Siltek deactivation

from RESTEK

The Next Generation of Surface Deactivation

- ✔ Maximizes the inertness of sample pathway
- ✔ Minimizes breakdown and bleed
- ✔ Thermally stable

What is Siltek™ Deactivation?

The Siltek™ process (patent pending) produces a highly inert glass surface that features high-temperature stability, extreme durability, and virtually no bleed.

Siltek™ deactivation is not susceptible to cleavage or formation of active silanols like traditional deactivations can be; and, therefore, greatly reduce bleed, breakdown, and adsorption of active components.

LOW BLEED

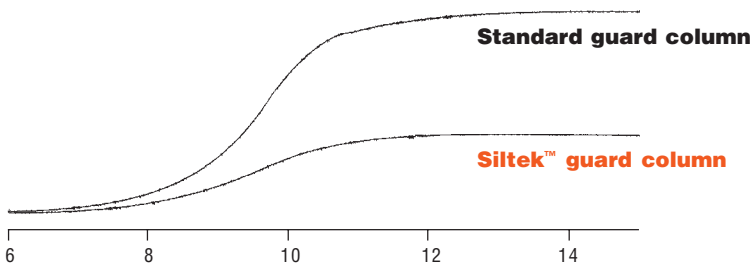
Lower Limits of Detection for High Molecular Weight Compounds

Traditional deactivated surfaces thermally degrade at the elevated temperatures used in GC analysis. As the temperature increases, so does the rate of thermal degradation of the column phase, which is reflected by an increase in the baseline of a detection system. This undesirable phenomena, called bleed, can interfere with the accurate quantitation of analytes. Although deactivated guard columns are not coated with stationary phase, their surface treatment can still show a measurable bleed level.

Siltek™ deactivation, however, results in extremely low bleed levels at elevated temperatures. A Siltek™ guard column has 60% less bleed than a standard deactivated guard column (Figure 1). Lower bleed translates to lower limits of detection for high molecular weight compounds. Better deactivation provides better analytical results!

Figure 1

An expanded bleed plot shows the Siltek™ guard column exhibits 60% less bleed than the standard deactivated guard column at 330°C.



The Next Generation of Surface Deactivation

INERTNESS

Enhanced Recovery of Trace-Level Chlorinated Pesticides

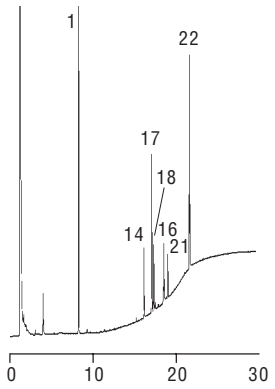
US Environmental Protection Agency (EPA) Method 8081A is a challenging analysis that requires gas chromatographic (GC) separation and detection of chlorinated pesticides in low ppb levels. Three compounds listed in the 8081A Method—endrin, DDT, and methoxychlor—are highly susceptible to breakdown on a variety of active surfaces, making accurate analysis difficult. A typical configuration for this analysis includes a direct injection sleeve and a guard column connected to one or two analytical columns via a press-tight connector. This entire chromatographic system needs to be optimized to prevent breakdown and ensure accurate results.

In Figure 2a, an on-column analyte concentration of 50ppb shows 62% endrin breakdown on an inadequately deactivated liner, as indicated by the integrated decomposition products of endrin aldehyde (peak 18) and endrin ketone (peak 21). Use of a Siltek™ inlet liner results in less than 1% endrin breakdown, and undetectable DDT and methoxychlor breakdown (Figure 2b). A completely deactivated GC system shows unsurpassed response and resolution of the complete list of 8081A analytes using a Siltek™ liner, Siltek™ Press-Tight® connector, Siltek™ guard column, and an Rtx®-CLPesticides analytical column (Figure 3).

Figure 2

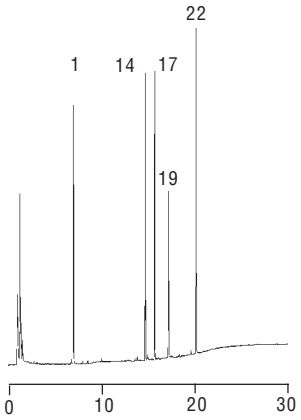
a) Before

A chromatographic system that is inadequately deactivated will cause poor linearity, a loss of reproducibility, and costly analytical downtime.



b) After

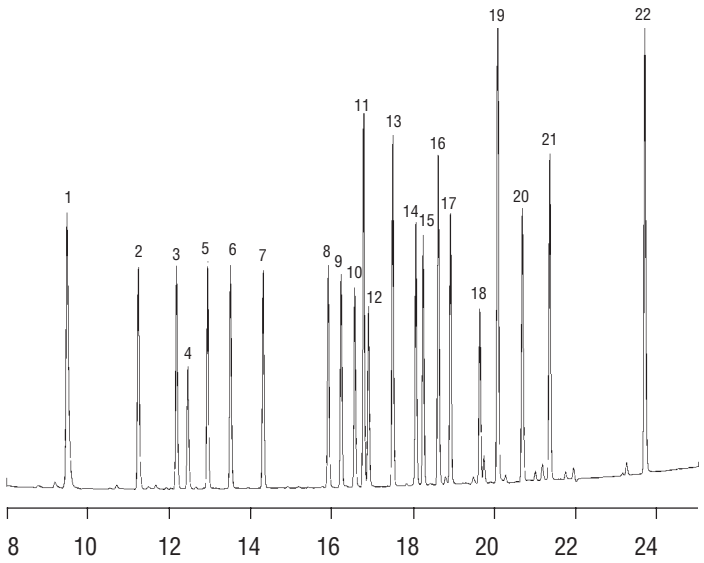
Siltek™-deactivated Uniliner® inlet liners result in less than 1% endrin breakdown, and undetectable DDT and methoxychlor breakdown.



