

Air Monitoring





Air Monitoring

SilcoCan Canisters	402-403
Canister Carrying Supplies	403
TO-Can Canisters	404
Canister Supplies	405-406
Canister Reconditioning	406
Passive Air Sampling Kits & Parts	407-408
Miniature Air Sampling Canisters	409
Thermal Desorption Unit Tubes	410
Resin, PUFs	411
Gas Sampling Bags	412
Gas Standards	413-418
Reference Cylinder Regulators	415, 417-418
High-Pressure Sample Cylinders	419

Air Monitoring Syringes	292
Reference Books	www.restek.com

SilcoCan™ Air Monitoring Canisters

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

Features

Siltek® treated.
High-purity, 3/8-turn valve with stainless steel diaphragms.
Vacuum/pressure gauge (optional).
Variety of sizes.
Stable to 250°C.
Siltek® valve available (add suffix "-650" to cat.#).

Benefits

High inertness—ensures sample stability.
No sample adsorption at the valve, for more accurate results; easy to use.
Ascertain internal conditions at a glance.
Meet extensive range of sampling needs.
Heat canister to 250°C for superior cleaning.
Completely passive sample pathway for maximum sample stability.



Canisters are the gold standard for ambient VOC monitoring.

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.

for more info

For more information about Siltek® deactivation, refer to the Restek Performance Coatings section of this catalog. See **page 380**.

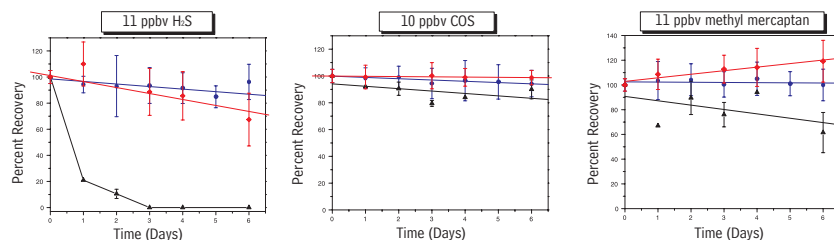
did you know?

SilcoCan™ Canisters are cleaned prior to shipping.

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

Whether you are monitoring for TO-14, TO-15, or reactive sulfur compounds, SilcoCan™ canisters are your best choice for inertness. In Tedlar® bags, the stability of low-level (100ppbv) 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 (1–20ppbv), under dry or humid conditions. The versatility of the SilcoCan™ canister makes it an excellent choice for collecting and storing TO-14 or TO-15 compounds.

Figure 1 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 precleaned 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)

SilcoCan™ Air Monitoring Canisters

- High quality, metal-to-metal seal, $\frac{2}{3}$ -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.

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

Description	qty.	1L Volume	3L Volume	6L Volume	15L Volume
		cat.#	cat.#	cat.#	cat.#
SilcoCan™ Canister, $\frac{1}{4}$ " Valve	ea.	24180	24181	24182	24183
SilcoCan™ Canister, Siltek® Treated $\frac{1}{4}$ " Valve	ea.	24180-650	24181-650	24182-650	24183-650
SilcoCan™ Canister with Gauge, $\frac{1}{4}$ " Valve	ea.	24140	24141	24142	24143
SilcoCan™ Canister with Gauge, Siltek® Treated $\frac{1}{4}$ " Valve	ea.	24140-650	24141-650	24142-650	24143-650
SilcoCan™ Canister with No Valve	ea.	22090	22091	22092	22093

Restek canisters are originally equipped with high-quality Parker Hannifin diaphragm valves. Each valve is helium leak-tested to 4×10^{-6} 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 $\frac{1}{4}$ " inlet and outlet.

Dimensions/Weights of SilcoCan™ 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	1.13kg
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

*16 lbs shipped UPS Air, 22 lbs shipped Fed Ex (USA).

for example
applications

Vist www.restek.com

also available

For additional gauge and valve options, see [page 405](#).

please note

SilcoCan™ canisters at quantity discounts. Call Restek for details!

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 60psi. 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.

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

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 one shipping box per kit.

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

Canister Carrying Case

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

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





Improved TO-Can™ Air Monitoring Canisters

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

- High quality, metal-to-metal seal, $\frac{2}{3}$ -turn valve with stainless steel diaphragms.
- 2-port or 3-port valve available; 3-port valve includes 30" Hg/60psi vacuum/pressure gauge (other gauges available).
- Sizes from 1 to 15 liters, for a range of sampling needs.

Features

Benefits

Metal to metal seat, valve with stainless steel diaphragms.	No sample adsorption, for more accurate results.
Vacuum/pressure gauge (optional).	Ascertain internal conditions at a glance.
Stable to 250°C.	Heat canister to 250°C for superior cleaning.

please **note**

TO-Can™ canisters at quantity discounts. Call Restek for details!

