

Air Monitoring

Canisters & Accessories

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Air Canisters for VOC Monitoring

SilcoCan® & TO-Can® Air Monitoring Canisters

- Get high performance canisters from the innovators of fused silica coating technology.
- Variety of options available, including SUMMA can equivalent.
- Standard fittings compatible with all instrumentation and accessories.
- Exclusive manufacturer of 1 L spherical canister.
- Repair service available to extend canister life.

Canister Options

Sizes	1, 3, 6, 15 L
Valves	Parker® diaphragm, Swagelok® bellows
Interior Coating	Electropolished, Siltek® treated
Gauges	3 vacuum/pressure ranges

Applications

Ambient Air - US EPA TO-14A, TO-15, ASTM D5466
Indoor Air
Vapor Intrusion
Emergency Response

Dimensions/Weights of Air Canisters

Can Volume	Dimensions (height x sphere diameter)		Weight	
	1 liter	8.5 x 5.25"	21.6 x 13.3cm	2.5 lbs
3 liter	11.5 x 7.25"	29.2 x 18.4cm	4 lbs	1.81kg
6 liter	12.5 x 9.25"	31.8 x 23.5cm	7 lbs	3.18kg
15 liter	17 x 12.25"	43.2 x 31.1cm	13 lbs	5.90kg



did you know?

SilcoCan® and TO-Can® canisters are cleaned prior to shipping.

- Excellent stability for long-term storage of sulfur-containing volatile organic compounds.
- More accurate sampling.

Canister product listings are on **pages 410-411** or go to **www.restek.com/air** for more air monitoring products and solutions.

Anatomy of a SilcoCan® Canister

Optional gauge

- Quickly confirm vacuum or pressure inside canister.
- Monitor pressure changes.
- Fully protected by canister frame.
- Can be heated to 90°C during cleaning.

Newest surface technology

To ensure sample stability, SilcoCan® canisters are deactivated with Restek's innovative Siltek® surface treatment, which chemically bonds a fused silica layer to the metal inner surface of the canister. This layer offers unsurpassed inertness for active compounds, including polar and sulfur-containing molecules. It will not crack, chip, or flake off, despite harsh handling in the field or during transport.

Enhanced valve and canister bracket

Canister holder and valve bracket protect canister, tube stub, and valve.

1/4" tube stub

Allows user to interchange valves.

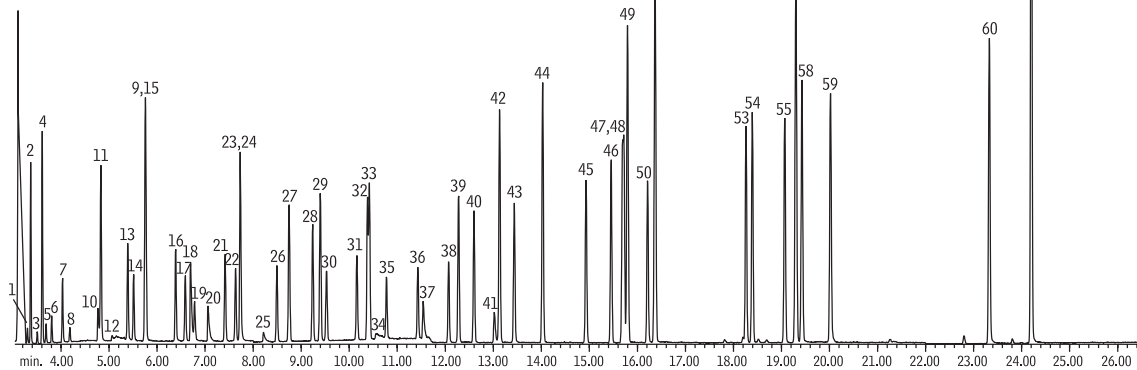
Serial-controlled label

For quick, sure identification.



US EPA TO-15 compounds on an Rtx®-1 column.

Column: Rtx®-1, 60m, 0.32mm ID, 1.0µm (cat.# 10157)
 Sample: TO-15 standard (cat.# 34436) humidified to 33% RH in a 6L SilcoCan® canister (cat.# 24182)
 Concentrator: Nutech 3550A Preconcentrator; 300mL sample concentrated at -160°C, thermally desorbed at 150°C, cryofocused at -185°C, thermally desorbed to column at 150°C
 Carrier gas: helium, constant flow
 Flow rate: 1.2mL/min.
 Oven temp.: 30°C (hold 4 min.) to 175°C @ 8°C/min., to 220°C @ 20°C/min. (hold 2 min.)
 Det.: MS
 Transfer line temp.: 150°C
 Scan range: 35–280amu
 Ionization: EI
 Mode: scan



GC_AR00748

- | | | | |
|--|--|---------------------------------------|-------------------------------|
| 1. propylene | 15. Freon® 113 | 30. cyclohexane | 46. ethylbenzene |
| 2. Freon® 12 (dichlorodifluoromethane) | 1,1,2-trichloro-1,2,2-trifluoroethane) | 31. 1,2-dichloropropane | 47. <i>p</i> -xylene |
| 3. chloromethane | 16. <i>trans</i> -1,2-dichloroethene | 32. trichloroethylene | 48. <i>m</i> -xylene |
| 4. Freon® 114
(dichlorotetrafluoroethane) | 17. 1,1-dichloroethane | 33. bromodichloromethane | 49. bromoform |
| 5. vinyl chloride | 18. methyl <i>tert</i> -butyl ether | 34. 1,4-dioxane | 50. styrene |
| 6. 1,3-butadiene | 19. vinyl acetate | 35. heptane | 51. <i>o</i> -xylene |
| 7. bromomethane | 20. methyl ethyl ketone | 36. <i>cis</i> -1,3-dichloropropene | 52. 1,1,2,2-tetrachloroethane |
| 8. chloroethane | 21. <i>cis</i> -1,2-dichloroethene | 37. methyl isobutyl ketone | 53. 4-ethyltoluene |
| 9. carbon disulfide | 22. hexane | 38. <i>trans</i> -1,3-dichloropropene | 54. 1,3,5-trimethylbenzene |
| 10. acetone | 23. chloroform | 39. 1,1,2-trichloroethane | 55. 1,2,4-trimethylbenzene |
| 11. Freon® 11 (trichlorofluoromethane) | 24. ethyl acetate | 40. toluene | 56. 1,3-dichlorobenzene |
| 12. isopropyl alcohol | 25. tetrahydrofuran | 41. methyl butyl ketone | 57. benzyl chloride |
| 13. 1,1-dichloroethene | 26. 1,2-dichloroethane | 42. dibromochloromethane | 58. 1,4-dichlorobenzene |
| 14. methylene chloride | 27. 1,1,1-trichloroethane | 43. 1,2-dibromoethane | 59. 1,2-dichlorobenzene |
| | 28. benzene | 44. tetrachloroethylene | 60. 1,2,4-trichlorobenzene |
| | 29. carbon tetrachloride | 45. chlorobenzene | 61. hexachloro-1,3-butadiene |

Canisters



24182

Canisters are the gold standard for ambient VOC monitoring.

Get the ultimate insurance plan—order your SilcoCan® canister with a Siltek® treated valve.

SilcoCan® Air Monitoring Canisters

Ideal for low-level reactive sulfur (1-20 ppb), TO-14A, or TO-15 compounds

- High quality, metal-to-metal seal, 2/3-turn valve with stainless steel diaphragms.
- Sizes to support a wide range of sampling needs.
- 2-port or 3-port valve available; 3-port valve includes -30" Hg/60psi vacuum/pressure gauge (other gauges available).
- Unsurpassed inertness, even for sulfur-containing or brominated compounds.
- For critical applications, order a Siltek® treated valve—add suffix “-650” to the catalog number of the canister.

