlorophenol (95-57-8)
4-Chlorophenyl phenyl ether (7005-72-3)
Chrysene (218-01-9)
Dibenz[a,h]anthracene (53-70-3)
Dibenzofuran (132-64-9)
1,2-Dichlorobenzene (95-50-1)
1,3-Dichlorobenzene (541-73-1)
1,4-Dichlorobenzene (106-46-7)
2,4-Dichlorophenol (120-83-2)
Diethylphthalate (84-66-2)
2,4-Dimethylphenol (105-67-9)
Dimethylphthalate (131-11-3)
Di-n-butyl phthalate (84-74-2)
1,2-Dinitrobenzene (528-29-0)
1,3-Dinitrobenzene (99-65-0)
1,4-Dinitrobenzene (100-25-4)
4,6-Dinitro-2-methylphenol (Dinitro-o-cresol) (534-52-1)
2,4-Dinitrophenol (51-28-5)
2,4-Dinitrotoluene (121-14-2)
2,6-Dinitrotoluene (606-20-2)
Di-n-octyl phthalate (117-84-0)
Diphenylamine (122-39-4)†
Fluoranthene (206-44-0)
Fluorene (86-73-7)
Hexachlorobenzene (118-74-1)
Hexachlorobutadiene (87-68-3)
Hexachlorocyclopentadiene (77-47-4)
Hexachloroethane (67-72-1)
Indeno[1,2,3-cd]pyrene (193-39-5)
Isophorone (78-59-1)
1-Methylnaphthalene (90-12-0)
2-Methylnaphthalene (91-57-6)
2-Methylphenol (*o*-cresol) (95-48-7)
3-Methylphenol (*m*-cresol) (108-39-4)
4-Methylphenol (*p*-cresol) (106-44-5)
Naphthalene (91-20-3)
2-Nitroaniline (88-74-4)
3-Nitroaniline (99-09-2)
4-Nitroaniline (100-01-6)
Nitrobenzene (98-95-3)
2-Nitrophenol (88-75-5)
4-Nitrophenol (100-02-7)
N-Nitrosodimethylamine (62-75-9)
N-Nitroso-di-*n*-propylamine (621-64-7)
2,2'-Oxybis(1-chloropropane) (108-60-1)
Pentachlorophenol (87-86-5)
Phenanthrene (85-01-8)
Phenol (108-95-2)
Pyrene (129-00-0)
Pyridine (110-86-1)
2,3,4,6-Tetrachlorophenol (58-90-2)
2,3,5,6-Tetrachlorophenol (935-95-5)
1,2,4-Trichlorobenzene (120-82-1)
2,4,5-Trichlorophenol (95-95-4)
2,4,6-Trichlorophenol (88-06-2)

Cat.# 31909: SVOC Additions
1000 µg/mL each in methylene chloride, 1 mL/ampul
Acrylamide (79-06-1)
Benzidine (92-87-5)
n-Decane (C10) (124-18-5)
Dibenz(a,h)acridine (226-36-8)
2,3-Dichloroaniline (608-27-5)
3,3'-Dichlorobenzidine (91-94-1)
Dimethoate (60-51-5)
Dinoseb (88-85-7)
Disulfoton (298-04-4)
Famphur (52-85-7)
n-Hexadecane (C16) (544-76-3)
Indene (95-13-6)
Methyl parathion (298-00-0)
6-Methylchrysene (1705-85-7)
4,4'-Methylene-bis(2-chloroaniline) (101-14-4)
n-Octadecane (C18) (593-45-3)
Parathion (ethyl parathion) (56-38-2)
Phorate (298-02-2)
Quinoline (91-22-5)
Sulfotepp (3689-24-5)
α-Terpineol (98-55-5)
o,o,o-Triethyl phosphorothioate (126-68-1)
Zalophus (thionazine) (297-97-2)

