



Figure 1: CarboFrit® inserts show excellent response to active phenols including 2,4-dinitrophenol and pentachlorophenol compared to liners packed with deactivated glass wool.

Table 1 Endrin Breakdown Results with CarboFrit® Inserts

Sleeve#	% Endrin Breakdown
1	3.4
2	7.8
3	0.8
4	0.4
5	2.3
Average	2.9
Standard Dev.	2.7

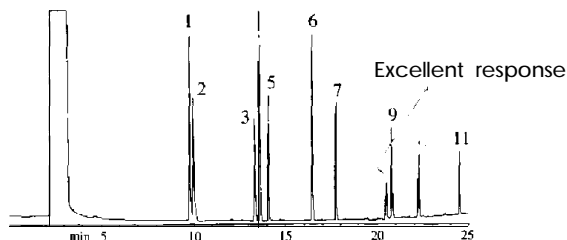
The inertness of CarboFrit® inserts and fused silica wool was compared by analyzing a mixture of EPA Method 604 phenols. Figure 1 shows the analysis of these phenols. The response of 2,4-dinitrophenol (peak 8) and 2-methyl-4,6-dinitrophenol (peak 10) is significantly higher with the CarboFrit®-packed liner. Even though the glass wool packed into the first liner was deactivated, some active sites were exposed from placing it into the sleeve. These exposed sites can adsorb low levels of active compounds such as 2,4-dinitrophenol and 2-methyl-4,6-dinitrophenol.

One limitation we discovered was that the CarboFrit® inserts can retain low concentrations of hydrocarbons above C30 or 4- and 5-ring aromatic hydrocarbons at levels less than 20ng/pl in the splitless injection mode. However, at concentrations commonly used for split injections (>20ng/ul), no retention was observed. For all other classes of compounds and lower molecular weight hydrocarbons, no retention was observed. This is true even at levels below 50pg. Increased injection port temperatures will reduce retention of high molecular weight aromatic compounds at trace levels when using

CarboFrit® inserts. Elevating injection port temperatures to as high as 400°C will ensure that these components completely elute from the injector. Unlike deactivated glass wool that can release siloxane deactivants at high injection port temperatures, CarboFrit® inserts show no background contamination peaks even at injection port temperatures of 350°C. CarboFrit®-packed liners can be oxidized at high temperatures in the presence of room air. Therefore, the injector should be cooled before installing or replacing the CarboFrit® insert. In addition, high-purity carrier gas and oxygen-removal traps should be used on carrier gas lines.

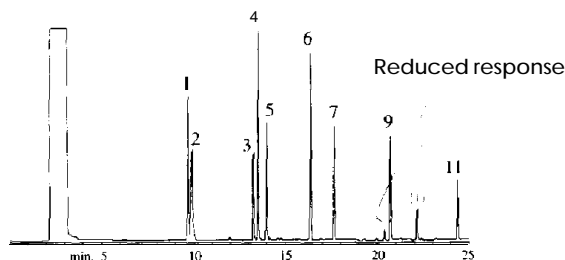
Restek has developed an alternative liner packing that offers all the positive features of wool without the adsorption problems. The CarboFrit® insert is easy to install and replace and can be used for a wide range of applications including alcohols, amines, pesticides, esters, dioxins, triglycerides, fatty acid methyl esters, and hydrocarbons. Call Restek to discuss how these inserts can help with your analyses.

liner packed with a Carbofrit® insert



- | | | |
|-------------------|----------------------------|--------------------------------|
| 1. phenol | 4. 2,4-dimethylphenol | 8. 2,4-dinitrophenol |
| 2. 2-chlorophenol | 5. 2,4-dichlorophenol | 9. 4-nitrophenol |
| 3. 2-nitrophenol | 6. 4-chloro-3-methylphenol | 10. 2-methyl-4,6-dinitrophenol |
| | 7. 2,4,6-trichlorophenol | 11. pentachlorophenol |

liner packed with deactivated wool



30m, 0.25mm ID, 0.25µ XTI®-5 (cat.# 12223). 1.0µl splitless injection of Method 604 phenols. **Oven temp.:** 50°C (hold 4 min.) to 250°C @ 8C/min.; **Inj. & det. temp.:** 275°C; **Carrier gas:** H₂, **Linear velocity:** 24cm/sec. set @ 50°C; **Splitless hold time:** 1 min.; **Split vent flow:** 50mU/min.

Gob, K., "Sample Evaporation in Hot GC Injectors". The *Restek Advantage*, Winter 1996, pp. 12-13.



Prepacked Sleeves.

4mm Splitless		4mm Gooseneck
for HP	for Varian	for HP
20772-209.1	20904-209.1	20798-209.1
20773-209.5	20905-209.5	20799-209.5
20774-209.25	20906-209.25	20800-209.25

The catalog numbers above ending in ".1" are single packs, ".5" are 5-packs, ".25" are 25-packs, in ".1" are single packs, in ".25" are 25-packs

To order other sleeves >3.5mm ID prepacked with CarboFrit® inserts, add the appropriate suffix to the inlet sleeve catalog number.

Each	-209.1
5-pack	-209.5
25-pack	-209.25

Replacement hits & Accessories:	Cat #
CarboFrit (10-Pack)	20295
Puller\ Packing tool	21642