

Theory of Operation of the AutoDesorb System (cont.)

The desorption tube is then injected into the GC injection port. The desorption tube will pass through the opening in the middle plate of the Desorption Unit base to position the desorption tube in proper alignment with the GC injection port and the normally open desorption block assembly (7).

When injection is complete, a programmable time delay permits the injection port pressure to equilibrate and the system is checked for pressure leaks (8). If leaks are detected, the sample is unloaded, the error reported and the next sample in the sequence is analyzed.

If there are no leaks detected, the desorption blocks close around the desorption tube and the desorption tube will ballistically heat up to the set temperature or the temperature program ramp for the heater blocks will begin (9). The combination of the heat applied and the carrier gas flow through the Desorption Tube will purge the desired components into the GC injection port and onto the front of the GC column.

Normally desorption temperatures between 70°C and 250°C are suitable for most applications. The maximum desorption temperature permissible with the system is 450°C.

The heater blocks can be temperature programmed at ramp rates up to 100 degrees/min. Multi-step and hold time desorption heater block programs can be set up via the AutoDesorb software. Normal desorption times vary from 3 minutes to 15 minutes, however longer desorption times up to 100 minutes are permitted. This allows the trapped samples to be heated by the Desorption Tube Heater Blocks, the analytes thermally desorbed from the adsorbent resin and injected directly into the injection port of the Gas Chromatograph via the shortest path possible, i.e direct injection into the GC much like a syringe.

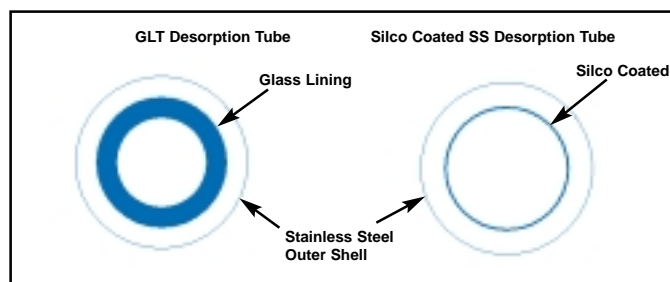
Since the column is normally maintained at subambient temperatures, the desorbed compounds of interest are trapped on the front of the GC column in a narrow band utilizing GC oven cooling or the optional GC Cryo-Trap™ Accessory. Despite the long desorption times, the peaks eluted from the column are extremely sharp and well resolved.

When the sample has been fully desorbed into the GC column, the desorption blocks are opened (10), the sample is uninjected from the GC injection port (11), the Cryo-Trap is heated to release the analytes from the Cryo-Trap and the GC is started by the AutoDesorb system. The GC temperature programming is commenced to elute and separate the analytes into the desired components. The purge gas remains on for 5.0 minutes to cool the desorption tube and then the sample is unloaded back into the AutoDesorb carousel (12).

When the GC analysis is complete, the next sample of the ChemStation™ sequence is loaded, the GC and AutoDesorb system parameters are reset and this next sample is analyzed.



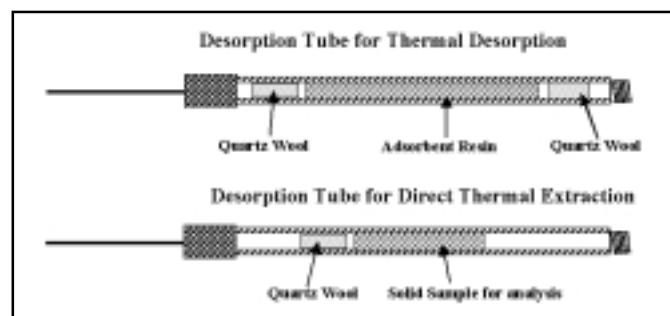
Loading of the Thermal Desorption tubes into the AutoDesorb Carousel



Cross section of thermal desorption tube



GLT Thermal desorption tube with threaded ends.



Loading of Desorption Tubes for sample analysis