

Rtx[®]-CLPesticides Columns

Reduce Analysis Time; Reduce System Maintenance



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Turning Visions into Reality™

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Rtx®-CLPesticides and Rtx®-CLPesticides2 Fused Silica Columns

- Detect and confirm 20 common organochlorine pesticides simultaneously.
- Complete analysis in less than 14 minutes (see Figure 3).
- Primary and confirmation analysis with one injection.

Organochlorine pesticides represent a very common analysis in environmental laboratories, traditionally using Rtx®-5, Rtx®-35, Rtx®-1701, or equivalent columns. With traditional columns, however, it is difficult to resolve the 20 most commonly analyzed organochlorine pesticides in a reasonable time. Higher polarity columns also are problematic - they trap polar contaminants from the samples, and this reduces column lifetime.

Rtx®-CLPesticides and Rtx®-CLPesticides2 columns were designed specifically for this application, with consideration for both analysis time and column lifetime. They separate commonly analyzed organochlorine pesticides rapidly, with high temperature stability that assures reliable data. Figure 1 shows the analysis of 20 pesticides is completed in 24 minutes - 50% of the time required on a traditional column! Further, an Rtx®-CLPesticides column and an Rtx®-CLPesticides2 column can be used under the same injection port pressure and oven temperature program, which makes them an ideal pair for dual column analysis.

Some analysts prefer columns with internal diameters other than 0.32mm, and Rtx®-CLPesticides and Rtx®-CLPesticides2 columns with other IDs can be used without sacrificing resolution. Figure 2 shows these 20 pesticides exhibit the same resolution on 0.53mm ID columns, in the same analysis time, as on 0.32mm ID columns.

To increase lab efficiency and throughput, Rtx®-CLPesticides and Rtx®-CLPesticides2 columns can be used under fast analytical conditions, reducing analysis time to less than 14 minutes, as Figure 3 shows.

Column Deactivation

Rtx®-CLPesticides and Rtx®-CLPesticides2 columns incorporate our proprietary intermediate polarity deactivation to make the tubing surface non-adsorptive to active pesticides. A second version of CLPesticides columns, Stx™-CLPesticides and Stx™-CLPesticides2 columns, incorporate our Siltek® deactivation process, which makes the tubing surface virtually inert to endrin and other active compounds. These columns provide the ultimate performance for ppb on-column concentrations. Resolution on either column pair is not affected by the tubing deactivation.

Additional Applications

Laboratories strive to use one primary column / confirmation column pair for multiple methods, and Rtx®-CLPesticides and Rtx®-CLPesticides2 columns offer this convenience. In addition to organochlorine pesticides, compounds that are routinely analyzed by GC/ECD on these columns include triazine herbicides, chlorinated disinfection byproducts, haloacetic acids, and volatile chlorinated and brominated insecticides. Figures 4 - 6 demonstrate the versatility of Rtx®-CLPesticides and Rtx®-CLPesticides2 columns.

tech tip

A primary cause for downtime is system maintenance, to clean or replace contaminated injection port components. By using a "Y" connector to connect a guard column to an Rtx®-CLPesticides / Rtx®-CLPesticides2 column pair, one injection port and one injection of sample extract can be used for the primary and confirmation analysis. This cuts injection port maintenance by half, which greatly reduces downtime.