Features

Benefits

Siltek® treated.	High inertness—ensures sample stability.
High-purity, 2/3-turn valve with stainless steel diaphragms.	No sample adsorption at the valve, for more accurate results; easy to use.
Vacuum/pressure gauge (optional).	Ascertain internal conditions at a glance.
Variety of sizes.	Meet extensive range of sampling needs.
Stable to 250°C.	Heat canister to 250°C for superior cleaning.
Siltek® valve available (add suffix “-650” to cat.#).	Completely passive sample pathway for maximum sample stability.

Description	1L Volume cat.#	3L Volume cat.#	6L Volume cat.#	15L Volume cat.#
Parker Diaphragm Valve				
w/ Parker Diaphragm Valve	24180	24181	24182	24183
w/ Parker Diaphragm Valve, Siltek Treated	24180-650	24181-650	24182-650	24183-650
w/ Parker Diaphragm Valve, and Gauge*	24140	24141	24142	24143
w/ Parker Diaphragm Valve, Siltek Treated, and Gauge*	24140-650	24141-650	24142-650	24143-650
without Valve	22090	22091	22092	22093

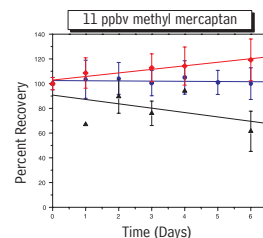
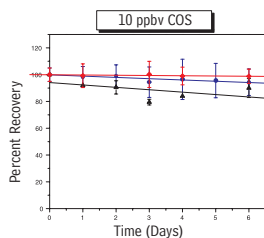
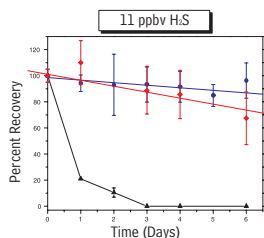
*Range of standard gauge is -30"Hg to 60psi.
For additional gauge and valve options, see pages 412-413.

Whether you are monitoring for TO-14A, TO-15, or reactive sulfur compounds, SilcoCan® canisters are your best choice for inertness. In Tedlar® bags, the stability of low-level (100 ppbv) sulfur volatile organic compounds (VOCs) is poor, even within 24 hours of sampling. Sulfur compounds react with the metal surface in electropolished canisters, so these canisters are unsuitable for collecting and storing low-level sulfur VOCs. SilcoCan® air monitoring canisters, which feature a Siltek® treated surface, offer excellent storage stability for sulfur VOCs at very low levels (1–20 ppbv), under dry or humid conditions. The versatility of the SilcoCan® canister makes it an excellent choice for collecting and storing TO-14A or TO-15 compounds.

also available

We also offer sampling kits, sampling bags, and a range of gas reference standards to meet your environmental gas sampling requirements. See **pages 414-432**.

SilcoCan® canisters effectively store very low levels of sulfur compounds.



Standards: Dry standards were made by adding 2mL of a 100ppm stock sulfur standard to each pre-cleaned and evacuated canister, then pressurizing to 30psi with ultra-pure nitrogen. The resultant concentrations are listed in Applications Note #59347A (download your free copy from www.restek.com). Humidified standards were made by injecting 100µL of deionized water into the evacuated canisters prior to adding 2mL of stock standard. This produced 50% RH.

GC Column: Rtx®-1, 60m, 0.53mm ID, 7.0µm; **Detector:** Sievers Model 355 Sulfur Chemiluminescence Detector

● Dry SilcoCan® (n=18)
◆ Humidified SilcoCan® (n=5)
▲ Electropolished (n=2)

Improved TO-Can® Air Monitoring Canisters (SUMMA Can Equivalent)

Optimized for EPA Methods TO-14A and TO-15, and ASTM D5466

- Proprietary electropolished surface that maintains compound stability.
- High quality, metal-to-metal seal, 2/3-turn valve with stainless steel diaphragms or Bellows design.
- 2-port or 3-port valve available for diaphragm valve; 3-port valve includes -30" Hg/60 psi vacuum/pressure gauge (other gauges available).

Features

Metal to metal seat, valve with stainless steel diaphragms.
Vacuum/pressure gauge (optional).
Stable to 250°C.

Benefits

No sample adsorption, for more accurate results.
Ascertain internal conditions at a glance.
Heat canister to 250°C for superior cleaning.



please note

- SUMMA canister equivalent.
- Excellent analyte recovery—even after 14 days of storage.

did you know?

TO-Can® canisters are cleaned prior to shipping.

Quickly confirm vacuum or pressure. Request a high-quality gauge mounted on your SilcoCan® or TO-Can® canister.



US EPA Compendium of Air Methods TO-14A and TO-15 regulate the collection, storage, and analysis of volatile organic compounds (VOCs) using treated air sampling canisters. Restek offers a complete line of TO-Can® canisters (SUMMA can equivalent), electropolished using a proprietary process and extensively cleaned using an ultrasonic method. This ensures a high-quality, passivated surface that maintains the stability of TO-14A/TO-15 compounds during storage. The frame surrounds the electropolished canister, eliminating the need for weld marks on the sphere, thereby preventing active sites on the canister. The Parker® Hannifin metal-to-metal diaphragm valve supports the excellent performance of the canister.

The unique holder attaches the handle and base to the canister without welds, and protects the canister, tube stub, and valve. The 2/3-turn diaphragm valve has a metal-to-metal seat and a temperature limit of 250°C. We leak check the system with helium to ensure the TO-Can® canister and valve are leak-tight, then pressurize the canister with contaminant-free nitrogen before we ship it.

Description	1L Volume	3L Volume	6L Volume	15L Volume
	cat.#	cat.#	cat.#	cat.#
Parker Diaphragm Valve				
w/ Parker Diaphragm Valve	24172	24173	24174	24175
w/ Parker Diaphragm Valve, and Gauge*	24176	24177	24178	24179
Swagelok SS4H Bellows Valve				
w/ Swagelok SS4H Bellows Valve	22105	22106	22107	22108
without Valve	22094	22095	22096	22097

*Range of standard gauge is -30"Hg to 60psi.
For additional gauge and valve options, see pages 412-413.

Alternative Mounted Vacuum/Pressure Gauges
The standard vacuum/pressure range on a SilcoCan® or TO-Can® canister fitted with a gauge is -30" Hg to 60 psi. To have a different gauge mounted on your canister, add the appropriate suffix number to the canister catalog number.*

Gauge	Suffix
-30" Hg/15psi	-651
-30" Hg/30psi	-652

*No price difference for these substituted gauges.

free literature

A Guide to Whole Air Canister Sampling: Equipment Needed and Practical Techniques for Collecting Air Samples

Ambient air sampling involves collecting a representative sample of ambient air for analysis. There are two general approaches: 1) "whole air" sampling with canisters or Tedlar® bags and 2) "in-field concentration" sampling using sorbent tubes or cold traps. In this guide, we focus on collecting whole air samples in canisters, a flexible technique with many applications.

Download your free copy from www.restek.com

Technical Guide
lit. cat.# EVTG1073





Valves and Gauges for Air Monitoring Applications



24144

Replacement Parker® Diaphragm Valves

- High quality, metal-to-metal seal, 2/3-turn valve with stainless steel diaphragms.
- 2-port or 3-port valve available.

Description	Stainless Steel Valve cat.#	Siltek-Treated Valve cat.#
1/4" Replacement Valve (2-port)	24145	24144
1/4" Replacement Valve (3-port)	24147	24146

*All Restek canisters are originally equipped with high-quality Parker Hannifin diaphragm valves. Each valve is helium leak-tested to 4×10^{-2} cc/sec. The all-stainless steel construction eliminates contamination and withstands temperatures from -100°C to 250°C. Other features include a compression outlet fitting and a 1/4" inlet and outlet.



24148

Replacement Swagelok® SS4H Bellows Valve

- All metal flow path prevents sample adsorption, giving more accurate results.
- Unique serial number on each valve for complete traceability.
- Withstands temperatures of up to 300 °C.
- Rugged performance in the field.
- Fast delivery from Restek!

Restek offers Swagelok® SS4H canister valves. These popular, rugged valves are available separately or already assembled on our TO-Can® canisters. Valves are bellows-sealed for durability and meet all EPA requirements for air monitoring by methods TO-14A and TO-15.

