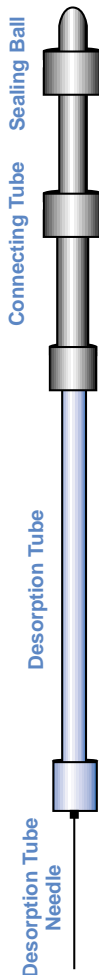


Theory of Operation of the AutoDesorb System

The AutoDesorb System sits on top of the GC injection port of a Agilent Technologies 6890 or 5890 GC, where it is utilized for the direct thermal desorption of both volatile and semi-volatile samples into the GC injection port and subsequently onto the GC column. It is NOT permanently mounted to the GC. It is held in place by gravity and can be lifted up and removed in seconds to restore the GC to its normal operation. The only modification to the GC is the addition of a carrier gas shut-off valve which does not effect the normal operation of the GC. The GC can be returned to normal GC operation in seconds.

The SIS™ AutoDesorb system is controlled by a PC Windows software program that is integrated with the Agilent ChemStation™ GC or GC/MS program to control the automatic injection, timed desorption, multi-step temperature ramp of heater blocks, control of GC Cryo-Trap accessory, and remote starting of the GC and Mass Spectrometer (see page C10). The Agilent ChemStation program is used for sample information input and it controls the analysis of multiple samples using the sequential running mode or single samples using the normal run mode.

The standard desorption tubes are Glass Lined Stainless Steel (GLT) Desorption Tubes which have an I.D of 3.0 mm, are 4.0" long by 1/4" diameter and are threaded on both ends. The inside of the desorption tube is lined with glass to provide an inert environment for sample. In addition 4.0 mm I.D. tubes are available in stainless steel and Silco coated stainless steel. Samples to be analyzed are collected on the desorption tubes containing an adsorbent resin such as Tenax™ TA or activated carbon. Alternatively, samples of small size (1 to 500 mg) can be packed directly into the desorption tube. The ends of the tubes can be fitted with stainless steel caps with seals to maintain sample integrity during sample storage. The thermal desorption tubes can be reused hundreds of times which brings the cost of sample containers down to pennies per sample.



When ready for analysis, the thermal desorption tube is attached to a connecting tube and the desorption needle is attached to the other end of the desorption tube. This connecting tube is the adapter that enables the desorption tube to be attached to the AutoDesorb carousel for thermal desorption analysis. The top of the connecting tube contains a spring loaded sealing ball to seal the desorption tube and maintain sample integrity until the actual thermal desorption process begins.

The thermal desorption tube is then loaded into the AutoDesorb system carousel. Up to 12 desorption tubes can be loaded into the carousel (1). Tubes can be continuously loaded and unloaded during the running of the sample sequence. During the thermal desorption process, each desorption tube is checked for leaks. If a problem occurs with the sample such as a pressure leak or system parameter problem, the sample is unloaded and a report of the error is indicated in the sample log table. The sample integrity is maintained, which enables the error to be corrected and the sample re-analyzed.

After the sample tube and connecting tube have been placed onto the carousel, the Agilent ChemStation software is set up with the GC or GC/MS method and the desorption method is setup on the AutoDesorb windows. When the sample run is initialized on the ChemStation Window, the desorption tube is automatically loaded in the pickup mechanism (2 & 3). The desorption heater blocks are preheated to their initial temperature (4) and the cryo-trap cooled to its preset temperature (5). The carrier gas through the desorption tube is turned on and the flow can be manually adjusted via the flow controller to between 1.0 ml/min and 120 ml/min for an initial purge time (6).

AutoDesorb Sequential Operations