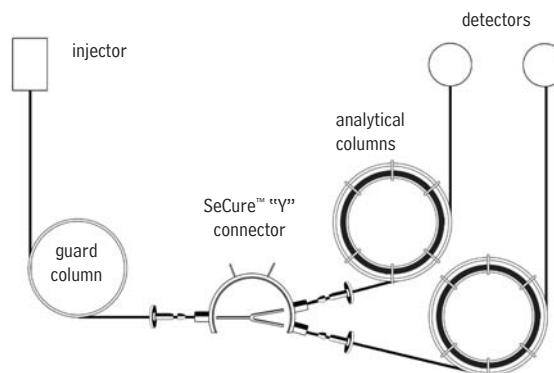
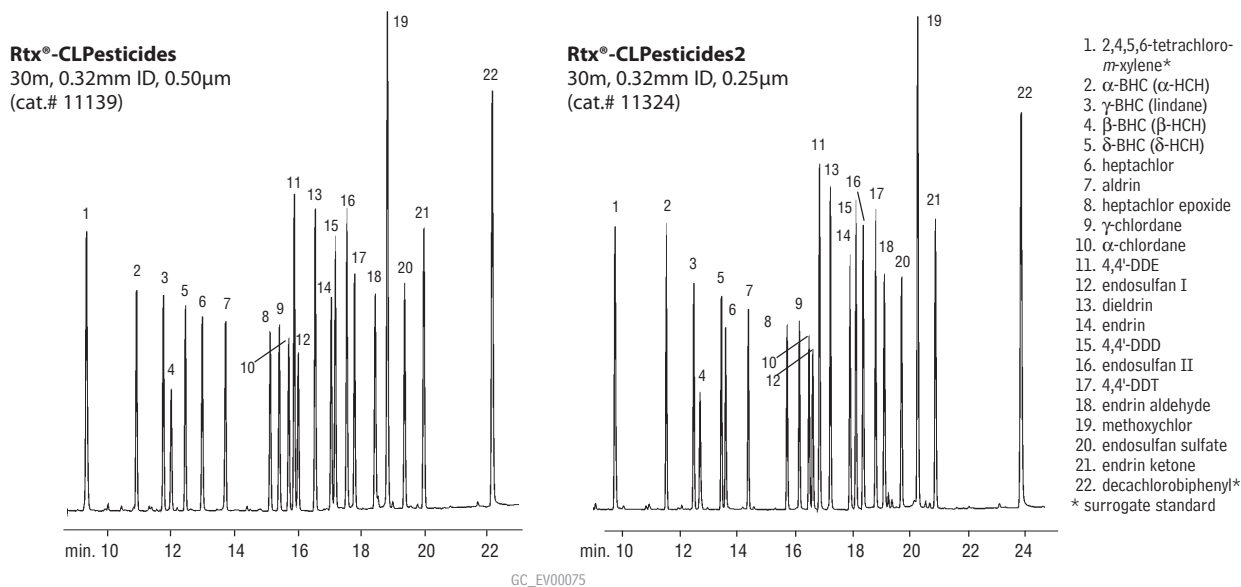


Figure 1 Analyze and confirm 20 common organochlorine pesticides in 24 minutes, using an Rtx®-CLPesticides and Rtx®-CLPesticides2 column pair.



Sample: Organochlorine Pesticide Mix AB#2 (cat.# 32292),
Pesticide Surrogate Mix (cat.# 32000),
16-160pg each analyte on-column

Oven temp.: 120°C (hold 1 min.) to 300°C (hold 10 min.) @ 9°C/min.