Conditions for Figure 2
30m, 0.53mm ID, 0.42µm Rtx-CLPesticides2 (cat.#11340) with open-top Siltek™ Uniliner® w/o wool (cat.# 20843-214.1)
Inj.: 1µL of 50pg/µL standard of tetrachloro-meta-xylene (IS), endrin, 4,4'-DDT, methoxychlor, and decachlorobiphenyl (IS); **Oven temp.:** 120°C (hold 1 min.) to 300°C @ 9°C/min. (hold 10 min.)
Inj. temp.: 250°C; **Det.:** ECD, 300°C
Carrier gas: helium

Figure 3

A completely deactivated GC system shows excellent resolution of the complete list of US EPA Method 8081A analytes at very low levels.



Peak List for Figures 2 and 3

1. 2,4,5,6-tetrachloro-m-xylene (IS)
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'-DDE
16. endosulfan II
17. 4,4'-DDT
18. endrin aldehyde
19. methoxychlor
20. endosulfan sulfate
21. endrin ketone
22. decachlorobiphenyl (IS)

Conditions for Figure 3
30m, 0.32mm ID, 0.5µm (cat.# 11139) Rtx®-CLPesticides with a 5m, 0.32mm ID Siltek™ guard column (cat.# 10027) and a Siltek™ gooseneck liner (cat.# 20798-214.1)
On-column conc.: 16-160pg
Oven temp.: 120°C (hold 1 min.) to 300°C @ 9°C/min. (hold 10 min.)
Inj. temp.: 250°C, splitless (hold for 0.75 min.)
Det.: ECD, 300°C with anode purge
Carrier gas: helium, 31cm/sec.

The Next Generation of Surface Deactivat

Siltek™ Inlet Liners

For Siltek™ inlet liners, add the corresponding suffix number to your Restek liner catalog number.

Qty.	Siltek™		Siltek™ with Siltek™ wool		Siltek™ with CarboFrit™	
each	-214.1	addl. cost	-213.1	addl. cost	-216.1	addl. cost
5-pk.	-214.5	addl. cost	-213.5	addl. cost	-216.5	addl. cost
25-pk.	-214.25	addl. cost	-213.5	addl. cost	-216.25	addl. cost

Siltek™ Press-Tight® Connectors

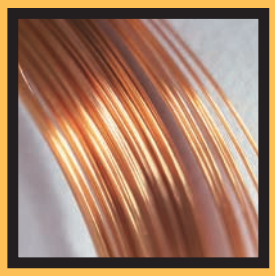
Type	Ea.	3-Pk.	5-Pk.	25-Pk.	100-Pk.
straight	—	—	20480	20449	20481
angled	—	—	20482	20483	20484
"Y"	20485	20486	—	—	—
angled "Y"	20487	20469	—	—	—

Siltek™ Borosilicate Wool

Qty.	cat.#
10 g	21100

Siltek™ Guard Columns

Nominal ID	Nominal OD	5-Meter	10-Meter
0.25mm	0.37 ±0.04mm	10026	10036
0.28mm	0.37 ±0.04mm	10016	10017
0.32mm	0.45 ±0.04mm	10027	10037
0.45mm	0.69 ±0.05mm	10018	10019
0.53mm	0.69 ±0.05mm	10028	10038



Rtx®-CLPesticides Column Kits

Kits include a universal angled "Y" Siltek™ Press-Tight® connector, 5m Siltek™ guard column, and columns listed.

Nominal ID	cat.#
30m, 0.53mm ID, 0.50µm Rtx®-CLPesticides column	
30m, 0.53mm ID, 0.42µm Rtx®-CLPesticides2 column	11197
30m, 0.32mm ID, 0.50µm Rtx®-CLPesticides column	
30m, 0.32mm ID, 0.25µm Rtx®-CLPesticides2 column	11198
30m, 0.25mm ID, 0.25µm Rtx®-CLPesticides column	
30m, 0.25mm ID, 0.20µm Rtx®-CLPesticides2 column	11199

U.S.: 110 Benner Circle • Bellefonte, PA 16823 • 814-353-1300 • **800-356-1688** • fax: 814-353-1309 • **www.restekcorp.com**

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Restek France: (33) 01 60 78 32 10

Restek Ireland: (44) 2 890 814 576

Thames Restek U.K. LTD: (44) 01753 624111

Thames Restek Scotland LTD: (44) 870 241 1247

Lit. Cat.# 59803A-INT

RESTEK

introducing Siltek™ deactivation from RESTEK

Order Siltek™-deactivated products
Top Ten Most Frequently Asked Questions

- Maximizes the inertness of sample pathway
- Minimizes breakdown
- Low bleed
- Thermally stable
- "Clean and green" -- manufactured without the use of harmful organic solvents

First Restek developed a 100% polymeric, high-temperature silanization process for inlet liners. Restek's polymeric silanization is the deactivation of choice, resulting in low endrin breakdown and inertness for compounds containing active functional groups like phenols, diols, and acids.