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

For more information, request lit. cat.# 59189A.

US EPA Compendium of Air Methods TO-14 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-14/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 $\frac{2}{3}$ -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.

did you **know?**

TO-Can™ Canisters are cleaned prior to shipping.

Description	qty.	1L Volume	3L Volume	6L Volume	15L Volume
		cat.#	cat.#	cat.#	cat.#
TO-Can™ Canister, $\frac{1}{4}$ " Valve	ea.	24172	24173	24174	24175
TO-Can™ Canister with Gauge, $\frac{1}{4}$ " Valve	ea.	24176	24177	24178	24179
TO-Can™ Canister with No Valve	ea.	22094	22095	22096	22097

Restek canisters are originally equipped with high-quality Parker Hannifin diaphragm valves. Each valve is helium leak-tested to 4×10^{-9} 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 $\frac{1}{4}$ " inlet and outlet. For additional gauge and valve options, see page 405.

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 60psi. 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.

TO-Can™ Canisters with Swagelok® SS4H Bellows-Sealed Valve

- All metal flow path prevents sample adsorption, giving more accurate results.
- Withstands temperatures of up to 300°C.
- Rugged performance in the field.
- Fast delivery from Restek!

Restek now offers Swagelok® SS4H canister valves on our TO-Can™ canisters. Valves are bellows-sealed for durability and meet all EPA requirements for air monitoring by methods TO-14 and TO-15.

Description	qty.	1 Liter Volume	3 Liter Volume	6 Liter Volume	15 Liter Volume
		cat.	cat.	cat.	cat.
TO-Can™ Canister with $\frac{1}{4}$ " Swagelok® SS4H Bellows-Sealed Valve	ea.	22105	22106	22107	22108

Replacement valves are available on page 405.

new!



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 407-417**.

Alternative Gauges and Valves for Air Monitoring Canisters

1/4" Replacement Valves for Air Monitoring Canisters*

Description	qty.	Non-Treated Valve		qty.	Siltek®-Treated Valve	
		cat. #			cat. #	
1/4" Replacement Valve (2-port)	ea.	24145		ea.	24144	
1/4" Replacement Valve (3-port)	ea.	24147		ea.	24146	

*All Restek canisters are originally equipped with high-quality Parker Hannifin diaphragm valves. Each valve is helium leak-tested to 4×10^{-6} 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.



Canister valve
(Siltek®-treated)

Swagelok® SS4H Bellows-Sealed Valve, 1/4-inch, 2-Port, Stainless Steel

- 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 now 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-14 and TO-15.

Description	qty.	cat.
Replacement 1/4" Swagelok® SS4H Bellows-Sealed Valve	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.		

new!

**Replacement Combination Vacuum/Pressure Gauges**

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

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

2-Inch Vacuum Gauge

High-quality vacuum gauge with 316 stainless steel wetted surfaces. 30" Hg.

Description	qty.	cat. #
2-Inch Vacuum Gauge; 1/8" NPT	ea.	24269
2-Inch Vacuum Gauge; 1/4" NPT	ea.	24270

Siltek® tee



High-quality
vacuum gauge

Ashcroft Test Gauges

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

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 two 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

new!



new!

**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

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.

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

*Not CE certified.



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

did you know?**SilcoCan™ and TO-Can™ Canisters are Cleaned Prior to Shipping**

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

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 90psi. 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.



Restek's canister cleaning system with humidification chamber.



Humidification Chamber

Description	qty.	cat.#
Humidification Chamber	ea.	24282

Reconditioning Service for SilcoCan™ or TO-Can™ Canisters

Normal wear and tear on a canister may result in valve damage and leakage. We offer a reconditioning service in which we will replace the valve, clean, and leak test the canister for much less than the cost to replace the entire canister. If you would like this service, please follow the instructions below:

1. Contact Customer Service at 800-356-1688, ext. 3, or contact your Restek representative and place an order for part number 560838 using your company purchase order.
2. Obtain a return authorization number to affix on the outside of the shipping container.
3. Clean canister before shipment to Restek.
4. Return canister intact. Do not remove valves or gauges that were part of the original canister.



Irene DeGraff
Air & SPE Product
Marketing Manager
1+ year of service!

Passive Air Sampling Kits

Superior Performance—an Excellent Restek Value.

- Improved design eliminates leaks at the filter.
- Siltek® treated components ensure a very inert surface.
- Excellent for sampling times from 0.5 hour to 125 hours, or grab sampling.

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.

Air Sampling Kits

400cc	Canister Volume*/Sampling Time				Flow (scm)	Orifice size	Siltek® Treated Sampling Kits	Stainless Steel Sampling Kits
	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	8–20	0.0020"	24162	24167
—	—	2 hour	3 hour	8 hour	20–40	0.0030"	24163	24168
—	—	—	1.5 hour	4 hour	40–80	0.0060"	24164	24169
—	—	—	0.5 hour	1 hour	80–350	0.0090"	22101	22100

*Air sampling canisters sold separately.