Description	qty.	cat.
Replacement 1/4" Swagelok SS4H Bellows-Sealed Valve (2-port)	ea.	24148

Replacement 1/4" Swagelok SS4H Bellows-Sealed Valves are available on SilcoCan canisters as a custom product. Contact Technical Service for more information.

Replacement Combination Vacuum/Pressure Gauges

2-inch vacuum/pressure gauges, 316 stainless steel with 1/8" NPT fitting and center back mount. Recommended for use with canisters.

Description	qty.	cat.#
-30"Hg/15psi Vacuum/Pressure Gauge	ea.	24100
-30"Hg/30psi Vacuum/Pressure Gauge	ea.	24104
-30"Hg/60psi Vacuum/Pressure Gauge	ea.	24108

Alternative Mounted Vacuum/Pressure Gauges

The standard vacuum/pressure range on a SilcoCan® or TO-Can® canister fitted with a gauge is -30" Hg to 60 psi. To have a different gauge mounted on your canister, add the appropriate suffix number to the canister catalog number.*

Gauge	Suffix
-30" Hg/15psi	-651
-30" Hg/30psi	-652

*No price difference for these substituted gauges.



24120

Vacuum Gauges

High-quality vacuum gauges with 316 stainless steel wetted surfaces. -30" Hg to 0" Hg. Recommended for use with passive sampling kits. All are rear mount.

Description	Fittings	qty.	cat.#
2" Vacuum Gauge	1/8" NPT	ea.	24269
2" Vacuum Gauge	1/4" NPT	ea.	24270
1 1/2" Vacuum Gauge	1/8" NPT	ea.	24120

Ashcroft® Test Gauges

- Accurate measurement of vacuum to -30" Hg and pressure to 60 psi.
- Available in both analog and digital formats.
- Accuracy to +/- 0.25%.
- Gauge connector to canister valve available.

High accuracy test gauges are recommended for verifying the vacuum/pressure in canisters before and after sampling. The 6-inch face on the analog gauge allows for easy reading. The digital gauge operates on 2 AAA batteries and offers an unambiguous readout. Both gauges have an accuracy of +/- 0.25% and all metal wetted parts.



Description	qty.	cat.#
Analog Test Gauge, 6" diameter, 1/4" NPT	ea.	24285
Digital Test Gauge, 3" diameter, 1/4" NPT	ea.	24268
Ashcroft Gauge Connector to Canister Valve, stainless steel, connects 1/4" male NPT to 1/4" male compression fitting	ea.	22121



Choose the Appropriate Device for Your Sampling Needs



	Canister	Gas Sampling Bag	Solvent Desorption Tube
Media Type	whole air	whole air	adsorption
Sensitivity	ppb	ppm	ppm
Technique	passive (no pump)	active	active
Sample Type	grab or integrated	grab	integrated
Analyte	wide range of VOCs	wide range of VOCs & permanent gases	sorbent specific
Applications	ambient, IAQ, emergency response, IH	ambient, IAQ emission	IAQ, IH
Durability	reusable	one time use	one time use
Inertness	excellent	fair	fair
Stability	30 day	48 hrs	varies by analyte
Sample Volume	0.4–6 L	0.5–100 L	varies by analyte
Sampling Time	minutes to days	minutes to hours	minutes to hours

See pages 408-411 for canisters. See page 423 for gas sampling bags. See page 425 for canister and thermal desorption tube comparison.



Passive Air Sampling Kits—Integrated

- Provide accurate integrated sampling without a sampling pump.
- Siltek® treated components ensure accurate sampling of active components.
- Excellent for sampling times from 0.5 hour to 125 hours.

Restek’s passive air sampling kit incorporates all the hardware necessary to collect air samples, and is easy to assemble for field sampling.* The improved filter design greatly reduces the number of potential leak sites.

The passive air sampling kit is available in seven sampling flow ranges, and in stainless steel or Siltek® treated finish. The stainless steel kit is ideal to partner with the Restek TO-Can® air sampling canister for TO-14A and TO-15 methods. Use the Siltek® treated version with the Restek SilcoCan® air sampling canister when collecting low-level volatile sulfur compounds, or other active compounds.

also available

Miniature air sampling kits. See **page 420**.

Canister and flow controller repair service. See **page 422**.

Canister Volume*/Sampling Time					Flow (mL/min.)	Orifice size	Siltek Treated Sampling Kits	Stainless Steel Sampling Kits
400cc	1 Liter	3 Liter	6 Liter	15 Liter				
8 hour	24 hour	48 hour	125 hour	—	0.5–2	0.0008"	24217	24216
2 hour	4 hour	12 hour	24 hour	60 hour	2–4	0.0012"	24160	24165
1 hour	2 hour	6 hour	12 hour	30 hour	4–8	0.0016"	24161	24166
—	1 hour	4 hour	8 hour	20 hour	8–15	0.0020"	24162	24167
—	—	2 hour	3 hour	8 hour	15–30	0.0030"	24163	24168
—	—	—	1.5 hour	4 hour	30–80	0.0060"	24164	24169
—	—	—	0.5 hour	1 hour	80–340	0.0090"	22101	22100

*Air sampling canisters sold separately. See pages 410-411.

1. Veriflo® SC423XL flow controller

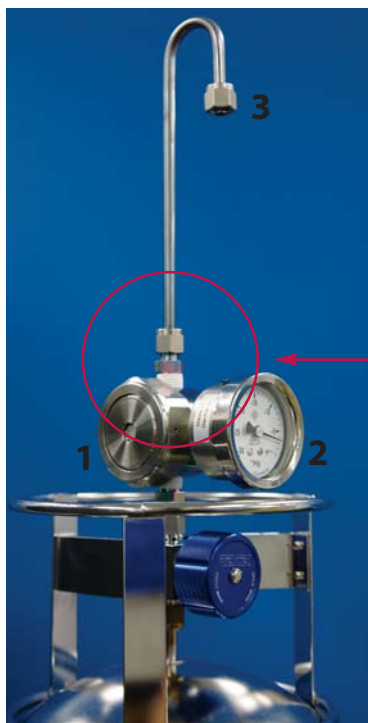
This flow controller is the heart of the sampling train. It is a high-quality device designed to maintain a constant mass flow as the pressure changes from -30" Hg to 7" Hg (we recommend you stop sampling at or before 7" Hg of vacuum). All wetted parts of the flow controller can be Siltek® treated.

2. Stainless steel vacuum gauge, 1/8" NPT

Fitted to the flow controller, the gauge monitors canister vacuum change during sampling.

3. 1/4-inch Siltek® sample inlet

The 0.3 m x 1/4-inch tubing includes a stainless steel nut on the inlet end, to prevent water droplets from accumulating at the edge of the tubing, where they could be pulled into the sampling train.



All fitting connections are 1/4" tube, except where noted.



4. 2-micron frit filter and washer

Located prior to the critical orifice to prevent airborne particles from clogging the critical orifice. Replaceable. Available in stainless steel, or Siltek® treated for optimum inertness.

5. Interchangeable critical orifice

An interchangeable ruby critical orifice allows you to control the flow with very high precision.

To select the correct critical orifice for your sample, see table above. Available in stainless steel, or Siltek® treated for optimum inertness.

please note

For individual components, see **page 415**.

Buy only the parts you need!

Replacement Orifices

Use these orifices with a Veriflo® 423XL flow controller to change the flow range for alternative sampling times.

Flow	Orifice size	Siltek Treated cat.#	Stainless Steel cat.#
0.5–2 mL/min.	0.0008"	24219	24218
2–4 mL/min.	0.0012"	24233	24245
4–8 mL/min.	0.0016"	24234	24246
8–15 mL/min.	0.0020"	24235	24247
15–30 mL/min.	0.0030"	24236	24248
30–80 mL/min.	0.0060"	24237	24249
80–340 mL/min.	0.0090"	22099	22098



Critical orifice



24249

2 µm Frit Filters

For use in critical orifice fitting. Includes washers.