Next Restek developed a surface deactivation for handling basic compounds, like those found in drugs, azo-dyes, and amines. Our base-deactivated glass accessories provide excellent recovery of trace-level active basic compounds.

Now Restek Introduces the Next Generation of Deactivation... Siltek™

The Siltek deactivation process (patent pending) produces a highly-inert glass surface, which features high temperature stability, extreme durability, and low bleed. Try Siltek-deactivated liners, guard columns, wool, and connectors for minimized breakdown and better recovery of sample analytes.

INERTNESS

Enhanced Recovery of Trace-Level Chlorinated Pesticides

US Environmental Protection Agency (EPA) Method 8081A is a challenging analysis that requires gas chromatographic (GC) separation and detection of chlorinated pesticides in low ppb levels. A typical configuration for this analysis includes a direct injection sleeve and a guard column connected to one or two analytical columns via a press-tight connector. Three compounds listed in the 8081A Method -- endrin, DDT, and methoxychlor -- are highly susceptible to breakdown on a variety of active surfaces. Therefore, a chromatographic system that is inadequately deactivated will result in poor linearity, poor reproducibility, and costly analytical downtime.

In Figure 1, an on-column analyte concentration of 50ppb shows 62% endrin breakdown on an inadequately deactivated liner, as indicated by the integrated decomposition products of endrin aldehyde (peak 18) and endrin ketone (peak 21). Use of a Siltek™-deactivated inlet liner results in less than 1% endrin breakdown, and undetectable DDT and methoxychlor breakdown (Figure 2). A completely deactivated GC system shows amazing resolution of the complete list of 8081A analytes using a Siltek™-deactivated liner, Siltek™-deactivated Press-Tight® connector, Siltek™-deactivated guard column, and an Rtx®-CLPesticides analytical column (Figure 3).

NEUTRAL DEACTIVATION

Improved Analyses of Samples Containing Acidic, Basic, and Neutral Compounds

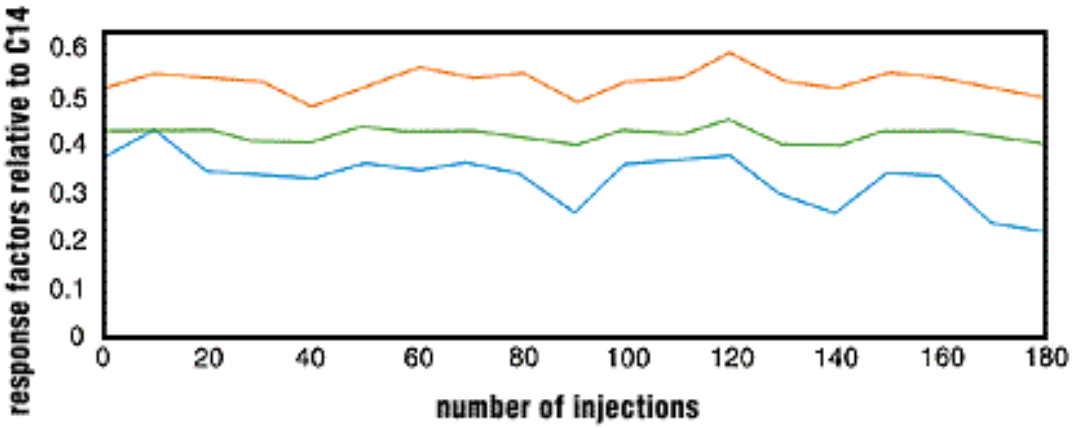
Semi-volatile analyses also can present a challenge because the sample mixture may include compounds with acidic, basic, and neutral characteristics. Improperly deactivated surfaces will adsorb many or all of these compounds. The Restek XTI® test mix is a good example of this type of sample (e.g., 1,2-hexanediol, n-nitroso-di-n-propylamine, benzoic acid, 2,4-dinitrophenol, nitrophenol, 4-nitroaniline, pentachlorophenol, and carbazole). A successful splitless analysis of the XTI® test mix at 4-10ng on-column concentration is accomplished using a Siltek™-deactivated liner and an Rtx®-5 analytical column (Figure 4). The inertness of the Siltek™ surface to acidic, basic, and neutral compounds is obvious.

Extreme Durability Protects Against Acidified Samples

Many analytical matrices contain hydrochloric acid (HCl), which remains from sample preparation procedures. These acidified samples can decrease the lifetime of inlet liner deactivations. However, Siltek™ deactivation can withstand high temperatures and handle repeated exposure to a caustic or acidic environment. A plot of active compound responses after repeated injections of a pH 1.4 HCl (aq) solution demonstrates remarkable stability after 120 injections of HCl solution (Figure 5).

Figure 5

Siltek™ liner retains remarkable inertness and stability after 120 injections of a pH 1.4 (0.4 Molar) HCl aqueous solution.



