

Holding Time Requirements for SUMMA Canisters

Steven D. Hoyt

*Environmental Analytical Service, Inc.,
173 Cross Street, San Luis Obispo, CA*

EASlab.com

Topics

- Introduction to SUMMA Canisters
- What Parameters Effect VOC Stability In Canisters
- What Have Past Stability Studies Shown?
- What Holding Time is Best?
- Cleaning and Certification of Canisters?

Introduction to VOC Sampling Media

- SUMMA Canister
- Silico Canister
- Tedlar Bags
- Sorbent Tubes
- Glass Bottles
- Glass Syringes

The SUMMA Canister

- Stainless Steel Container with a Pack-less Valve and Cap.
- Internal Surface is Electrochemically Passivated – SUMMA Process – No Welds after Passivation.
- Canister is Steam Cleaned to Remove Surface Oils.
- Moisture in Air Sample Creates an Inert Surface

Historical Overview

- 1965 – SUMMA Canister Developed by Hutton and Rasmussen.
- 1970 – SUMMA Canister and Cryogenic Concentration by Rasmussen at WSU for Collecting Air Samples.
- 1988 – EPA TO-14 Compendium Method
- 1999 – EPA Second Edition of Compendium Methods, TO-14A, TO-15

How the Canister Works

- Electropolishing Makes a Ni and Cr Oxide Surface
- The Water in the Air or Gas Sample forms a Film on the Surface Making it Inert.
- When Canister is Cleaned Old Water Film and VOC's Removed from Canister.
- Next Sample forms New Inert Surface

Factors the Effect Stability in Canisters

- Moisture Content in Samples
- Soil Gas has High Moisture leading to Good Stability
- Canister Pressure
 - ◆ 15 to 30 psig for Ambient Air
 - ◆ 0 to 5 psig can be used for Moist Samples
- How the Canister was Built

SUMMA Canister is Different from Silico Canisters

- The Surface Coating of the Silico Canister is Initially Put on the Canister and Stays through the Cleaning Cycles. Any Damage to the Coating effects Inertness.
- The Surface Coasting of the SUMMA Canister is Re-established each Time the Canister is Used.

Stability of VOC's in SUMMA Canisters

- Historical Data from Professor Rasmussen
- Published Stability Studies
- Stability Studies Performed by Labs

Historical Data from Professor Rasmussen

- **Stability of Chlorinated Hydrocarbons at the low pptv level**
- **Stability Data from the ALE Program**
- **He has concluded that any compound stable for a couple of hours in a canister will be stable at least 30 days.**
- **In his last study in 1998 he looked at canisters collected in 1978 that were still stable – over 20 years later.**

Published Stability Studies

- **Oliver, Pleil, McClenny 1986 – No Significant change in TO-14 compounds over 30 days.**
- **Kelly and Holdren 1995 – They Reviewed Stability Studies and Showed No Significant Change for 52 common TO-15 compounds.**
- **Brymer, Ogle, Jones, Lewis 1996 – Concluded that the Common TO-15 Compounds are Stable over a 30 day Period.**

Laboratory Stability Studies

- Most Labs have Unpublished data Indicating their TO-15 compounds to be Stable over 30 days.
- Columbia Analytical will Present Data on a 32 canister study with 91 compounds over 1 year - Supports the 30 day Holding Time.

What Holding Time is Best?

- For Hydrocarbons and the TO-15 Compounds Analyzed by Most Air Laboratories –
- All Studies Point to 30 Days.

Reasons Why Holding Times of Less than 30 Days are Required

- The Canister is not Fully Understood.
- Anecdotal Information showing Losses in Canisters.
- Thinking the Water and Soil Matrix is the Same as the Air Matrix
- Specifying a Short Holding Time Means the Lab Will Report the Data Faster.

Canister Cleaning and Certification

- The Cleaning Process is Important Because it Regenerates the Canister Surface for Passivation by Water Vapor.
- Canister Heated to about 150 C under Vacuum
- Canisters Can be Flushed if Dirty
- Steam Cleaning Can be used on Very Dirty Canisters

Certification

- Analytical Method for Certification
- Batch Certification
- Individual Certification

Conclusions

- SUMMA Canisters Provide a Good Collection Media for Soil Gas
- The Holding Times for SUMMA Canisters Should be Changed to 30 Days