Canisters: Descriptions and Applications

Canisters are one of the most common and versatile media available for the collection of a whole air sample. Their relative ease of operation makes them a good choice for a wide variety of applications.

Collection Of Whole Air Samples

The basic premise upon which canister sampling is based is quite simple—a vacuum is applied to a specially prepared canister, and the valve is closed, maintaining the vacuum. To collect the air sample, the valve is opened, and the vacuum dissipates as the whole air sample is drawn in and captured. The valve is closed, and the sample is contained. This is called a "GRAB SAMPLE".

There are many variations to this straightforward approach, depending on the project objectives. Another common application is to sample over a specific time interval. For this time-integrated sample, a flow controller or critical orifice is attached to the valve of the canister to regulate the rate of the air intake.

Summa Canisters

A passivated, stainless steel Summa canister is the most commonly used medium for the collection of whole air samples. What makes it unique for the collection of chemical compounds in air is the electropolished interior. Through a chemical process known as a Summa process, the interior of the canister is removed of all contaminants and rendered passive, left with a mirror-like surface that is inert to many chemical substances, especially volatile organic compounds (VOCs).

Silco Canisters

The collection of sulfur-containing compounds in ambient or indoor air creates specific challenges. Due to the low odor thresholds of sulfur-containing compounds, investigators are often dealing with very low concentrations. The compounds often react not only with each other, but also with the vessels in which they are collected, including Summa canisters, causing low recoveries.

To create a chemically inert interior to preserve these compounds, the interior of a Silco canister is coated with a glass-like substance (Silcosteel) that is unreactive with sulfur compounds. When used in conjunction with other Silco-lined components, the Silco canister is suitable for the stable collection of low-level sulfur compounds, as well as VOCs. In almost all other respects, it functions and appears the same as a Summa canister.

Summa Or Silco?

Both Summa and Silco canisters are suitable for the collection of air and vapor samples, but each has certain limitations. Summa canisters are well suited for the collection of most VOCs, but should not be used for many sulfur compounds. Silco canisters, on the other hand, are suitable for the collection of sulfur compounds and most VOCs, but research has indicated poor recovery of certain brominated compounds from Silco canisters. Thus, each canister has its applications and limitations.

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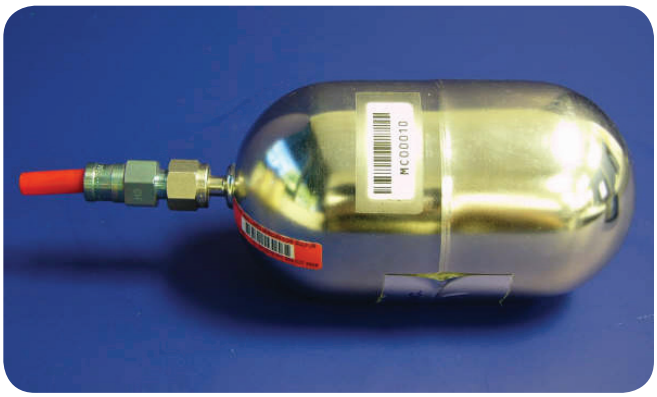
Mini Canisters (Minicans)

MiniCans were originally developed for personal exposure monitoring for industrial hygiene applications. In some situations, standard sample tubes or passive badges may not be suitable for the collection of a large number of VOCs. In those instances, a MiniCan may be a good sampling option. Like a Summa or Silco canister, a MiniCan is an evacuated passivated canister that may collect instantaneous samples, or, when fitted with a calibrated flow controller, time-integrated samples. The difference is its size—instead of the 6 L or 2.4 L volume typical of other canisters, the capacity of a MiniCan is about 400 mL. This reduced size allows it to be attached to a sampling belt and worn by the subject with relative comfort and ease.

MiniCans can typically support analyses of VOCs in the 5-10 ppbV range. If a MiniCan is the right choice for your application, your rental will include a sampling belt and Teflon tubing at no extra charge.



Canister Or Tedlar Bag?

Compared with a Tedlar bag – another common whole air sampling medium – a Summa canister offers a number of advantages. It is sturdy and can withstand transportation well, allowing long-term sample stability, even in the part per trillion range. It is suitable for low-level applications like indoor air and ambient air samples, as well as more highly contaminated samples from landfills, soil vapor extraction systems and stationary source emissions. While a hold time is not specified for Summa canisters, EPA Method TO-15 lists a guideline of 30 days. However, it is not suitable for the collection of many sulfur compounds.

We have the right sampling media for your project.

Columbia Analytical Services maintains an inventory of over 2000 canisters in a variety of sizes and models to address your project-specific needs. We have 6L and 1L Summa Canisters, 3L Silco Canisters, Mini Canisters, and the corresponding flow controllers and critical orifices.

Call Columbia Analytical to request canisters for your next project.

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