XTI®-5, 30m, 0.25mm ID, 0.25µm (cat.#12223), 4mm splitless gooseneck Siltek™-deactivated liner (cat.# 20798-214.1); **Inj.:** 250°C; **Det.:** 330°C, **Oven temp.:** 40°C (hold 2 min.) to 190°C @ 6°C/min. to 330°C @ 30°C/min. (hold 10 min.)

pentachlorophenol

n-nitroso-di-*n*-propylamine

diol

LOW BLEED

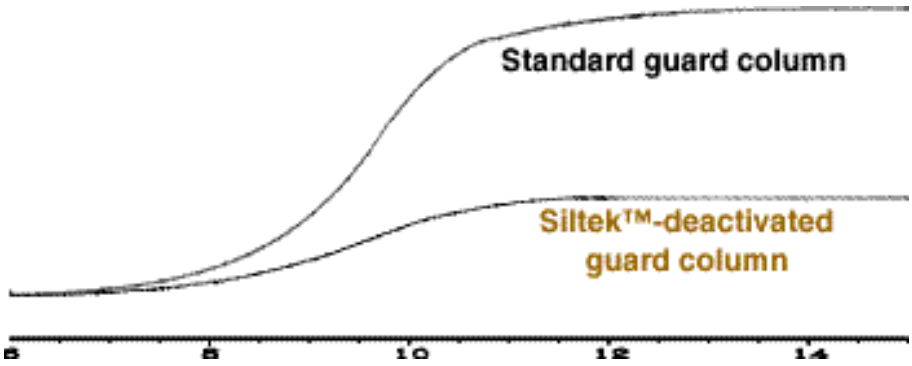
Lower Limits of Detection for High Molecular Weight Compounds

Traditional deactivated surfaces thermally degrade at the elevated temperatures used in GC analysis. As the temperature increases, so does the rate of thermal degradation of the column phase, which is reflected by an increase in the baseline of a detection system. This undesirable phenomenon, called bleed, can interfere with the accurate quantitation of analytes. Although deactivated guard columns are not coated with stationary phase, their surface treatment can still show a measurable bleed level.

Siltek™ deactivation results in extremely low bleed levels at elevated temperatures. A Siltek™-deactivated guard column has 60% less bleed than the standard deactivated guard column (Figure 6). Lower bleed translates to lower limits of detection for high molecular weight compounds. Therefore, better deactivation provides better analytical results.

Figure 6

The Siltek™-deactivated guard column has 60% less bleed than the standard deactivated guard column at 330°C.

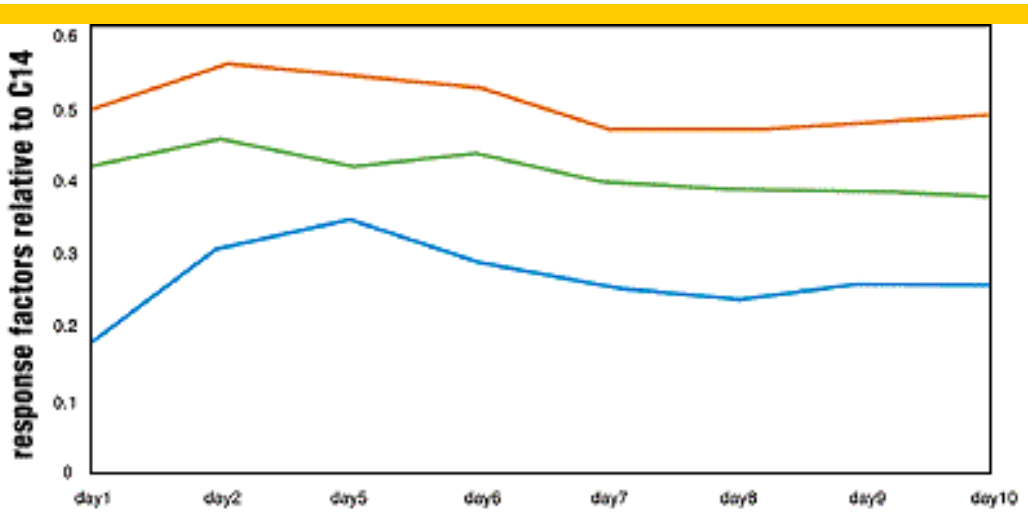


Thermally Stable

Another important criterion for any deactivation is its thermal stability over time. This factor is directly related to bleed. If a surface exhibits high bleed, it will not maintain its integrity over long periods of time at elevated temperatures. However, Siltek™ deactivation is rugged at high temperatures. Using a Siltek™-deactivated inlet liner does not significantly decrease the response of analytes when operated at 330°C over 10 days (Figure 7).

Figure 7

Using a Siltek™-deactivated inlet liner maintains the response of analytes, even when operated at 330°C over 10 days.



XTI®-5, 30m, 0.25mm ID, 0.25µm (cat.#12223), 4mm splitless gooseneck Siltek™-deactivated liner (cat.# 20798-214.1); **Inj.:** 330°C; **Det.:** 330°C, **Oven temp.:** 40°C (hold 2 min.) to 190°C @ 6°C/min. to 330°C @ 30°C/min. (hold 10 min.); 1 min. purge

Siltek™ Deactivation
Minimize Breakdown of Chlorinated Pesticides

by Deb Salabsky, Applications Chemist

Gas chromatographic (GC) analysis of chlorinated pesticides presents unique challenges to environmental laboratories because the compounds are analyzed at trace levels and are susceptible to decomposition. Analytical methods have stringent breakdown and reproducibility criteria (such as the US Environmental Protection Agency (EPA) Methods 8081 and 608).