Inj.: direct, Uniliner® inlet liner (cat.# 20335), 200°C

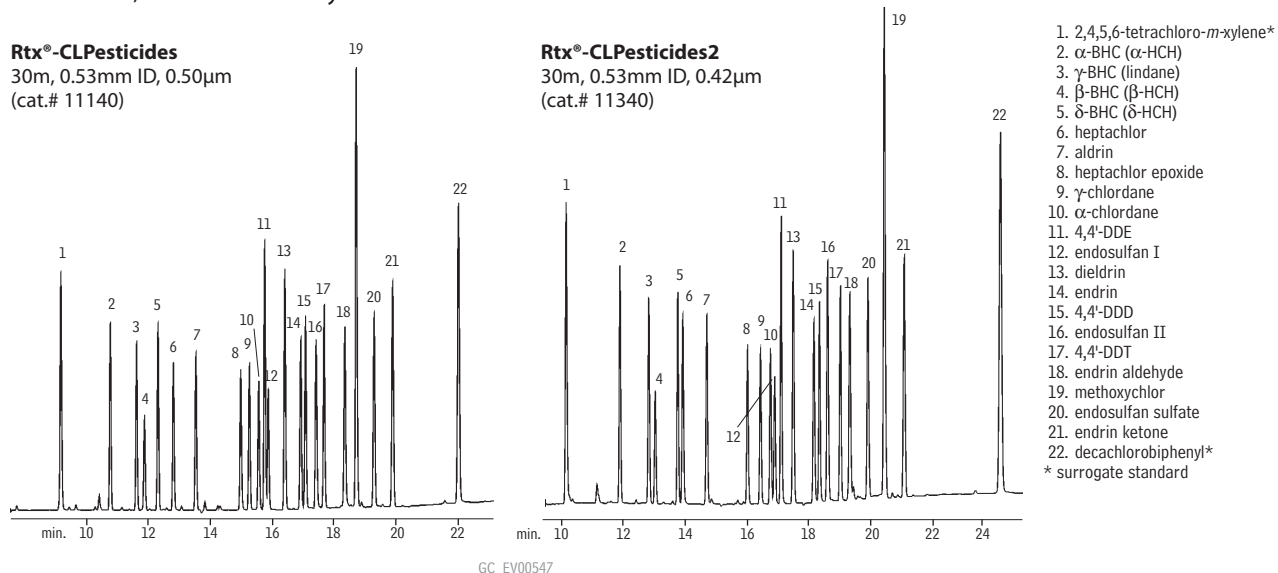
Detector: ECD, 300°C with anode purge

Dead time: 1.9 min.

Head pressure: 8.7psi (constant)

Flow rate: 1.3mL/min. @ 120°C, helium

Figure 2 0.53mm ID Rtx®-CLPesticides and Rtx®-CLPesticides2 columns provide the same resolution as 0.32mm ID columns, in the same analysis time.



Sample: Organochlorine Pesticide Mix AB#2 (cat.# 32292),
Pesticide Surrogate Mix (cat.# 32000),
16-160pg each analyte on-column

Oven temp.: 120°C (hold 1 min.) to 300°C (hold 10 min.) @ 9°C/min.

Inj. port: direct, Uniliner® inlet liner (cat.# 20335), 200°C

Detector: ECD, 300°C with anode purge

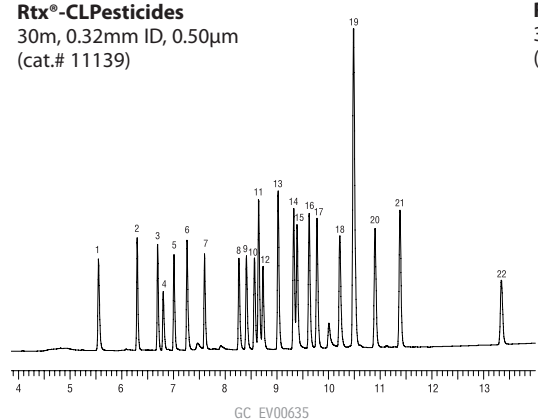
Dead time: 1.9 min.

Head pressure: 3psi (constant)

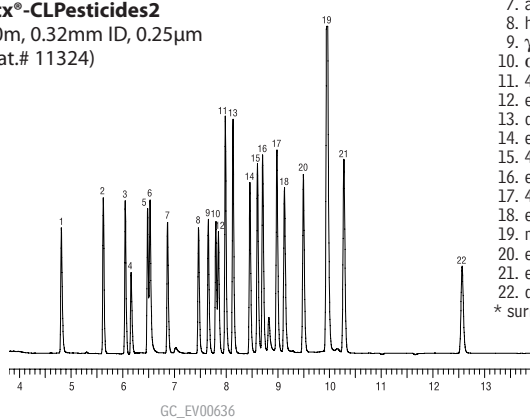
Flow rate: 2.83mL/min. @ 120°C, helium

Figure 3 Fast GC conditions and Rtx®-CLPesticides / Rtx®-CLPesticides2 columns cut analysis time to less than 14 minutes.

