O·I·Analytical
a xylem brand

Application Note 12861111

Keywords
Model 4560 and 4660
Purge and Trap
Trap Selection

Proper Trap Selection for the OI Analytical Model 4560 and 4660 Purge-and-Trap Sample Concentrators

One of the key factors in successful purge-and-trap analysis is the selection of the proper trap for the target analytes of interest. Several traps ware available, so it is important to completely define the application when selecting a trap. If there are several purge-and-trap units running different applications it may be necessary to use different traps to optimize performance.

The original trap used for purge-and-trap analysis consisted of a 1-cm section of OV-1 sorbent on a chromatographic support, followed by 7.7-cm sections of Tenax®, silica gel, and activated charcoal. This packing is listed in the order the sorbents are packed in the trap for the purge state of the analysis. The OV-1 sorbent was found to cause excessive bleed and artifact peaks, so the original trap was replaced with a trap containing 8-cm sections of Tenax, silica gel, and activated charcoal. this trap provides good trapping and desorb performance for compounds ranging from dichlorodifluoromethane (Freon 12) up to napththalene and the trichlorobenzenes. The Tenax traps compounds with boiling points higher than 35 °C; the silica gel traps compounds with boiling points below 35 °C with the exception of dichlorodifluoromethane and compounds of similar volatility. The charcoal traps disclorodifluoromethane and other highly volatile compounds. Very low boiling compounds such as ethane and ethylene are not trapped on this trap using the standard condition of 11 minutes of purge time at 40 mL per minute purge flow.

If dichlorodifluoromethane is not going to be analyzed, a trap consisting of 16 cm of Tenax and 8 cm of silica gel may be used and will give good performance. If only compounds with boiling points greater than 35 °C are to be analyzed, a trap packed with 24 cm of Tenax will give good results. The Tenax trap is often used for BTEX analysis as the methanol in the standards can be removed from the trap using dry purge, eliminating a possible interference.

For general use, trap #9 with equal length segments of Tenax, silica gel, and activated charcoal is recommended. For use with a mass spectrometer, trap #10 with equal length segments of Tenax, silica gel, and carbonized molecular sieve will give equivalent trapping and desorb performance with a lower background level of carbon dioxide.

For most applications, it is recommended to use traps #7-10. Traps #11 and #12 are VOCARB® type traps, for applications where this type of sorbent is required. An example of an application where a VOCARB trap would offer better performance is using purge and trap in conjunction with an ion trap mass spectrometer, where very small masses of water or

methanol may affect the mass spectrometer severely. for this application, the hydrophobic nature of the VOCARB trap allows the water and methanol to be dry purged off the trap, minimizing the problem.

For most applications with the Model 4560 and 4660, either the #10 (3-layer) or #11 (VOCARB) trap can be used. The standard packings provide optimum performance with fewer possible interactions to degrade analytes. Regardless of which trap is selected, the trap must be monitored on a daily basis for signs of analyte degradation due to trap deterioration. VOCARB traps may be necessary for certain applications, such as an ion trap mass spectrometer used as the detector, but for most applications, a trap using the standard USEPA recommended sorbents will give a longer useful life and more consistent performance from trap to trap.

The following table gives a listing of the traps OI Analytical offers and the applications where each trap is appropriate.

Table 1. Conventional Traps

Trap #	Tenax	Silica Gel	Activated Carbon	Carbon Mol. Sieve	Selected Applications
0	–	–	–	–	Blank trap for custom packing
7	24 cm	–	–	–	BTEX
8	16 cm	8 cm	–	–	602, 601 without gases
9	8 cm	8 cm	8 cm	–	502.2, 8021
10	8 cm	8 cm	–	8 cm	524.2, 624, 8260
11	VOCARB 3000				502.2, 601, 624, 524.4
12	VOCARB				BTEX

Publication 12861111

O·I·Analytical
a xylem brand
P.O. Box 9010
College Station, TX 77842-9010
Tel: (979) 690-1711 • Fax: (979) 690-0440 • www.oico.com