Breakdown occurs when a compound decomposes into related compounds, generally from a thermal or chemical reaction that has taken place. Two pesticides prone to breakdown are endrin, which breaks down into endrin aldehyde and endrin ketone, and DDT, which breaks down into DDE and DDD. The source of breakdown is most commonly caused by active sites in the GC system. Routine maintenance of the injection port, prevention of sample flashback, and thorough deactivation of the inlet liner and GC columns are essential to minimize compound breakdown.

A study on the effect of inlet liner deactivation on endrin and DDT breakdown shows that breakdown can be decreased drastically by using Siltek™ products (Figure 1). When a direct injection of a pesticide standard is injected into an untreated glass Uniliner®, endrin breakdown is calculated at 62% and DDT breakdown is less than 1%. In a Siltek™ Uniliner® inlet liner, endrin and DDT breakdown measured less than 1%.

We also studied the effects of hot metal surfaces on endrin and DDT breakdown. For more information, request Applications Note #59111.

Our research demonstrates that direct injection into a Siltek™ Uniliner® inlet liner provides the best protection against problematic breakdown in the injection port when analyzing chlorinated pesticides. Endrin is more prone to breakdown on glass surfaces than metal, and DDT is more prone to breakdown on metal surfaces. Restek's Siltek™ deactivation can yield a minimal endrin breakdown of

1%!

For a complete, highly inert pathway for chlorinated pesticides, Restek also offers Rtx®-CLPesticides and Rtx®-CLPesticides2 columns and Siltek™ guard columns.

Now available!

New, improved Siltek™ pesticide column kits! Kit includes a Rtx®-CLPesticides column and a Rtx®-CLPesticides2 column; a 5m Siltek™ guard column; and a Siltek™ universal, angled "Y" Press-Tight® connector. (Note: columns are not pre-connected in these kits).

Product Listing

For Siltek™-deactivated inlet liners, add the corresponding suffix number to your liner catalog number.

Siltek™-Deactivated Inlet Liners

qty.	Siltek™	Siltek™ with Siltek™-deactivated wool	Siltek™ with CarboFrit™
each	-214.1	-213.1	-216.1
5-pk.	-214.5	-213.5	-216.5
25-pk.	-214.25	-213.25	-216.25

Siltek™-Deactivated Press-Tight™ Connectors

type	qty.	cat.#
straight	25-pk.	20449
angled 'Y'	3-pk.	20469

Siltek™-Deactivated Borosilicate Wool

qty.	cat.#
10g	cat.# 21100

Rtx®-CLPesticides Kits

ID (mm)	cat.#
0.25	11199
0.32	11198
0.53	11197

Siltek™-Deactivated Guard Columns

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 ±0.04mm	10028	10038

“You guys did a great job!”

That's what John Syslo, an analytical chemist at Lockheed-Martin, says about Siltek™ deactivation. Pleased with the results of an analysis performed with a Siltek™ deactivated liner, John explains, "I have evaluated the Siltek™ liners against standard silanized deactivation and found significantly lower breakdown for endrin and DDT. The Siltek™ liners are superior to any other deactivation I've seen in relation to inertness."

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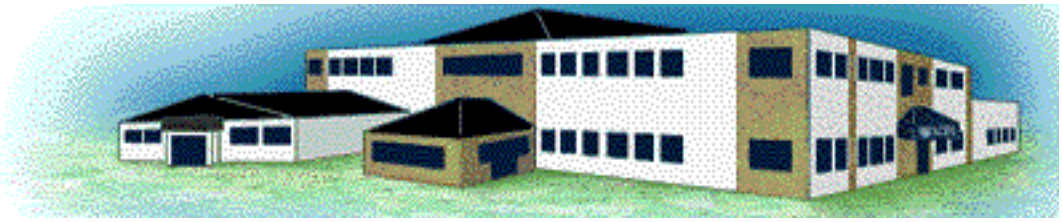


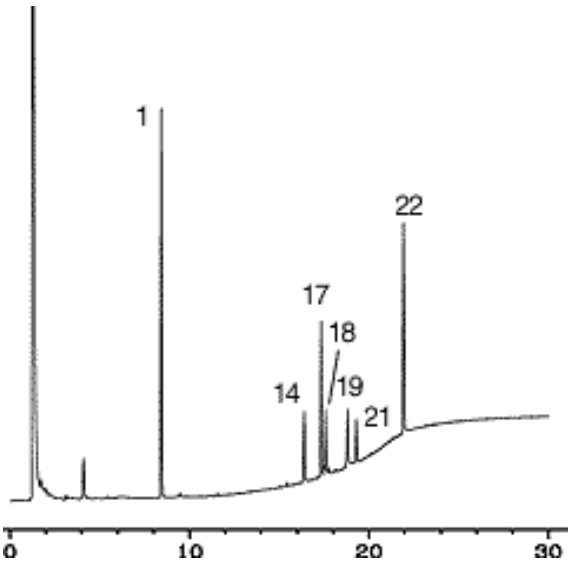
Siltek™ deactivation 101

Top Ten Most Frequently Asked Questions

More information about Siltek™

Figure 1: Direct injection Uniliner® without deactivation exhibits 62% endrin breakdown.