Rtx®-CLPesticides
30m, 0.32mm ID, 0.50µm
(cat.# 11139)



Rtx®-CLPesticides2
30m, 0.32mm ID, 0.25µm
(cat.# 11324)



1. 2,4,5,6-tetrachloro-*m*-xylene*
 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. 4,4'-DDE
 12. endosulfan I
 13. dieldrin
 14. endrin
 15. 4,4'-DDD
 16. endosulfan II
 17. 4,4'-DDT
 18. endrin aldehyde
 19. methoxychlor
 20. endosulfan sulfate
 21. endrin ketone
 22. decachlorobiphenyl*
- * surrogate standard

Sample: Organochlorine Pesticide Mix AB #2 (cat.# 32292)
8–80µg/mL each pesticide in hexane:toluene (1:1)
Pesticide Surrogate Mix (cat.#32000) 200µg/mL each surrogate in acetone

Inj.: 1.0µL direct, open-top drilled Uniliner® inlet liner (cat.# 21054)

Inj. temp.: 225°C

Carrier gas: helium, constant pressure

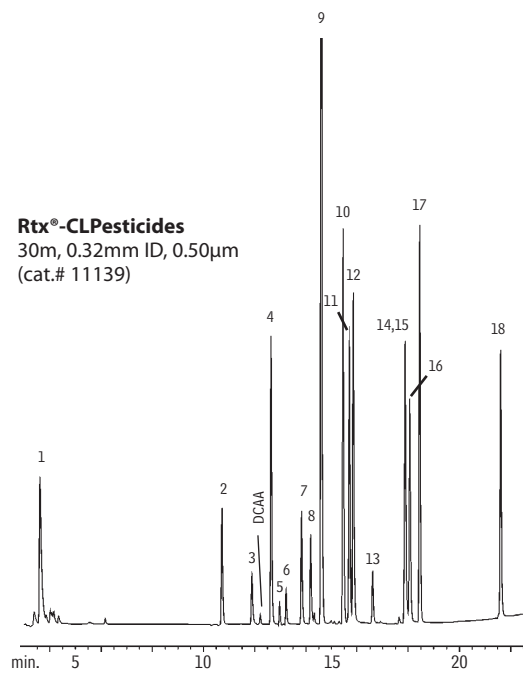
Linear velocity: 53cm/sec. @ 110°C

Oven temp.: 110°C (hold 1 min.) to 245°C @ 20°C/min. to 310°C (hold 1 min.)

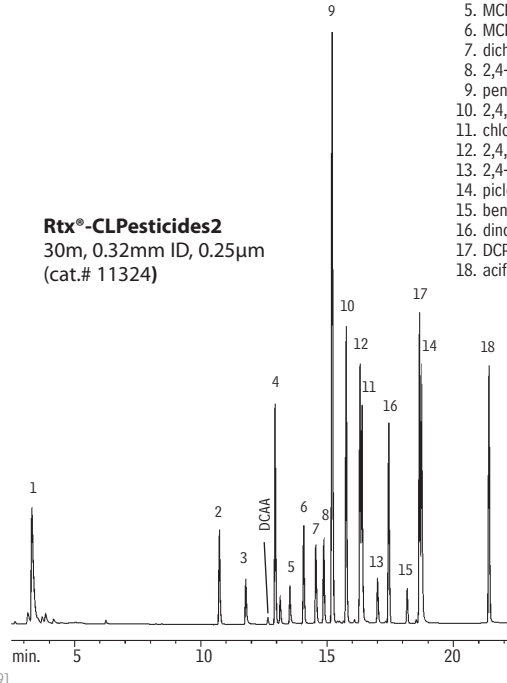
Det.: ECD @ 330°C

Figure 4 Chlorophenoxy acid herbicide derivatives are well resolved, with elution reversals, on Rtx®-CLPesticides / Rtx®-CLPesticides2 columns.

Rtx®-CLPesticides
30m, 0.32mm ID, 0.50µm
(cat.# 11139)



Rtx®-CLPesticides2
30m, 0.32mm ID, 0.25µm
(cat.# 11324)



1. dalapon
2. 3,5-dichlorobenzoic acid
3. 4-nitroanisole
4. dicamba
5. MCPP
6. MCPA
7. dichlorprop
8. 2,4-D
9. pentachloroanisole
10. 2,4,5-TP
11. chloramben
12. 2,4,5-T
13. 2,4-DB
14. picloram
15. bentazon
16. dinoseb
17. DCPA
18. acifluorfen

Sample: derivatized chlorophenoxy herbicides, on-column conc.: 200–20,000pg/mL

Inj.: 1.0µL direct injection of Uniliner® inlet liner (cat.# 20335),

Oven temp.: 80°C (hold 1 min.) to 300°C @ 10°C/min. (hold 10 min.)

