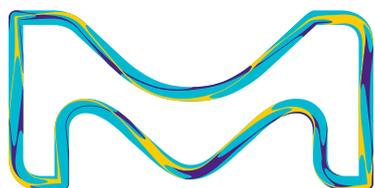


NEWS ON AIR

2021 Volume 1

Special Active Sampling



This edition will concentrate on active air sampling—the use of solvent or thermal desorption to extract analytes of interest from sampling media—highlighting some techniques and specialist products.

In addition to capturing analytes of interest from air, an active sampling device must ensure minimal background interference, have sufficient capacity or breakthrough volume for its intended application, and provide an acceptable pressure drop during sampling. Supelco® air sampling media meet these requirements and conform to NIOSH, OSHA, US EPA, and ASTM specifications. Our stringent quality control testing results in both consistency and reproducibility.

This volume of News on Air highlights:

- Solvent Desorption
- Thermal Desorption
- Filters and Cassettes
- Whole Air Sample
- Air Monitoring Pumps and Accessories
- Tube Spiking System: Adsorbent Tube Injector System (ATIS)

Solvent Desorption

Why Use Solvent Desorption?

Some applications use solvent desorption, rather than thermal desorption. Solvent desorption is typically used for:

- Thermally labile compounds
- When derivatization is necessary for higher analyte stability, recovery or detectability (e.g. formaldehyde, acids)
- High flow rate sampling using polyurethane foam (PUF)
- Occasional measurements not justifying expensive equipment
- Instances when thermal desorption equipment is unavailable

Types of Solvent Desorption Tubes

Several types of tubes are available, and guidance on the most suitable tube is typically given by method compendiums like the US Occupational Health and Safety Administration (OSHA) or the National Institute of Occupational Safety and Health (NIOSH). The information on methods is also available on our website.

ORBO™ Solvent Desorption Tubes

ORBO™ Solvent Desorption Tubes are packed in glass with sealed ends.



ORBO™ sorbent glass tubes contain trusted, high-quality Supelco® adsorbents. They are used for gas and vapor sampling, and typically have two beds of the same adsorbent separated by glass, wool, or foam. The dual-layer or two-bed construction of the tube allows for any sample breakthrough to be captured in a smaller back-up bed. We offer a wide range of adsorbents for routine sampling needs as well as special and challenging applications, such as analyzing unstable analytes requiring derivatization, for example.

Common Adsorbents:

- Charcoal
- Silica gel
- Florisil®
- Amberlite® XAD® - 2, 4, 7, 8
- Carbotrap®, Carbosieve® SIII, Carboxen®
- Polyurethane foam (PUF)

Coatings for Adsorbents When Derivatization is Required (when products are unstable):

- 2,4-dinitrophenylhydrazine (DNPH) on silica gel
- 2-(hydroxymethyl) piperidine (HMP) on Supelpak™20 - Amberlite® XAD®
- Florisil®

Thermal Desorption

Supelco® adsorbent technology is recognized as world-leading. Our evaluation and development of air sampling adsorbents has produced the industry's most comprehensive selection of adsorbent tubes—Carbotrap® tubes—offering superior performance for trapping and thermal desorption of organic compounds.



Selecting the proper adsorbent(s) is critical to achieving the best thermal desorption results. An ideal adsorbent tube will trap and retain compounds of interest for the entire sampling period, then allow total analyte desorption without thermal decomposition. The release rate should be as rapid as possible to minimize analysis time and provide the most efficient separation, which is especially important if analytes are desorbed directly to a chromatographic column held at ambient or above-ambient temperature. Thermal stability is also an important attribute of an ideal adsorbent: stable adsorbents ensure the best detection limits by minimizing the possibility of breakdown products interfering with quantification in addition to having a long shelf life.

Filters and Cassettes

We have carefully-selected cassettes, filters, and accessories to best meet your air sampling needs. These products, cited in numerous OSHA and NIOSH methods, are universally respected for quality and reliability.



Our products include coated filters, membrane filters, and cassettes for air monitoring of particulates.



Download our informative guide, "Air monitoring around the world"

Thermal Desorption Tubes with Unique Barcodes

Features and Benefits

- All Carbotrap® products are supplied with our adsorbent technology inside
- More consistent back pressure from tube-to-tube
- Easy-to-read markings on the stainless-steel tubes
- Glass-fritted tubes with a frit at an optimized location
- TDS3™ storage container or brass endcap sealed pre-conditioned tubes
- Easy-to read barcodes resistant to many pre-conditioning cycles



Supelco® thermal desorption tubes can also be customized! If you do not find thermal desorption tubes for your application, we may be able to manufacture them for you. To find out more, contact the Technical Service Experts and add this link <https://www.sigmaldrich.com/support/customer-support>.