[see Figure 2 for comparison]



Component list:

1. 2,4,5,6-tetrachloro-m-xylene
14. endrin
17. 4,4'-DDT
18. endrin aldehyde
19. methoxychlor
21. endrin ketone
22. decachlorobiphenyl

Run Conditions:

30m, 0.53mm ID, 0.42µm Rtx-CLPesticides2 (cat.#11340) with open-top Uniliner® (cat.# 20843-214.1 for Siltek™ deactivation)

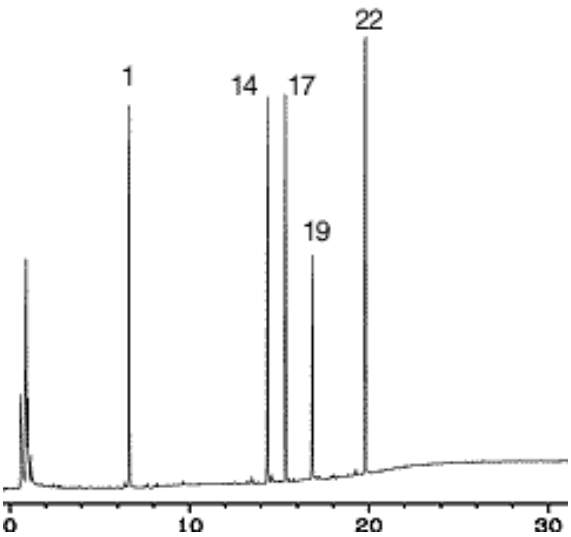
Inj.: 1µL of 50pg/µL standard of tetrachloro-meta-xylene (IS), endrin, 4,4'-DDT, methoxychlor, and decachlorobiphenyl (IS)

Oven temp:	120°C (hold 1 min.) to 300°C @ 9°C/min. (hold 10 min.)
Inj. temp.:	250°C
Det.:	ECD, 300°C
Carrier gas:	helium

<Summer 1999 *Advantage*

Figure 2: A Siltek™-deactivated liner exhibits approximately 1% endrin breakdown.

[see Figure 1 for comparison]

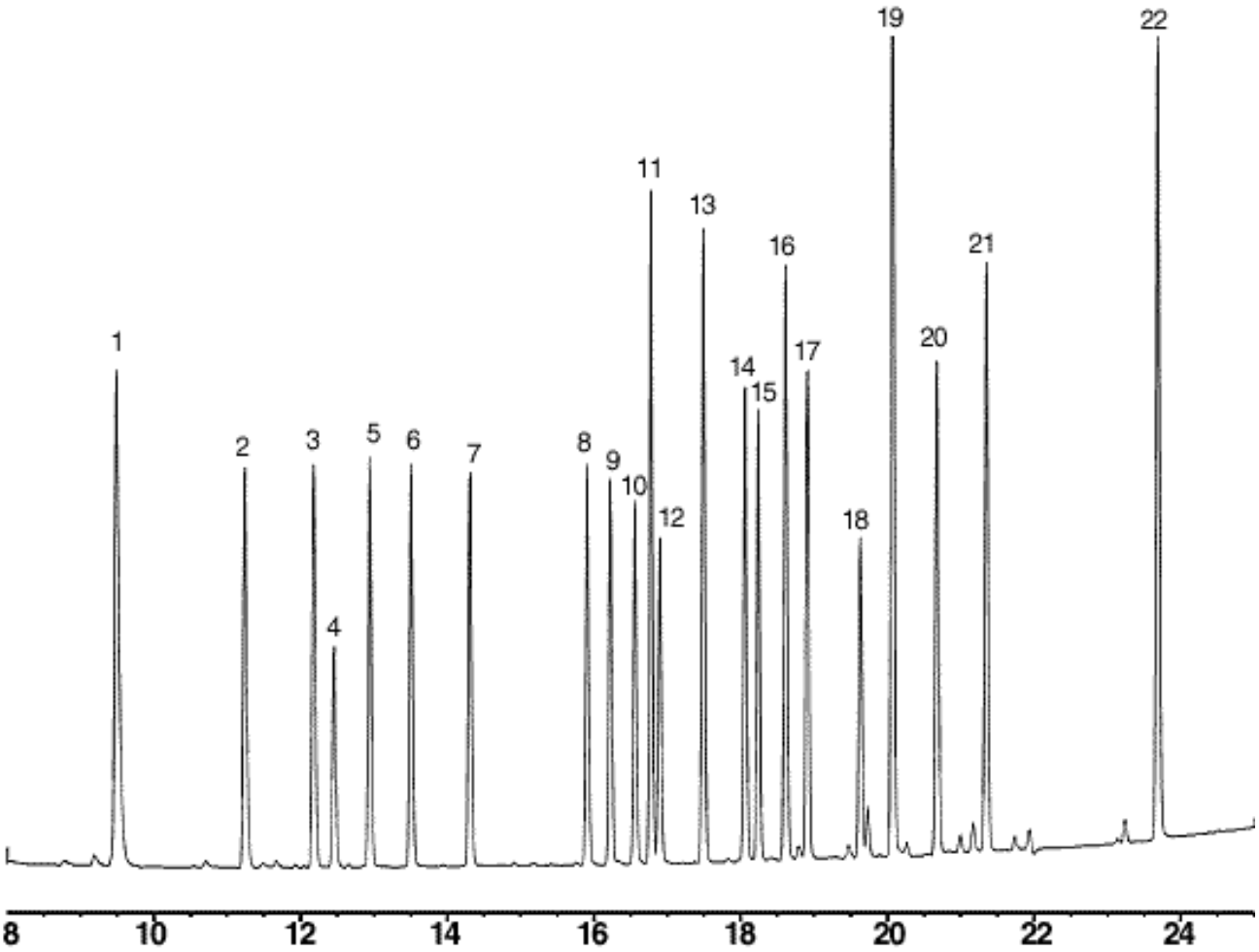


Component list:
1. 2,4,5,6-tetrachloro-m-xylene
14. endrin
17. 4,4'-DDT
19. methoxychlor
22. decachlorobiphenyl