Inj. / det. temp.: 200°C/300°C

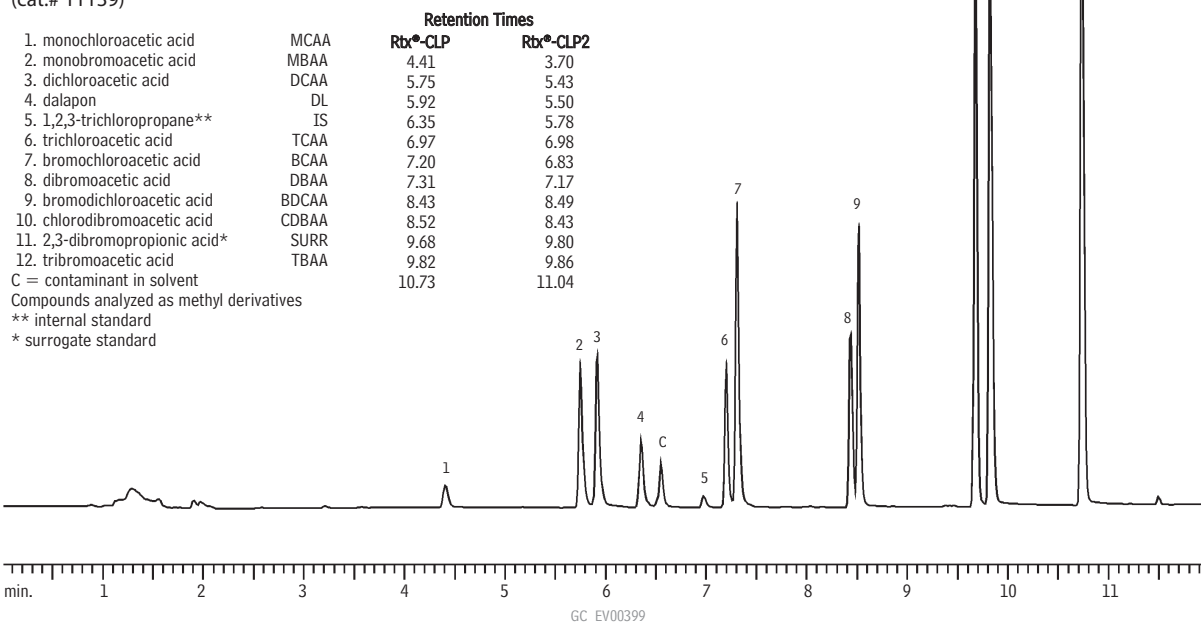
Carrier gas: helium

Inlet pressure: 12.5psi set @ 80°C

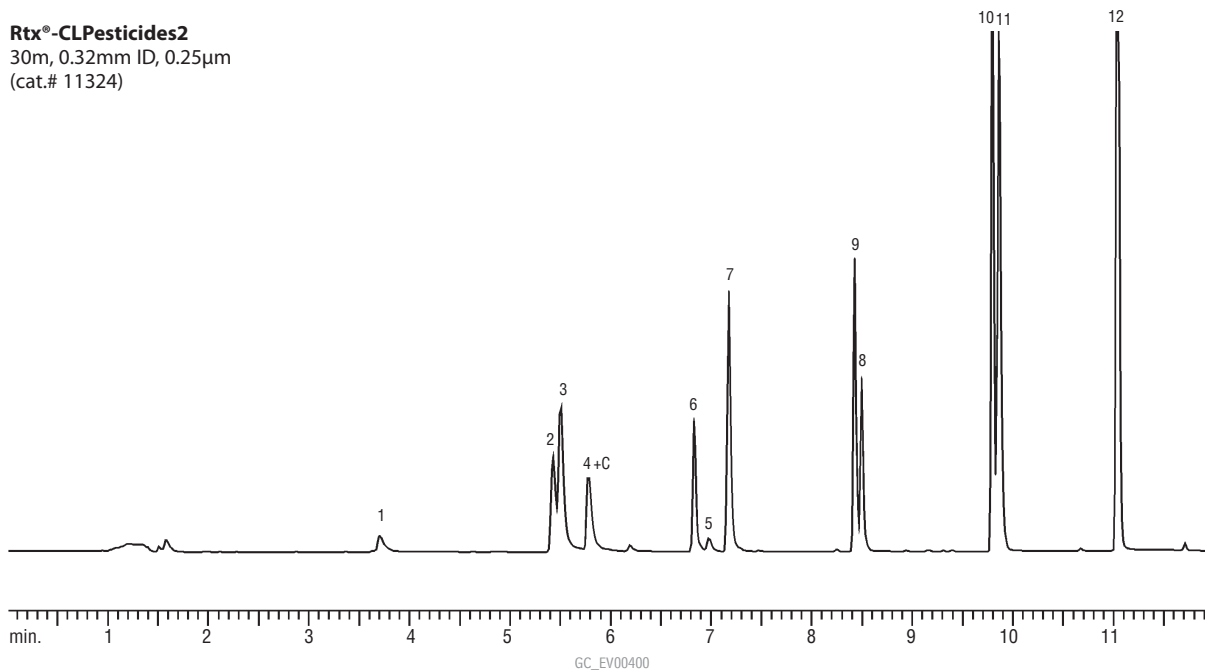
Det.: ECD w/anode purge

Figure 5 Haloacetic acid methyl derivatives by US EPA Method 552.2 on Rtx®-CLPesticides / Rtx®-CLPesticides2 columns.

Rtx®-CLPesticides
30m, 0.32mm ID, 0.50µm