Cat.# 32459: Appendix IX mix #1, revised
2000 µg/mL each in methylene chloride, 1 mL/ampul
2-Acetylaminofluorene (53-96-3)
4-Aminobiphenyl (92-67-1)
p-Dimethylaminoazobenzene (60-11-7)
3,3'-Dimethylbenzidine (o-tolidine) (119-93-7)
α,α-Dimethylphenethylamine (phentermine) (122-09-8)
1-Naphthylamine (1-aminonaphthalene) (134-32-7)
2-Naphthylamine (2-aminonaphthalene) (91-59-8)
N-Nitrosodibutylamine (924-16-3)
N-Nitrosodiethylamine (55-18-5)
N-Nitrosomethylethylamine (10595-95-6)
N-Nitrosomorpholine (59-89-2)
N-Nitrosopiperidine (100-75-4)
N-Nitrosopyrrolidine (930-55-2)
5-Nitro-o-toluidine (99-55-8)
1,4-Phenylenediamine (106-50-3)
2-Picoline (109-06-8)
o-Toluidine (95-53-4)

Cat.# 32460: Methapyrilene
2000 µg/mL each in methylene chloride, 1 mL/ampul
Methapyrilene hydrochloride (135-23-9)

Cat.# 31806: Appendix IX mix #2
1000 µg/mL each in methylene chloride, 1 mL/ampul
Acetophenone (98-86-2)
Aramite (140-57-8)
Atrazine (1912-24-9)
Benzaldehyde (100-52-7)
Biphenyl (92-52-4)
ε-Caprolactam (105-60-2)
Chlorobenzilate (510-15-6)
1-Chloronaphthalene (90-13-1)
Diallate (2303-16-4)
Dibenz[a,j]acridine (224-42-0)
2,6-Dichlorophenol (87-65-0)
7,12-Dimethylbenz[a]anthracene (57-97-6)
1,4-Dioxane (123-91-1)
Diphenyl ether (101-84-8)
Ethyl methacrylate (97-63-2)
Ethyl methanesulfonate (62-50-0)
Hexachloropropene (1888-71-7)
Isodrin (465-73-6)
Isosafrole (cis & trans) (120-58-1)
Kepone (143-50-0)
3-Methylcholanthrene (56-49-5)
Methyl methanesulfonate (66-27-3)
1,4-Naphthoquinone (130-15-4)
4-Nitroquinoline-N-oxide (56-57-5)
Pentachlorobenzene (608-93-5)
Pentachloroethane (76-01-7)
Pentachloronitrobenzene (Quintozene) (82-68-8)
Phenacetin (62-44-2)
Propyzamide (23950-58-5)
Safrole (94-59-7)
1,2,4,5-Tetrachlorobenzene (95-94-3)
1,3,5-Trinitrobenzene (99-35-4)

Cat.# 31879: Benzoic acid
2000 µg/mL in methylene chloride, 1 mL/ampul
Benzoic acid (65-85-0)

*1,2-diphenylhydrazine (8270-listed analyte) decomposes to azobenzene (mix component) in the injector.
†N-Nitrosodiphenylamine is a reactive species that can initiate premature decomposition of other compounds in the mix. For these reasons, diphenylamine is used in the preparation of this mixture.

Catalog No.	Units
31907	kit

GC-MS Tuning Mix

1000 µg/mL, Methylene Chloride, 1 mL/ampul

Catalog No.	Contains	Units
31615	Benzidine (92-87-5) 4,4'-DDT (50-29-3) DFTPP (decafluorotriphenylphosphine) (5074-71-5) Pentachlorophenol (87-86-5)	ea.

Acid Surrogate Mix (4/89 SOW)

2000 µg/mL, Methanol, 1 mL/ampul

Catalog No.	Contains	Units
31025	2-Fluorophenol (367-12-4) Phenol-d6 (13127-88-3) 2,4,6-Tribromophenol (118-79-6)	ea.

Base Neutral Surrogate Mix (4/89 SOW)

1000 µg/mL, Methylene Chloride, 1 mL/ampul

Catalog No.	Contains	Units
31024	2-Fluorobiphenyl (321-60-8) Nitrobenzene-d5 (4165-60-0) p-Terphenyl-d14 (1718-51-0)	ea.

Revised SV Internal Standard Mix

4000 µg/mL, Methylene Chloride, 1 mL/ampul

Catalog No.	Contains		Units
31886	Acenaphthene-d10 (15067-26-2) Chrysene-d12 (1719-03-5) 1,4-Dichlorobenzene-d4 (3855-82-1) 1,4-Dioxane-d8 (17647-74-4)	Naphthalene-d8 (1146-65-2) Perylene-d12 (1520-96-3) Phenanthrene-d10 (1517-22-2)	ea.

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