Run Conditions:
30m, 0.53mm ID, 0.42µm Rtx-CLPesticides2 (cat.#11340) with open-top Uniliner® (cat.# 20843-214.1 for Siltek™ deactivation)
Inj.: 1µL of 50pg/µL standard of tetrachloro-meta-xylene (IS), endrin, 4,4'-DDT, methoxychlor, and decachlorobiphenyl (IS)

Oven temp:	120°C (hold 1 min.) to 300°C @ 9°C/min. (hold 10 min.)
Inj. temp.:	250°C
Det.:	ECD, 300°C
Carrier gas:	helium

Figure 3: Analysis of US EPA Method 8081 with a Siltek™-deactivated Uniliner® and guard column shows resolution of all 22 chlorinated pesticides.



Component list:

1. 2,4,5,6-tetrachloro-m-xylene
2. alpha-BHC
3. gamma-BHC
4. beta-BHC
5. delta-BHC
6. heptachlor
7. aldrin
8. heptachlor epoxide
9. gamma-chlordane
10. alpha-chlordane
11. 4,4'-DDE
12. endosulfan I

Run Conditions:

30m, 0.32mm ID, 0.5µm (cat.# 11139) Rtx®-CLPesticides with a 5m, 0.32mm ID Siltek™-deactivated guard column (cat.# 10027) and a Siltek™-deactivated gooseneck liner (cat.# 20798-214.1)

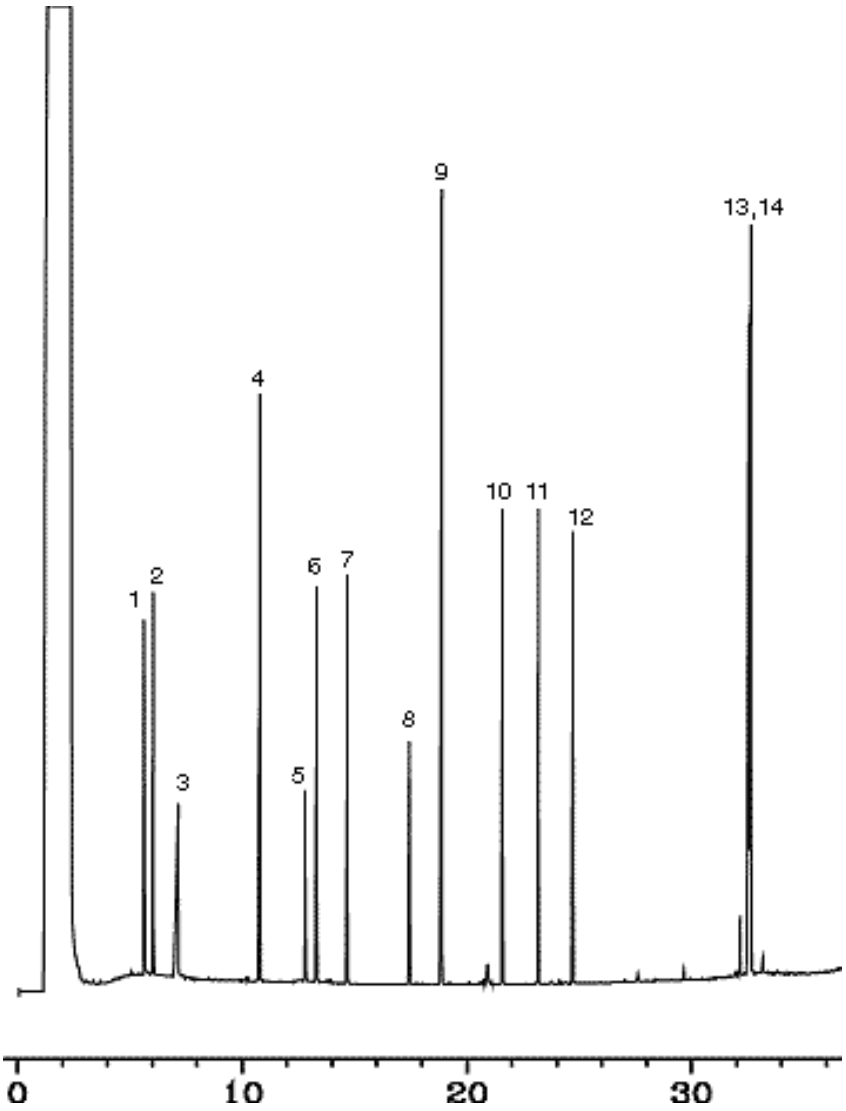
On-column conc.: 16-160pg

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

Oven temp:	120°C (hold 1 min.) to 300°C @ 9°C/min. (hold 10 min.)
Inj. temp.:	250°C, splitless (hold for 0.75 min.)
Det.:	ECD, 300°C with anode purge
Carrier gas:	helium at 31cm/sec. linear velocity

Siltek™ Deactivation

Figure 4: Siltek™-deactivated liners show excellent interness even with low ng concentration of active compounds used in XTI® test mixture.