(cat.# 11139)



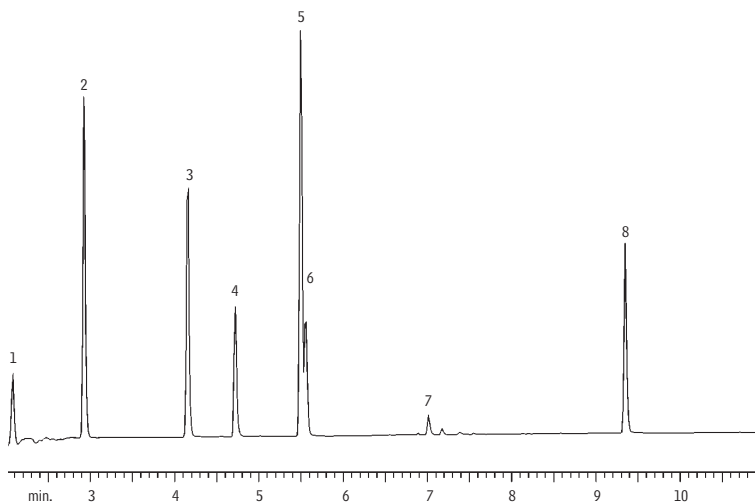
Rtx®-CLPesticides2
30m, 0.32mm ID, 0.25µm
(cat.# 11324)



Sample: custom haloacetic acid methyl derivatives mix, 20-200µg/mL each component in MTBE
Inj.: 2µL splitless
Oven temp.: 40°C (hold 4 min.) to 200°C @ 14°C/min.
Inj. temp.: 200°C
Carrier gas: helium
Linear velocity: 46cm/sec.
ECD temp.: 300°C