Our thermal desorption tubes are available in either glass-fritted or stainless-steel tubing with a unique barcode label.

Whole Air Sample

Gas Sampling Bags and Bottles

A whole air sample is collected when compounds of interest cannot be reliably trapped onto an adsorbent, so air is drawn into a containment vessel like a gas sampling bag (i.e., a Tedlar® bag), stainless steel canister, or glass canister. The compounds of interest are then retrieved from the vessel for analysis in the lab. Recovery is a function of several factors including the surface area of the vessel, the chemistry and vapor pressure of the contaminants, the influence of various matrix effects, and the ability to begin with a vessel free of contamination. The Supelco® portfolio offers gas sampling bags made of Tedlar® or Supel™ inert foil (aluminum-lined) and glass bulbs for whole air sampling.

Supel™ Inert Multi-layer Foil Gas Sampling Bags with Thermogreen® LB-2 Septa

Supel™-inert foil gas sampling bags with Thermogreen® LB-2 Septa are ideal for sampling low molecular weight compounds such as carbon monoxide (CO), carbon dioxide (CO₂), and permanent gases.



Key Features and Benefits:

- The Thermogreen® polymer has the industry's lowest bleed, preventing sample contamination from the septum, and is proprietary to the Supelco® portfolio

- Multi-layer foil composition with two outer layers of aluminum film for an effective barrier to gases permeating through the walls of the bag
- Chemically inert with moisture and light protection
- Not recommended for low ppm VOCs due to background levels

Tedlar® Gas Sampling Bags

Tedlar® gas sampling bags are recommended in many US EPA methods including Toxicity Characteristic Leaching Procedure (TCLP) and methods TO-3 (VOCs), TO-12 (NMOC), TO-14A (VOCs), TO-15 (VOCs), ASTM D-5504 (reduced sulfur compounds) and a variety of atmospheric gas methods. Our Tedlar® bags are an excellent value and offer several features over competitor's versions.



Benefits:

- Unique valve and seam-sealing process ensuring bags are sturdy and leak-proof under the most demanding sampling conditions
- 2-mil Dupont Tedlar® material for superior inertness and impermeability
- Abrasion-resistant
- Two valve fitting options available: push/pull lock (PLV) and screw cap valve (SCV) with Thermogreen® LB-2 septa installed inside the valve

Air Monitoring Pumps and Accessories

Air Sampling Pumps

Escort® Elf Air Sampling Pump and Accessories

Escort® Elf air sampling pumps provide constant flow, regardless of changes in battery voltage, temperature, sample load, or altitude. This easy-to-operate pump features an internal secondary standard for constant calibration, a low battery indicator light, and blocked flow detection. The built-in counter monitors total operating time and provides a reminder when the monthly primary calibration is required. The Escort® Elf air sampling pump is not compatible with Tedlar® bags.

Designed for low-flow industrial hygiene sampling, the Gemini twin port sampler attachment features two needle valves with independent flow control.

The dual valves allow for simultaneous collection into two sorbent tubes but can also be used for single tube collection when one valve is closed. The sampler is compatible with any personal sampling pump capable of 1.5 L/min flow rate with a total flow less than 500 mL/min.



Tube Spiking System: Adsorbent Tube Injector System (ATIS)

Sample preparation device for Thermal and Solvent Desorption Tubes



The Supelco® ATIS is a sample preparation device for adsorbent tubes. It uses flash vaporization to vaporize the sample into a continuous flow of an inert gas which carries the sample to the adsorbent tube. The

sample pathway of the ATIS is constructed of glass and stainless steel. The calibration standard is injected by a syringe through a replaceable septum in the center of the injection glassware, which is heated.

Features & Benefits:

- Calibration standards can be injected onto adsorbent tubes for analytical system calibration
- Surrogates and system monitoring compounds can be added to adsorbent tubes before or after sampling
- Removes moisture from tubes prior to analysis (dry purging)
- Sampling and analysis of outlet during calibration can be used to confirm complete sample vaporization
- Compatible with 1/4" or 6 mm OD thermal desorption tubes
- Includes injection glassware, constant flow controller with an on/off valve, heating source, spare parts, and Luer/hose barb adapters to connect a variety of solvent desorption tubes

Cat. No.	Description
28521-U	ATIS Adsorbent Tube Injector System 230V
28520-U	ATIS Adsorbent Tube Injector System 110V

QUALITY AIR SAMPLING

For Accurate Gas & Vapor Monitoring



To discover our comprehensive offers for air monitoring, visit our dedicated webpage at SigmaAldrich.com/air-monitoring

Merck KGaA
Frankfurter Strasse 250,
64293 Darmstadt,
Germany

Merckgroup.com/life-science