Description	qty.	cat.#
Replacement Frit Filter, Siltek Treated	3-pk.	24171
Replacement Frit Filter, Stainless Steel	3-pk.	24170



24171

24170

Veriflo® Flow Controllers

Veriflo® 423XL flow controllers are offered in a Siltek® and stainless steel version. The flow device is available with or without a critical orifice. (Vacuum gauge sold separately.)

The critical orifice in a Veriflo® flow controller is interchangeable. Order orifices for alternate sampling times, or replacement orifices, separately.

Flow	Orifice size	Siltek Treated cat.#	Stainless Steel cat.#
0.5–2 mL/min.	0.0008"	24232	24229
2–4 mL/min.	0.0012"	24255	24260
4–8 mL/min.	0.0016"	24256	24261
8–15 mL/min.	0.0020"	24257	24262
15–30 mL/min.	0.0030"	24258	24263
30–80 mL/min.	0.0060"	24259	24264
80–340 mL/min.	0.0090"	22103	22102
	without orifice	24238	24239



Flow controller



24262

7µm In-Line Filter

This 316 stainless steel filter is designed to collect particles larger than 7 microns. We offer Siltek® and stainless steel versions (1/4" compression fitting on both ends).

Description	qty.	cat.#
7µm In-Line Filter, Siltek Treated	ea.	24265
7µm In-Line Filter, Stainless Steel	ea.	24266

Note: frit is not replaceable.



24266

Sample Inlets

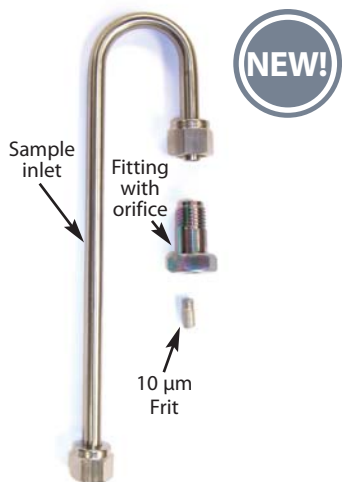
- 1/4" stainless steel compression fitting on each end.
- One end connects to flow controller or canister; nut on other end serves as rain guard.
- Includes nuts and ferrules.
- Two different lengths for use with large canisters and miniature canisters.

Description	qty.	Siltek Treated cat.#	Stainless Steel cat.#
Sample Inlet, 6" Length	ea.	26210	26209
Sample Inlet, 1.5" Length	ea.	26212	26211



26209

26211



Unassembled kit components

NEW!

Passive Air Sampling Kits—Grab

- Use with 1, 3, or 6 L canisters, for qualitative grab air sampling.
- Variety of orifice sizes, for fast sampling from 5 to 60 minutes.
- 1/4" compression fitting connects directly to canister valve inlet.
- Replaceable frit protects orifice and valve from particulates.
- Sample inlet design minimizes water entry into sampling train.
- Individual replacement components available.

Canister Volume/Sampling Time (min.)			Flow (mL/min.)	Orifice Size	Siltek Treated	Stainless Steel
1 L Canister	3 L Canister	6 L Canister			Grab Sampling Kits cat.#	Grab Sampling Kits cat.#
60	—	—	15	0.0018"	26280	26263
30	—	—	20	0.0020"	26281	26264
15	60	—	45	0.0030"	26282	26265
—	30	60	80	0.0040"	26283	26266
5	15	30	150	0.0055"	26284	26267
—	—	15	300	0.0080"	26285	26268
—	5	—	390	0.0090"	26286	26269
—	—	5	>1,000	0.0130"	26287	26270

Air sampling canisters sold separately. See pages 410-411.

Replacement Fittings for Grab Sampling Kits

Includes fitting and orifice.

Orifice Size	Siltek Treated	Stainless Steel
	Replacement Fitting w/Orifice cat.#	Replacement Fitting w/Orifice cat.#
0.0018"	26288	26271
0.0020"	26289	26272
0.0030"	26290	26273
0.0040"	26291	26274
0.0055"	26292	26275
0.0080"	26293	26276
0.0090"	26294	26277
0.0130"	26295	26278

Replacement 10 µm Frits for Grab Sampling Kits

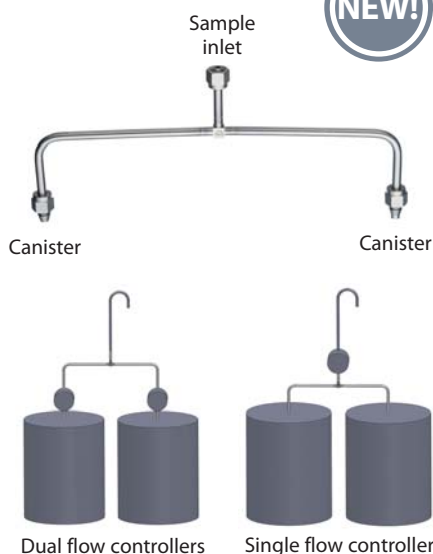
Description	qty.	Siltek Treated	Stainless Steel
		cat.#	cat.#
10µm Frit for Grab Sampling Kit	3-pk.	26296	26279



Assembled kit on canister

Air sampling canisters sold separately.

NEW!



Dual Canister Sampling Manifold

- Duplicate sampling with all size canisters using 1 or 2 flow controllers.
- Precise dimensions (9.5" wide x 3.5" high) provide accurate splitting of sample between two canisters.
- One-piece design means fewer leaks.
- Thick walled stainless steel tubing is rugged enough for field use.
- 1/4" compression connections.

Field duplicates of canister samples frequently result in analyte concentrations with high relative standard deviations. In addition, field duplicates do not differentiate laboratory performance from sampling variability. Restek's Dual Canister Sampling Manifold (DCSM) minimizes sampling variability through a single sample inlet and flow controller by which the sample is evenly collected between two canisters. Use of a single flow controller eliminates flow rate variability, as well as environmental variables common with collocated samples. The DCSM may also be used with 2 flow controllers to monitor individual canister vacuum.

Description	Stainless Steel	Sulfinert Treated
	cat.#	cat.#
Dual Canister Sampling Manifold	24998	24999

Note: Do not use the DCSM as a handle to pick up 2 canisters!

Passive Air Sampling Kits—Soil Gas

This unique grab sampler is specifically designed for soil gas sampling by allowing the connection of tubing coming from the soil gas sample port. The innovative design minimizes connections and leaks and houses a critical orifice in the tee fitting. It also incorporates a vacuum gauge and 2 µm frit filter.

Assembled sampler includes:

- Stainless steel tee with orifice.
- 1½" vacuum gauge (-30" Hg to 0" Hg).
- 2 µm frit filter for insertion into ¼" compression sample inlet.
- ¼" port connector to canister valve.

The ¼" compression inlet and outlet allows easy connection to the canister valve and also to the tubing from the sample port. Several orifice sizes provide sampling times from 20 min. to 10 hours on a 6 L canister. Individual replacement parts are available, providing a cost-effective alternative to replacing the entire sampler.

Sampling Time		Flow	Orifice Size	Siltek Treated	Stainless Steel
for 1 L Canister	for 6 L Canister			Soil Gas Samper Kit	Soil Gas Samper Kit
4 min.	20 min.	210 mL/min.	0.0065"	22935	22930
6 min.	30 min.	150 mL/min.	0.0055"	22936	22931
10 min.	1 hr.	80 mL/min.	0.0040"	22937	22932
45 min.	4 hr.	19 mL/min.	0.0020"	22938	22933
2 hr.	10 hr.	6 mL/min.	0.0014"	22939	22934

*Air sampling canisters sold separately. See pages 410-411.



Assembled kit on canister

Air sampling canisters sold separately.