Component list:

1. 1,2-hexanediol
2. *n*-nitroso-di-*n*-propylamine
3. benzoic acid
4. C14
5. 2,4-dinitrophenol
6. nitrophenol
7. 4-nitroaniline
8. pentachlorophenol
9. carbazole
10. C20
11. C21
12. C22
13. benzo-(b)-fluoroanthene
14. benzo-(k)-fluoroanthene

Run Conditions:

30m, 0.25mm ID, 0.25µm XTI®-5 (cat.#12223) with 4mm splitless sleeve (cat.# 20772-214.1 for Siltek™ deactivation)
Inj.: 4-10ng on-column of XTI® test mix, 1 min. splitless

Oven temp:	40°C (hold 2 min.) to 190°C @ 6°C/min. to 330°C (hold 10 min.)
Inj. temp.:	250°C, splitless (hold for 0.75 min.)
Det.:	ECD, 300°C
Carrier gas:	helium

Siltek™ Deactivation

Siltek™ Deactivation -- The Next Generation

Outstanding Performance for Chlorinated Pesticide Analyses

- Maximizes the inertness of sample pathway
- Minimizes breakdown
- Low bleed
- Thermally stable
- "Clean and green" -- manufactured without the use of harmful organic solvents

Top Ten Most Frequently Asked Questions about Siltek™ Deactivation

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First Restek developed a 100% polymeric, high-temperature silanization process for inlet liners. Restek's polymeric silanization is the deactivation of choice, resulting in low endrin breakdown and inertness for compounds containing active functional groups like phenols, diols, and acids.

Next Restek developed a surface deactivation for handling basic compounds, like those found in drugs, azo-dyes, and amines. Our base-deactivated glass accessories provide excellent recovery of trace-level active basic compounds.

Now Restek Introduces the Next Generation of Deactivation... Siltek™

The Siltek deactivation process (patent pending) produces a highly-inert glass surface, which features high temperature stability, extreme durability, and low bleed. Try Siltek-deactivated liners, guard columns, wool, and connectors for minimized breakdown and better recovery of sample analytes.

Siltek-Deactivated Inlet Liners

Gas chromatographic (GC) analysis of chlorinated pesticides presents unique challenges to

environmental laboratories because these compounds often are analyzed at trace levels and are susceptible to decomposition caused by reactive sites in the analytical system. Pesticide methods, such as the US Environmental Protection Agency (EPA) Methods 8081 and 608, have stringent breakdown criteria. The two pesticide compounds used to monitor system inertness are notorious for exhibiting breakdown -- endrin, which breaks down into endrin aldehyde and endrin ketone, and DDT, which breaks down into DDE and DDD. The breakdown of these compounds most often occurs in the GC injection port. Routine maintenance of the injection port and GC columns is essential to minimize compound breakdown.

To illustrate the importance of proper surface deactivation for endrin and DDT analysis, a 50pg/µL test mix was injected on an undeactivated direct injection glass inlet liner. Endrin breakdown was 62% and DDT breakdown was below detection limits, as shown in Figure 1.

Next, the raw liner was removed and replaced with a Siltek-deactivated direct injection liner. The results of this injection are shown in Figure 2. Endrin breakdown measured less than 1% and DDT breakdown again was below detection limits. The results not only confirm the necessity for inlet liner deactivation in pesticides analysis, but also show the inherent inertness of Siltek deactivation and its ability to improve the accuracy of pesticides analysis.

Siltek-Deactivated Guard Columns

Guard columns are commonly used in the analysis of chlorinated pesticides. Many analysts use them as a way to divide a sample equally onto two different analytical columns by way of a Press-Tight® 'Y' connector. This configuration allows a primary and a confirmational analysis using one injection. Guard columns also make routine maintenance easier by allowing removal of the first meter of column. This eliminates non-volatile contamination, without affecting the analytical column(s). Siltek-deactivated guard columns and Siltek-deactivated connectors provide an inert sample introduction pathway that is ideal for chlorinated pesticide analysis.

Siltek Deactivation -- The Complete Solution

The analysis of US EPA Method 8081 calibration standard is shown in Figure 3. This chromatogram was generated using a Siltek-deactivated inlet liner and guard column, and an Rtx®-CLPesticides analytical column.

The best protection against endrin and DDT breakdown for chlorinated pesticide analysis is to outfit your GC with Siltek-treated products. For a highly inert pathway and fast GC cycle times, use Rtx®-CLPesticides and Rtx®-CLPesticides2 analytical columns in

combination with Siltek-deactivated liners and guard columns.

Product Listing

For Siltek™-deactivated inlet liners, add the corresponding suffix number to your liner catalog number.

Siltek™-Deactivated Inlet Liners

qty.	Siltek™	Siltek™ with Siltek™-deactivated wool	Siltek™ with CarboFrit™
each	-214.1	-213.1	-216.1
5-pk.	-214.5	-213.5	-216.5

Siltek™-Deactivated Press-Tight™ Connectors

type	qty.	cat.#
straight	25-pk.	20449
angled 'Y'	3-pk.	20469

Other types of Press-Tight™ connectors can be ordered on a custom basis by adding the suffix -266.

Siltek™-Deactivated Borosilicate Wool

qty.	cat.#
10g	cat.# 21100

Siltek™-Deactivated Guard Columns

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 ±0.04mm	10028	10038

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