

Supelcarb™ GC Split Vent Traps Adsorb Toxic Compounds Longer Than Conventional Traps

Indoor pollution in the industrial workplace is a continuing concern. In an effort to eliminate airborne pollutants, Supelco has designed a cartridge containing a special carbonaceous adsorbent, to trap pollutants from the split vent outlet of a gas chromatograph. In our laboratory studies, this trap proved to outperform the conventional activated charcoal traps.

Key Words:

- split vent
- breakthrough volume
- carbonaceous adsorbent

Over the past several decades, federal regulations have facilitated the development of devices to minimize or eliminate airborne contamination. More recently, adsorbent traps have been developed for eliminating air pollution caused by the capillary split vent injection systems of modern gas chromatographs (GCs).

Typical split vent flow rates ranging from 10 to 100mL/min carry most of the injected sample into the laboratory atmosphere. Many GC manufacturers recommend venting the split injection systems into fume hoods. 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 trap, a replaceable split vent trap filled with a high-capacity carbonaceous adsorbent media, for trapping a broad range of organic compounds. This adsorbent has been specifically prepared for split vent applications. Its narrow particle size distribution and spherical shape allow for tight packing and less gas channeling than the irregular shape of activated charcoal particles (Figure A).

To determine the longevity of the Supelcarb trap and how it compared to three competitors' split vent traps, we tested for and compared each trap's breakthrough volume. 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 a 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 adsorbent 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. The trap was connected to the split vent outlet of the first GC. An autosampler injected one microliter of dichloromethane into this GC every 30 minutes. The second GC, with an automated 6-port sampling valve, was programmed to sample effluent from this trap and deliver it to an

Figure A. High-Capacity Carbonaceous Adsorbent Traps Split Vent Pollution Longer

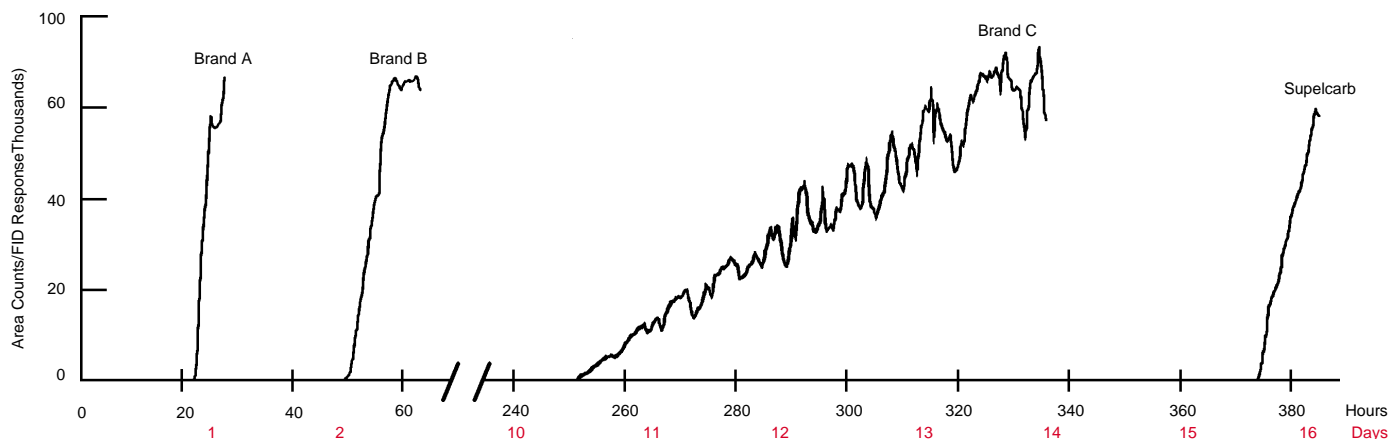


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analytical column every 30 minutes. Dichloromethane was chosen as a solvent because: it is one of the fastest eluting compounds and, therefore, will break through before most other compounds; it is a commonly-used solvent; and it is a suspected carcinogen.

The collected data show that breakthrough volume on the Supelcarb trap occurs after 1458L of helium has traveled through the trap, or approximately 2 weeks at 65mL/min. The other traps did not show a comparable capacity (Figure B). In fact, the breakthrough time of the other traps is actually 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 B. Breakthrough Data on Split Vent Traps



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	Brand A	Brand B	Brand C	Supelcarb
Actual Breakthrough Time (Hours)	22.5	49.5	249.0	374.0
Manufacturer's Recommended Replacement Time	168 hr	300 injections	720 hr	336 hr
No. of Injections Before Breakthrough	45	99	498	748
Breakthrough Volume (Liters)	88	193	971	1458

Ordering Information:

Description	Cat. No.
Supelcarb split vent trap starter kit one trap and an attachment kit	22536
Supelcarb replacement traps	
One trap	2253501
Two traps	2253502
Five traps	2253505
Polypropylene reducing unions, pk. of 10	21999

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