Replacement Tees w/Orifice for Soil Gas Sampler Kits

Orifice Size	Siltek Treated	Stainless Steel
	Replacement Tee w/Orifice	Replacement Tee w/Orifice
0.0065"	22945	22940
0.0055"	22946	22941
0.0040"	22947	22942
0.0020"	22948	22943
0.0014"	22949	22944

Replacement Parts for Soil Gas Sampler Kits

Description	qty.	cat.#
Vacuum Gauge, 1 ½"	ea.	24120
Replacement Frit Filter, Stainless Steel	3-pk.	24170
Replacement Frit Filter, Siltek Treated	3-pk.	24171
Port Connector, ¼", Siltek/Sulfinert Treated	ea.	21549
Port Connector, ¼", Stainless Steel	2-pk.	21936
Nut & Ferrule Set, ½", Stainless Steel	5-pk.	21911
Nut, ¼", Stainless Steel	10-pk.	21902



Use Restek's Electronic Leak Detector for tracer gas detection before soil gas sampling. See page 204.

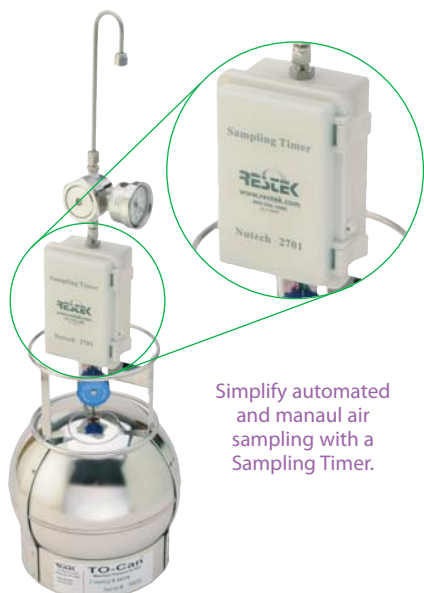


also available

VCO® Fittings

- Use VCO® fittings for rapid assembly to cleaning system.
 - Protect canister valves, flow controllers, and cleaning system fittings.
- See page 322.





Simplify automated and manual air sampling with a Sampling Timer.

Canister and passive air sampling kit must be purchased separately.

Canister Air Sampling Timer

- Program up to 12 timed events!
- Capable of both manual and automated operation.
- Perfect for either grab or time-integrated sampling.
- Long battery life; recharges conveniently using the USB port on any PC.
- All stainless steel sample flow path ensures inertness, improving accuracy.



These timers are designed to simplify both automated and manual air sampling. The easy-to-use keypad and graphic display facilitate the programming of up to 12 timed events. They offer the convenience of remote start/stop sampling and permit intermittent sampling throughout a test period. The LCD remains in sleep mode when not in use, greatly extending battery life. Timers are compatible with any canister and flow controller.

Features include: solenoid valve for sampling control, 1/4" Swagelok® inlet and outlet fittings, highly inert stainless steel flow path, and water-proof exterior for outdoor use.

Description	qty.	cat.#
Canister Air Sampling Timer	ea.	24267



TO-Clean Canister Cleaning System

High capacity, fully automated, easy to use canister cleaning oven dramatically increases lab efficiency.

- EPA Method TO-14A/15 compliant.
- Powerful pump can achieve 50 mTorr in 30 minutes for twelve 6 L canisters.
- Custom-built trays for different canister sizes.
- One year limited warranty.
- Fully assembled and ready to use.

TO-Clean from Wasson-ECE Instrumentation is a revolutionary canister cleaning system designed to take the guesswork out of canister cleaning. The system is fully automated, allowing the user to start a cleaning cycle and walk away. This is a high performance system that is easy to use and consistently produces excellent results.



Dimensions:
44"H x 48"W x 27"L
Weight: 525 lbs

Feature	Benefit
Large capacity—holds 12 6L cans or 24 1L cans.	Twice the capacity of other ovens for faster turnaround.
Embedded touch screen controller.	No separate computer needed.
Adjustable oven control up to 110 °C.	Cleans canisters AND valves faster and more completely than heating bands.
10 user defined methods.	Each cleaning cycle parameter can be configured separately to minimize overall cycle time.
Edwards RV-8 vacuum pump.	Cheaper to run and maintain than 2 pump alternatives.
Vacuum and pressure stainless steel cold traps.	Keeps the system clean—no contamination from the pump or dirty canisters.

Description	qty.	cat.#
TO-Clean Oven, 120V, 60Hz	ea.	22916
TO-Clean Oven, 220/230V, 50/60Hz	ea.	22917
Optional Accessories (not included with TO-Clean Oven)	qty.	cat.#
Dewar, glass, 4300mL stainless steel u-tube trap	ea.	22918
Oven Cart, 29"H x 27"W x 49"D, 12 gauge steel, push handle and casters	ea.	22919
1L Option: includes tubing, fittings, and inserts for 24 1L canisters	ea.	22920
Humidification Chamber	ea.	24282

Shipping: FedEx Ground, unless otherwise requested. Costs vary depending on ship-to location.

Note: Ovens are built on demand, therefore, a ten week lead time is required on all orders. A limited cancellation and return policy applies to TO-Clean ovens; contact Restek Customer Service for details.

	Restek	Entech
Capacity	Twelve-6 L cans	Six-6 L cans
Software	Included	Separate

www.restek.com/air

for **more info**

Download **EVTS1186.pdf** from www.restek.com

Air Canister Heating Jacket

- Closely simulates oven environment—heats entire canister and valve.
- Two temperature settings, 75 °C and 150 °C.*
- Prevents sample condensation, for accurate sub-sampling.
- Easily fits canister up to 6 liters.
- Lightweight; comfortable to the touch when heated.
- Connect up to five Canister Heating Jackets to one 15 amp circuit.



The ultimate in controlled heating, for reliably cleaning your air canisters!

Description	qty.	cat.#
Air Canister Heating Jacket (110 volt)	ea.	24123

*Not CE certified.

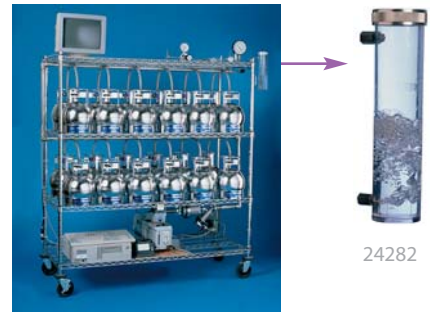
Humidification Chamber

When cleaning SilcoCan® or TO-Can® canisters, it is important to use humidified air or nitrogen to help remove volatile organic contaminants. We incorporated our humidification chamber into the design of our cleaning system. Restek's humidification chamber is made of acrylic and withstands pressure up to 90 psi. The 1/4-inch inlet and outlet compression fittings allow easy connection to pressure lines on your cleaning system. Our humidification chamber also has an easy-to-open lid for filling with water.

Description	qty.	cat.#
Humidification Chamber	ea.	24282

did you **know?**

After assembly, every Restek SilcoCan® and TO-Can® canister is evacuated to 50 mTorr, then pressurized with humidified nitrogen to 30 psi. The cleaning system is programmed to repeat this cycle two times to ensure thorough cleaning. We ship our canisters clean and under pressure at 30 psi with dry nitrogen.



Restek's canister cleaning system with humidification chamber.

Air Canister Tripod

- Lightweight (9 pounds) and compact, for easy storage and transport.
- Extends from 6' to 9' high.
- Large base provides enhanced stability, without additional supports.
- Sturdy, rugged metal design, for outdoor sampling and transport.



Restek's Air Canister Tripod holds two canisters simultaneously for collocated ambient air sampling. The custom-designed bracket holds most 1, 3, and 6 L canisters securely, without any tools.*

Description	qty.	cat.#
Air Canister Tripod	ea.	24151

*Air sampling canisters sold separately. See pages 410-411.



Air Canister Tripod conveniently holds 2 air canisters.

Canister Carrying Supplies

Canister Carrying Box Kit

6-liter carrying boxes with plastic handles simplify canister transport. These boxes also accommodate our passive sampling kit. 4 carrying boxes and 1 shipping box per kit.