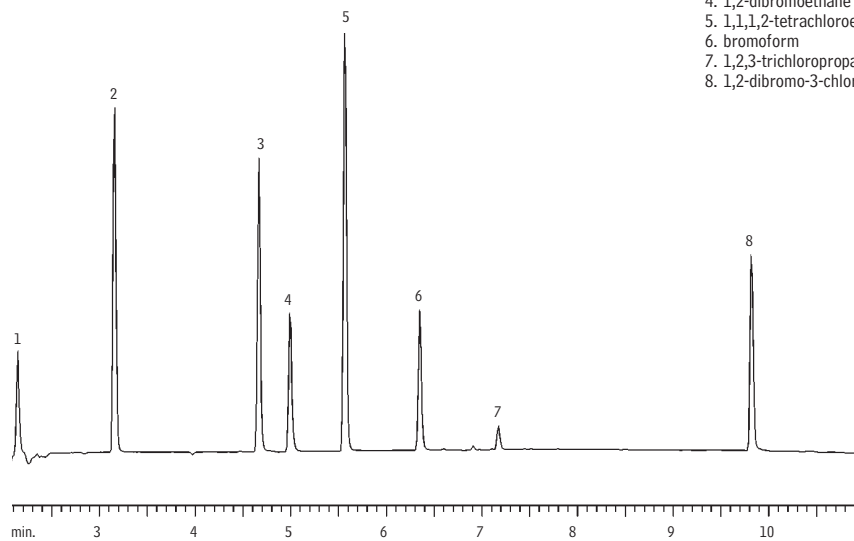
Figure 6 Volatile chlorinated and brominated insecticides by US EPA Method 504.1 on Rtx[®]-CLPesticides / Rtx[®]-CLPesticides2 columns.

Rtx[®]-CLPesticides
30m, 0.32mm ID, 0.50µm
(cat.# 11139)



Rtx[®]-CLPesticides2
30m, 0.32mm ID, 0.25µm
(cat.# 11324)

1. chloroform
2. bromodichloromethane
3. chlorodibromomethane
4. 1,2-dibromoethane (EDB)
5. 1,1,1,2-tetrachloroethane
6. bromoform
7. 1,2,3-trichloropropane
8. 1,2-dibromo-3-chloropropane (DBCP)



GC_EV00020

Dual-column analysis, using 0.32mm ID guard column (cat.# 10044),
universal angled "Y" Press-Tight[®] connector (cat.# 20403).
Direct injection using a Uniliner[®] inlet liner (cat.#20335).
On-column conc.: 10pg each compound.
Oven temp.: 35°C (hold 2 min.) to 300°C @ 12°C/min.
Inj./det. temp.: 200°C/300°C
Carrier gas: helium, 12psi constant pressure.

Product Listing

Rtx[®]-CLPesticides Columns (fused silica)

ID	df (μm)	temp. limits	10-Meter	15-Meter	20-Meter	30-Meter	60-Meter
0.10mm	0.10	-60 to 310/330°C	43101				
0.18mm	0.18	-60 to 310/330°C	42101		42102		
0.25mm	0.25	-60 to 320/340°C		11120		11123	11126
0.32mm	0.50	-60 to 320/340°C		11136		11139	
0.53mm	0.50	-60 to 300/320°C		11137		11140	

Rtx[®]-CLPesticides2 Columns (fused silica)

ID	df (μm)	temp. limits	10-Meter	15-Meter	20-Meter	30-Meter	60-Meter
0.10mm	0.10	-60 to 310/330°C	43301		43302		
0.18mm	0.14	-60 to 310/330°C	42301		42302		
0.25mm	0.20	-60 to 320/340°C		11320		11323	11326
0.32mm	0.25	-60 to 320/340°C		11321		11324	
	0.50	-60 to 320/340°C				11325	
0.53mm	0.42	-60 to 300/320°C		11337		11340	

Rtx[®]-CLPesticides Columns Kits

0.25mm ID Rtx[®]-CLPesticides Kit cat.# 11199 (kit),

Includes:	cat.#
30m, 0.25mm ID, 0.25μm Rtx [®] -CLPesticides Column	11123
30m, 0.25mm ID, 0.20μm Rtx [®] -CLPesticides2 Column	11323
Universal Angled "Y" Press-Tight [®] Connector	20403
5m, 0.25mm ID Siltek [®] Guard Column	10026

0.32mm ID Rtx[®]-CLPesticides Kit cat.# 11198 (kit),

Includes:	cat.#
30m, 0.32mm ID, 0.50μm Rtx [®] -CLPesticides Column	11139
30m, 0.32mm ID, 0.25μm Rtx [®] -CLPesticides2 Column	11324
Universal Angled "Y" Press-Tight [®] Connector	20403
5m, 0.32mm ID Siltek [®] Guard Column	10027

