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UNITED STATES • Supelco • Supelco Park • Bellefonte, PA 16823-0048 · Phone 800-247-6628 or 814-359-3441 · Fax 800-447-3044 or 814-359-3044 · email:supelco@sial.com

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New Supelcarb™ Split Vent Trap Exhibits Longer-Lasting Trapping of Toxic Compounds

W. Betz, O. Cheesman, R. Bartram

Indoor pollution in the industrial workplace is a continuing concern. Because of this concern, Supelco has designed a cartridge containing carbonaceous media to trap pollutants from the split vent outlet of a gas chromatograph. In our laboratory studies, this Supelcarb trap outperformed conventional activated charcoal traps.

Over the past several decades, federal regulations have facilitated the reduction of airborne contamination. Recently, adsorbent traps have been developed for eliminating air pollution caused by the capillary split vent injection systems of modern gas chromatographs.

Typical split vent flow rates (10 to 100mL/min) carry most of an injected sample into the laboratory atmosphere. Many GC manufacturers recommend venting the system into a fume hood. However, this is often impossible due to space constrictions. Another approach is to place an adsorbent trap onto the split vent outlet.

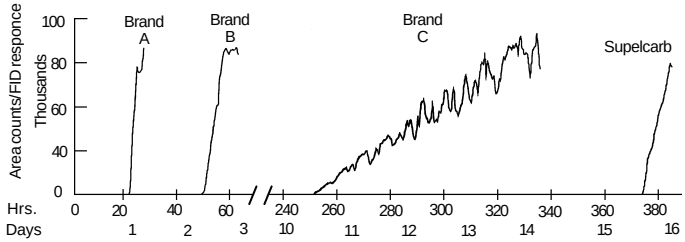
Supelco has designed the Supelcarb split vent trap, a replaceable cartridge filled with a high-capacity carbonaceous adsorbent, to trap a broad range of organic compounds. The adsorbent's narrow particle size distribution and spherical shape allow for tighter packing and less gas channeling than the irregular-shaped activated charcoal particles.

To determine the longevity of the Supelcarb trap and how it compared to three competitors' split vent traps, we tested for and compared the breakthrough volume for each trap. A breakthrough volume is defined as the amount of gas required to pass through the adsorbent bed to elute one molecule of a compound introduced at the inlet of the bed. Once the compound is injected, it will move through the bed of the trap as long as flow is maintained. When an adsorbent bed is saturated, the concentration of the toxic compound at the outlet is temporarily higher than that at the inlet. Therefore a spent trap is more harmful than no trap at all. Timely replacement of traps cannot be overemphasized.

The study simulated a GC operation in a typical lab: a 30-minute GC run and split vent flow of 65mL/min, with an automated analytical system comprised of two GCs. A trap was connected to the split vent outlet of the first GC, and an autosampler injected one microliter of dichloromethane into the GC every 30 minutes. The second GC, with an automated six-port sampling valve, was programmed to sample effluent from the trap and deliver it to the column every 30 minutes. Dichloromethane was chosen as the analyte because it is one of the fastest eluting compounds, it is a commonly used solvent, and it is a suspected carcinogen.

The collected data show breakthrough on the Supelcarb trap occurs after 1458L of helium has traveled through the trap — approximately 2 weeks at 65mL/min. The other traps did not show a comparable capacity (Figure A). In fact the breakthrough times for the other traps are less than the manufacturer's recommended replacement times. We recommend using the Supelcarb trap for longer-lasting trapping and replacing it every two weeks.

Figure A. Breakthrough on Split Vent Traps



	Brand A	Brand B	Brand C	Supelcarb
Time before breakthrough:	22.5 hr.	49.5 hr.	249 hr.	374 hr.
Number of injections:	45	99	498	748
Manufacturer recommended replacement time:	168 hr.	300 injections	720 hr.	336 hr.
Breakthrough volume:	88 liters	193 liters	971 liters	1458 liters

Ordering Information:

Description	Cat. No.
Supelcarb Split Vent Trap Starter Kit	
one trap and attachment kit	**22536**
Supelcarb Replacement Traps	
One trap	**22535,01**
Two traps	**22535,02**
Five traps	**22535,05**
Polypropylene Reducing Unions	
pk. of 10	**21999**

For more information about the Supelcarb split vent trap, request publication T396096.

Supelcarb is a trademark of Sigma-Aldrich Co.