Description	qty.	cat.#
Canister Carrying Box Kit	kit	24215

Canister Carrying Case

- Heavy-duty, all-aluminum design, fits two 6 L SilcoCan® or TO-Can® canisters tightly without foam.
- Weight: 9 lbs.
- Inside dimensions: length 18", width 9 1/8", height 12 1/2" (46 x 23 x 32 cm).
- No organic contaminants from foam or plastics.



24226

Description	qty.	cat.#
Deluxe Canister Carrying Case	ea.	24226



24215

Restek canisters are shipped in boxes with handles for easy transportation.



Expand Air Sampling with Mini-Cans & Accessories

Replacement Partspage #
 Flow Controller415
 Gauge412
 Orifices415
 Sample Inlet415

- Grab and integrated sampling without sampling pump.
- 8-hr integrated sample possible with 400 cc mini-can.
- Siltek® coating delivers high level of inertness for H₂S & other reactive compounds.
- Versatile enough for many applications:
 - Indoor air
 - Industrial hygiene
 - Soil gas
 - Emergency response



Miniature Air Sampling Kits

- Provide accurate integrated sampling without a sampling pump.
- Convenient smaller size connects easily to miniature canisters.
- Available in stainless steel or Siltek® treated components for greater inertness.

Restek's passive air sampling kit incorporates all the hardware necessary to collect air samples, and is easy to assemble for field sampling.* Kit includes flow controller, critical orifice, 2 µm frit filter, vacuum gauge, and sample inlet. The gauge (cat.# 24120) and sample inlet (cat.#s 26211, 26212) are downsized for partnering with smaller canisters. Refer to page 414 for sampling kit details and pages 412 and 415 for individual components.

Canister Volume*/Sampling Time			Orifice size	Siltek Treated Sampling Kits	Stainless Steel Sampling Kits
400cc	1 Liter	Flow			
8 hour	24 hour	0.5–2 mL/min.	0.0008"	26253	26252
2 hour	4 hour	2–4 mL/min.	0.0012"	26255	26254
1 hour	2 hour	4–8 mL/min.	0.0016"	26257	26256
—	1 hour	8–15 mL/min.	0.0020"	26259	26258

*Air sampling canisters sold separately.



Mini-Can Accessories

These accessories enhance mini-can usage and provide flexibility in their application, from personal to area to vapor intrusion sampling.

Sampling Belt:

- Adjustable up to 50"
- 2 velcro straps securely hold mini-can or other sampling device
- Straps slide anywhere on belt
- Versatile usage for personal wear or hanging for area sampling



Sampling Belt & Personal Sample Inlet

Personal Sample Inlet:

- 3' long x 1/16" OD all Teflon® tubing
- Convenient clip can be moved along length of tubing for proper attachment in breathing zone
- Teflon® reducing ferrule allows direct connection from 1/16" tubing to 1/4" flow controller without another fitting

Mini-Can Stand:

- Collapsible for easy storage and transport
- 2 out of 3 legs move to accommodate uneven surfaces
- Holds 2 3/4" diameter cans securely
- Small footprint—12" diameter x 6.5" height



Mini-Can Stand

Mini-Can and Sampling Kit not included.

Description	qty.	cat.#
Sampling Belt	ea.	22122
Personal Sample Inlet (includes: 3' x 1/16" OD Teflon tubing, Clip, Teflon Reducing Ferrule, 1/4" SS nut)	ea.	22123
Mini-Can Stand	ea.	22124

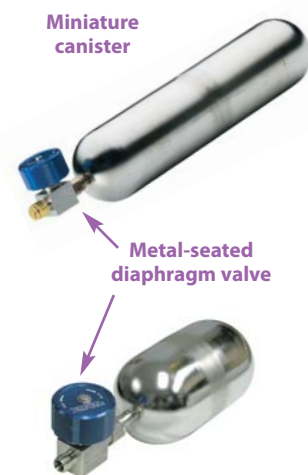
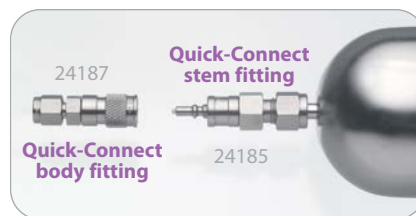
Miniature Air Sampling Canisters

- Ideal for indoor air, personal, emergency response, or soil gas sampling.
- 400 cc or 1,000 cc.
- Available with quick-connect fitting that is compatible with sampling and analysis instruments.
- Also available with nontreated or Siltek® treated valve.

These small canisters are designed for controlled sampling, such as personal air sampling, as an alternative to tube and pump samplers. The 1,000 cc canister is suitable for sampling volatile organic compounds in air according to US EPA Methods TO-14A and TO-15.

Restek offers these products in stainless steel or Siltek® treated, for greatest inertness. We continue to offer passive coating technologies that are unmatched in the air sampling industry—try a Siltek® treated canister to achieve the ultimate in analyte stability.

Description	qty.	400cc	1,000cc
		cat.#	cat.#
Miniature Canister with Quick-Connect Stem Fittings			
Electropolished Stainless Steel	ea.	24188	24194
Siltek Treated	ea.	24189	24195
Siltek Treated, with Siltek Treated Quick-Connect Stem Fitting	ea.	24190	24196
Miniature Canister with Parker Diaphragm Valve			
Electropolished Stainless Steel	ea.	24191	24197
Siltek Treated	ea.	24192	24198
Siltek Treated, with Parker Diaphragm Valve, Siltek Treated	ea.	24193	24199
Miniature Canister without Valve			
Electropolished Stainless Steel	ea.	24205	24206
Siltek Treated	ea.	24207	24208



Dimensions:
 400cc = 2.75" diameter, 5.35" long (7 x 13.6cm)
 1,000cc = 2.75" diameter, 11.92" long (7 x 30cm)

Quick-Connect Fittings for Miniature Air Sampling Canisters


Connection: 1/4" tube fitting.

Description	qty.	cat.#
Quick-Connect Stem Fitting	ea.	24185
Quick-Connect Stem Fitting, Siltek Treated	ea.	24186
Quick-Connect Stem Protector, Stainless Steel	ea.	24121
Quick-Connect Body Fitting	ea.	24187

Note: Quick-connect body fitting (cat.# 24187) must be ordered separately to sample with quick-connect stem fitting.



Attach quick-connect body fitting to stem fitting to open canister. Attach quick-connect stem protector to stem fitting when not sampling to prevent canister from accidentally opening.



Get Mini!

Mini-Can Options

Sizes	400 cc, 1000 cc
Valves	Quick connect, diaphragm
Interior Coating	Electropolished, Siltek treated
Sample Inlets	Area, personal
Flow ranges	0.5-15 mL/min.

i tech tip

Use a Gap Inspection Gauge to confirm fittings are sufficiently tightened. See page 325.



How to Extend Canister Life

What reduces canister performance and longevity? Leakage is the most common reason for canister failure, but contamination and damage to the fused silica lining can also send canisters to the scrap yard prematurely. Here are some tips to protect your investment:

1. Prevent leaks

Use proper handling to avoid these 3 leading causes of leaks.

a. Particles in the valve

You can prevent particles from entering the valve by always using a 2 or 7 μm particulate filter during sampling and on your canister cleaning equipment. Also, protect the valve inlet by replacing the brass dust cap when not in use. The EPA-recommended metal-to-metal sealing valves provide the greatest inertness, but tend to be more sensitive to particulate damage than other valve types.

b. Galled thread fittings

Avoid galled thread fittings by using a gap gauge to prevent overtightening of compression fittings. Turning only $\frac{1}{4}$ turn past finger-tight is another rule of thumb to prevent overtightening. Use brass compression fittings on stainless steel, during nonsampling activities, such as cleaning or calibration, to minimize thread damage. Galled threads may also cause a poor connection to vacuum/pressure gauges, resulting in inaccurate measurement and misleading conclusion that canister leakage exists.

c. Overtightened valve

Canister valves are designed to close securely with hand tightening only. Overtightening a valve closure with a wrench may damage the valve seat where the seal is made.