0.53mm ID Rtx[®]-CLPesticides Kit cat.# 11197 (kit),

Includes:	cat.#
30m, 0.53mm ID, 0.50μm Rtx [®] -CLPesticides Column	11140
30m, 0.53mm ID, 0.42μm Rtx [®] -CLPesticides2 Column	11340
Universal Angled "Y" Press-Tight [®] Connector	20403
5m, 0.53mm ID Siltek [®] Guard Column	10028

Stx[™]-CLPesticides Columns (fused silica with Siltek[®] deactivation)

ID	df (μm)	temp. limits	15-Meter	30-Meter
0.25mm	0.25	-60 to 310/330°C	11540	11543
0.32mm	0.50	-60 to 310/330°C	11541	11544
0.53mm	0.50	-60 to 310/330°C	11542	11545

Stx[™]-CLPesticides2 Columns (fused silica with Siltek[®] deactivation)

ID	df (μm)	temp. limits	15-Meter	30-Meter
0.25mm	0.20	-60 to 310/330°C	11440	11443
0.32mm	0.25	-60 to 310/330°C	11441	11444
0.53mm	0.42	-60 to 310/330°C	11442	11445

ordering note

Custom lengths and film thicknesses available. Call Technical Service at 800-356-1688 or 814-353-1300, ext. 4, or contact your Restek representative.

save money!

Get six columns for the price of five. Call 800-356-1688, ext. 4, or contact your Restek representative, for details!

Stx™-CLPesticides Columns Kits

0.25mm ID Stx™-CLPesticides Kit cat.# 11190 (kit)

Includes:	cat.#
30m, 0.25mm ID, 0.25µm Stx™-CLPesticides Column	11543
30m, 0.25mm ID, 0.20µm Stx™-CLPesticides2 Column	11443
Siltek® Treated Universal Angled "Y" Press-Tight® Connector	20487
5m, 0.25mm ID Siltek® Guard Column	10026

0.32mm ID Stx™-CLPesticides Kit cat.# 11191 (kit)

Includes:	cat.#
30m, 0.32mm ID, 0.50µm Stx™-CLPesticides Column	11544
30m, 0.32mm ID, 0.25µm Stx™-CLPesticides2 Column	11444
Siltek® Treated Universal Angled "Y" Press-Tight® Connector	20487
5m, 0.32mm ID Siltek® Guard Column	10027

0.53mm ID Stx™-CLPesticides Kit cat.# 11192 (kit)

Includes:	cat.#
30m, 0.53mm ID, 0.50µm Stx™-CLPesticides Column	11545
30m, 0.53mm ID, 0.42µm Stx™-CLPesticides2 Column	11445
Siltek® Treated Universal Angled "Y" Press-Tight® Connector	20487
5m, 0.53mm ID Siltek® Guard Column	10028

Intermediate-Polarity Deactivated Fused Silica Guard Columns/Transfer Lines

Nominal ID	Nominal OD	1-Meter	5-Meter	5-Meter/6-pk.
0.18mm	0.37 ± 0.04mm	10102	10046	
0.25mm	0.37 ± 0.04mm		10043	10043-600
0.32mm	0.45 ± 0.04mm		10044	10044-600
0.53mm	0.69 ± 0.05mm		10045	10045-600

Siltek®-Deactivated Fused Silica Guard Columns/Transfer Lines

Nominal ID	Nominal OD	5-Meter	10-Meter
0.25mm	0.37 ± 0.04mm	10026	10036
0.32mm	0.45 ± 0.04mm	10027	10037
0.53mm	0.69 ± 0.05mm	10028	10038

SeCure™ "Y" Connector Kits

SeCure™ "Y" connector body, 3 knurled nuts, "Y" Universal Press-Tight® union, 3 ferrules.



Description	Ferrules Fit Column ID	qty.	cat.#
SeCure™ "Y" Connector Kit	0.25/0.28mm	kit	20276
SeCure™ "Y" Connector Kit	0.28/0.32mm	kit	20277
SeCure™ "Y" Connector Kit	0.45/0.53mm	kit	20278
Knurled nut		3-pk.	20279

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SeCure, Turning Visions into
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