2. Reduce contamination

a. Segregate high concentration (ppm) cans and trace concentration (ppb) cans. Use dedicated canisters, or gas sampling bags, for ppm level sampling, since it is extremely difficult to remove impurities from ppm sampling to a level suitable for trace sampling.

b. Clean the entire sampling train as you would the can to minimize introduction of contaminants into a clean can. Maximum temperature is 80 °C on the gauge and 90 °C on Restek's Veriflo® flow controller.

c. High temperature (>100 °C) humidified air (steam cleaning) provides the most effective way to remove contamination from electropolished cans (TO-Can® or SUMMA® canisters), but can damage fused silica lined cans. See #3 below for proper cleaning of fused silica lined cans.

3. Avoid damage to fused silica lined cans

Be sure to follow method recommendations when cleaning your canisters to avoid damaging the fused silica lining. Cleaning studies of SilcoCan® canisters using humidified air and heat at 80 °C and 125 °C have shown reduced recoveries of sulfur compounds, when compared to using nitrogen under the same conditions. This irreversible damage is due to oxidation of the surface, creating active sites that may affect the recovery of reactive or polar compounds. Strong acids and bases may also result in damage to the internal can surface.



Canister and Flow Controller Repair Service

Save money and increase performance with Restek's canister and flow controller repair service.

Normal wear and tear on canisters and components can result in damage causing leakage. Restek's repair service allows you to extend the life of your equipment for much less than the cost to replace with new products. Contact Customer Service at 800-356-1688, or your Restek representative, to take advantage of this service. You will be given instructions and an SRV # to return the parts to us.

Sampling Kit/Flow Controller Repair

Includes all new rubber seals in flow controller and orifice and frit replacement
cat.# 550131

Canister Repair

Includes valve replacement, leak test & cleaning
cat.# 560838

Tedlar® Sampling Bags

- Find the bags you need—we offer sizes from 0.5 liters to 100 liters.
- Unique all-in-one septum and valve fitting make these lightweight and easy to use.
- Polypropylene or stainless steel valve.
- Both valves conveniently connect to 3/16" ID Teflon® tubing.

Description	qty.	Polypropylene Valve cat.#	Stainless Steel Valve cat.#
0.5L 6" x 6"	10-pk.	22049	22038
1L 7" x 7"	10-pk.	22050	22039
3L 9.5" x 10"	10-pk.	22051	22040
5L 12" x 12.5"	10-pk.	22052	22041
10L 11.75" x 22"	10-pk.	22053	22042
12L 13" x 24"	10-pk.	22054	22043
25L 17.5" x 24"	5-pk.	22055	22044
40L 24" x 24.25"	5-pk.	22056	22045
80L 28.25" x 30.5"	5-pk.	22057	22046
100L 28" x 36"	3-pk.	22058	22047

Description	qty.	cat.#
Teflon Faced Silicone Replacement Septum, 4mm diameter	10-pk.	22104

also available

Multi-layer foil bags

Visit www.restek.com

Vacuum Bag Sampler

- Fast bag sampling without sample passing through pump.
- Bag capacity up to 10 L.

The Model 1062 Vacuum Bag Sampler provides fast sampling with zero cross-contamination. A vacuum created in the box draws air into the sampling bag without drawing it through the vacuum pump first, as is the case with standard air sampling pumps, thereby preventing contamination of the sample. This bag sampler can fill a 10 L bag in two minutes with an automatic shut-off switch, which stops the sample bag from overfilling. The filling rate is adjusted with a vent rotometer valve. An external battery recharging port enables continuous operation with battery charger. In addition, the quick exhaust valve allows for fast removal of the sampling bag. The sampler comes with a universal power adapter/charger, battery, instruction manual, and 1-year limited warranty.

Specifications:

Sampling Bag:	1 bag up to 10L size
Running Time:	8 hours
Flow Rate (Fill Rate):	1-5L/min.
Power Requirements:	12V battery, 4.5 amp
Charge Time:	9 hours
Dimensions:	9" x 14.6" x 21.7"
Weight:	17 lbs

Description	qty.	cat.#
Vacuum Bag Sampler Model 1062 (includes: power adapter, battery, manual)	ea.	22118
Replacement Battery for Vacuum Bag Sampler Model 1062	ea.	22119
Universal Battery Charger for Vacuum Bag Sampler Model 1062 (115/230 VAC)	ea.	22120



tech tip

Use septum puller (cat.# 20117) to replace septum in sampling bag valve.



Description	qty.	cat.#
Septum Puller	ea.	20117



Features:

- Observation window on case lid
- Sample inlet accepts 1/4" OD tubing
- Case designed for rugged outdoor use
- CE certified

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Thermal Desorption Unit Tubes



method applications

Method	Application
US EPA	TO-17
ASTM	D6196
NIOSH	2549
DIN EN ISO	16017

Specifications

Dimensions: 1/4" OD x 3 1/2" long
 Low sampling rates: 0.01-0.20 L/min.
 (<10L total volume)
 Long-term storage caps are supplied with conditioned tubes

Thermal Desorption Unit (TDU) Tubes

- Variety of sorbents to collect a wide range of VOCs, including Tenax® and carbon sorbents.
- Use glass tubes for maximum inertness in active sampling.
- Choose stainless steel tubes for either active or passive sampling. No sampling pump necessary for passive sampling with diffusion caps!
- Individually etched with unique serial number for convenient sample identification.
- Available unconditioned or preconditioned and ready to sample. Tubes are reusable after thermal desorption.

High-quality thermal desorption tubes by Markes International. These sorbent tubes are suitable for ppt to ppm concentrations of volatile organic compounds (VOCs) in ambient, indoor, and industrial hygiene environments. Available in both stainless steel and glass (for thermally labile VOCs), they fit Markes ULTRA-UNITY™, PerkinElmer, and Shimadzu thermal desorbers. Packed tubes come with a report detailing the total mass of sorbent in the tube; conditioned tubes also include a blank chromatogram.

Thermal Desorption Tube Sorbent	Vapor Phase Organics Applications
Tenax® TA	C6/7 to C26
Graphitized Carbon	C5/6 to C14
Tenax® GR/Carbopack™ B	n-C5/6 to n-C20 (EPA Methods TO-14A/TO-15/TO-17)
Carbopack™ B/Carbosieve™ SIII	n-C2/3 to n-C12/14 (EPA Methods TO-14A/TO-15/TO-17)
Tenax® TA/Graphitized Carbon/Carboxen™ 1000	C2/3 to C20
Carbopack™ C/Carbopack™ B/Carbosieve™ SIII	n-C2/3 to n-C16/20 (EPA Methods TO-14A/TO-15/TO-17)

Thermal Desorption Unit Tubes (Unconditioned and Conditioned & Capped)

Description	qty.	Unconditioned		Conditioned & Capped	
		Stainless Steel cat.#	Glass cat.#	Stainless Steel cat.#	Glass cat.#
TDU Tubes, Tenax TA	10-pk.	24056	24062	24080	24086
TDU Tubes, Graphitized Carbon	10-pk.	24057	24063	24081	24087
TDU Tubes, Tenax GR/Carbopack B	10-pk.	24058	24064	24082	24088
TDU Tubes, Carbopack B/Carbosieve SIII	10-pk.	24059	24065	24083	24089
TDU Tubes, Tenax TA/Graphitized Carbon/Carboxen 1000	10-pk.	24060	24066	24084	24090
TDU Tubes, Carbopack C/Carbopack B/Carbosieve SIII	10-pk.	24061	24067	24085	24091

Thermal Desorption Unit Tubes (Empty)

- Empty tubes for direct desorption of VOCs in liquids, solids, or pastes.
- Stainless steel: front sorbent-retaining gauge fitted, rear gauze and gauze retaining spring supplied.
- Glass: with glass frit positioned 15 mm from sampling end.

Description	qty.	Stainless Steel cat.#	Glass cat.#
TDU Tubes, Empty	10-pk.	24054	24055

Thermal Desorption Unit Tubes (Calibration)

Description	qty.	Stainless Steel cat.#	Glass cat.#
TDU Tubes, Calibration, Tenax TA 1cm Bed	10-pk.	24075	24076
Calibration Solution Loading Rig			ea. 24077
Calibration Solution Loading Rig Replacement Septa, 9.5mm			10-pk. 24078
Certified Reference Standard, 100ng BTX on Tenax TA			10-pk. 24079

Thermal Desorption Unit Tubes (Accessories)

Description	Benefits/Uses	qty.	cat.
1/4" Brass Cap and PTFE Ferrules	Long-term storage of blank/sampled tubes.	20-pk.	24068
1/4" PTFE Ferrules	Long-term storage caps.	20-pk.	24069
CapLok Tool	Use for tightening long-term storage caps.	ea.	24070
Pen Clip		10-pk.	24071
TubeMate Tool	Assists with tube packing.	ea.	24072
1/4" Stainless Steel Union and PTFE Ferrules	Use for connecting tubes in series.	10-pk.	24073
Diffusion Caps	Required for diffusive sampling with stainless steel tubes.	10-pk.	24074



Thermal Desorption Tubes vs. Canister Sampling

Which VOC Sampling Technique is Right for You?

Thermal desorption tubes provide a complementary option to canisters for sampling VOCs. Both techniques have advantages and disadvantages, and their features must be evaluated for suitability relative to the sampling environment and analytical capabilities. Table I outlines the similarities and differences between these techniques; use this handy comparison to determine which equipment is best for you.

Table I Comparison of thermal desorption tube and canister sampling for VOCs.

Similarities Between Thermal Desorption Tubes and Canisters

- Reusable sampling device.
- Long product lifetime.
- Long-term sample stability.
- Blank certification required prior to sampling.
- Sample concentration required before GC/MS analysis.
- Dry purge helpful to remove moisture before GC injection.
- Ppt sensitivity.
- Method acceptance.
- Collection of wide range of VOCs with single device.
- Useful for screening of unknowns.
- Leak tightness critical to maintaining sample integrity and preventing contamination of a clean device.

Differences Between Thermal Desorption Tubes and Canisters

	Thermal Desorption Tubes	Canisters
Methods	US EPA TO-17 ASTM D6196 ISO 16017 ISO 16000-6 NIOSH 2549	US EPA TO-14A, TO-15 ASTM D5466 OSHA PV2120 NIOSH Protocol Draft
	World-wide acceptance	Gold standard for US ambient air market
Applications	Ambient air, indoor air, industrial hygiene Material emissions Food & flavor Chemical weapons	Ambient air, indoor air, vapor intrusion, emergency response
	C3 to C30	<C3 to ~C10
Handling	Light weight for personal monitoring and general ease of use	Larger and heavier; more costly to ship
Sampling	Active sampling with sampling pump or diffusive sampling without pump is possible with determined diffusion coefficients for each compound.	Passive sampling, no sampling pump required. Long-term sampling possible without battery to recharge.
	Integrated sampling only	Grab & integrated sampling
	Concentrated sample	Whole air
	Proper sorbent selection recommended in methodology.	N/A
	Must sample below sorbent breakthrough volumes to avoid sample loss and irreversible adsorption on sorbent	N/A
	Large sample volumes >100L	Sample volume is function of canister size, 15 L max
Analysis	Tube dimensions are instrument specific	Compatible with all manufacturer sample concentrators
	1 injection, more injections possible for some instrumentation	Multiple sample injections
	Concentration range ppt to ppm	ppt to ppm
	Some sorbents prone to artifact formation.	Low blanks when properly cleaned.
Storage	Sample storage at 4°C recommended for multi-bed tubes to prevent potential migration of compounds to more retentive sorbent, which may be difficult to recover.	Room temperature
Cleaning	Analytical process automatically cleans tube for reuse. Cleans as it analyzes. Conditioning/cleaning and analysis incorporated in one thermal desorption unit.	Canister cleaning requires separate equipment as additional step prior to background certification and sampling.
Cost	~130 each	~700 each



free literature

A Guide to Whole Air Canister Sampling: Equipment Needed and Practical Techniques for Collecting Air Samples

lit. cat.# EVTG1073



Thermal Desorption Tubes: Versatile Air Sampling for a Wide Range of Applications

lit. cat.# EVFL1065

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Residual Volatiles & Materials Emissions Testing

lit. cat.# GNTG1035

Defense & Forensic

lit. cat.# CFTG1036

Food, Flavor, Fragrance & Odor Profiling

lit. cat.# FFTG1037





Restek's Ultra-Clean resin eliminates the hassle of cleaning and testing resin for air sampling.

Sampling Supplies for Semivolatiles in Air

Everything you need for sampling semivolatile compounds in air: Ultra-Clean resin, PUF sampling cartridges.

Ultra-Clean Resin

- For adsorbing semivolatiles in air.
- Cleaned, GC tested and certified.
- Available in 100 gram quantities.

Although resin is an excellent adsorbent for trapping PAHs, it requires extensive clean-up because many of its impurities are PAH compounds. To enable you to eliminate time-consuming clean-up, we do the cleaning for you! We test each batch by capillary GC/flame ionization detector to ensure cleanliness.

method applications

Method	Applications
EPA TO-13A	PAHs in Ambient Air
ASTM D6209	PAHs in Ambient Air
EPA Method 23	Dioxins in Stationary Source Emissions
EPA Method 0010	Semivolatiles in Stationary Source Emissions

Description	cat.#
Ultra-Clean Resin, 100 grams	24230

SDVB Resin

- Styrene/divinylbenzene, equivalent to XAD-2 resin.
- Untreated, packaged in 1 kg plastic containers.
- Spherical, 20 to 60 mesh particles.

Description	qty.	cat.#
SDVB Resin	1kg	24053

Larger quantities available upon request.

Cleaned Polyurethane Foam (PUF) Cartridges

- Precleaned and ready to use for collection of semivolatiles (pesticides, PCBs, PAHs).
- Both large high-volume (220-280 L/min.) and small low-volume (1-5 L/min.) PUFs available.
- Suitable for ambient, indoor, and industrial hygiene applications.
- PUF/XAD-2 "sandwiches" capture a wider range of semivolatiles.



method applications

Method	Applications	cat.#
EPA TO-10A	Organochlorine and organophosphorous pesticides, carbamate, pyrethrin, triazine, and urea pesticides	22116
EPA IP-7	Polycyclic aromatic hydrocarbons (PAHs)	22114
EPA IP-8	Organochlorine and organophosphorous pesticides, carbamate, pyrethrin, triazine, and urea pesticides	22116
ASTM D4861	Organochlorine and organophosphorous pesticides, PCB	22116
ASTM D4947	Chlordane and heptachlor residues	22116
Research	Pesticides	22117
EPA TO-4A	Organochlorine pesticides, PCBs	22114
EPA TO-9A	Polychlorinated dibenzo- <i>p</i> -dioxins (PCDDs)	22114
EPA TO-13A	Polycyclic aromatic hydrocarbons (PAHs)	22114
EPA 600/8-80-038	Organochlorine pesticides, PCBs, PAHs	22115
ASTM D6209	Polycyclic aromatic hydrocarbons (PAHs)	22114

Description	qty.	cat.#
Cleaned PUF Plug (7.6cm length, 6cm diameter)	ea.	24295
Large PUF Cartridge, 65mm OD x 125mm length, 75mm PUF	ea.	22114
Large PUF/XAD Cartridge, 65mm OD x 125mm length, 25mm PUF/10g XAD-2/50mm PUF	ea.	22115
Small PUF Cartridge, 22mm OD x 100mm length, 76mm PUF	ea.	22116
Small PUF/XAD Cartridge, 22mm OD x 100mm length, 30mm PUF/1.5g XAD-2/30mm PUF	ea.	22117



22114

22115



22116

22117

also available

Untreated PUF Plugs

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