1. Veriflo™ SC423XL flow controller

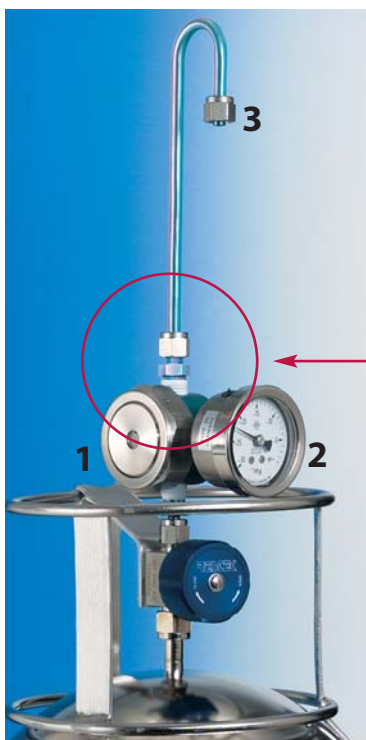
This flow controller is the heart of the sampling train. It is a high-quality device designed to maintain a constant mass flow as the pressure changes from 30" Hg to 5" Hg (we recommend you stop sampling at or before 5" Hg of vacuum). All wetted parts of the flow controller can be Siltek® treated.

2. Stainless steel vacuum gauge

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

3. 1/4-inch Siltek® sample inlet

The 0.3m 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 408**.

free literature

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

Download your free copy from www.restek.com.

Technical Guide
lit. cat. # 59977B



Critical orifice

Frit filters
(top: Siltek® treated)
(bottom: stainless steel)

Flow controller



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 (sccm)	Orifice size	Siltek® Treated		Stainless Steel	
		cat. #		cat. #	
0.5–2	0.0008"	24219		24218	
2–4	0.0012"	24233		24245	
4–8	0.0016"	24234		24246	
8–20	0.0020"	24235		24247	
20–40	0.0030"	24236		24248	
40–80	0.0060"	24237		24249	
80–350	0.0090"	22099		22098	

2µm Frit Filters

For use in critical orifice fitting. Includes washers.

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

Veriflo™ Flow Controllers

Veriflo™ 423XL flow controllers are offered in a Siltek® and a 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 (sccm)	Orifice size	Siltek® Treated		Stainless Steel	
		cat. #		cat. #	
0.5–2	0.0008"	24232		24229	
2–4	0.0012"	24255		24260	
4–8	0.0016"	24256		24261	
8–20	0.0020"	24257		24262	
20–40	0.0030"	24258		24263	
40–80	0.0060"	24259		24264	
80–350	0.0090"	22103		22102	
—	no orifice	24238		24239	

7µm In-Line Filter

This 316 stainless steel filter is designed to collect particles larger than 7 microns. We offer a Siltek® version and a stainless steel version.

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

Gap Inspection Gauge

- Confirm that fittings are sufficiently tightened.
- For use with 1/4", 3/8", 1/2" Swagelok® fittings.
- For Swagelok® fittings in new installations only.

Description	qty.	cat. #
Gap Inspection Gauge	ea.	22624

Miniature Air Sampling Canisters

- Ideal for indoor air, personal, emergency response, or soil gas sampling.
- 400cc or 1000cc.
- Low pressure applications not exceeding 40psig.
- Available with quick-connect fitting that is compatible with sampling and analysis instruments.
- Also available with nontreated or Sulfinert® treated valve.

These small canisters are designed for controlled sampling, such as personal air sampling, as an alternative to tube and pump samplers. The 1000cc canister is suitable for sampling volatile organic compounds in air according to US EPA Methods TO-14 and TO-15.

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

Miniature Air Sampling Canisters with Quick-Connect Stem Fittings

Description	Volume	qty.	cat.#
Electro-Polished Miniature Canister with Quick-Connect Stem Fitting	400cc	ea.	24188
	1000cc	ea.	24194
Sulfinert® Treated Miniature Canister with Quick-Connect Stem Fitting	400cc	ea.	24189
	1000cc	ea.	24195
Sulfinert® Treated Miniature Canister with Sulfinert® Treated Quick-Connect Stem Fitting	400cc	ea.	24190
	1000cc	ea.	24196

Quick-Connect Fittings for Miniature Air Sampling Canisters

Connection: 1/4" tube fitting.

Description	qty.	cat.#
Quick-Connect Stem Fitting	ea.	24185
Sulfinert® Treated Quick-Connect Stem Fitting	ea.	24186
Quick-Connect Body Fitting	ea.	24187

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

Miniature Air Sampling Canisters with Metal-Seated Diaphragm Valve

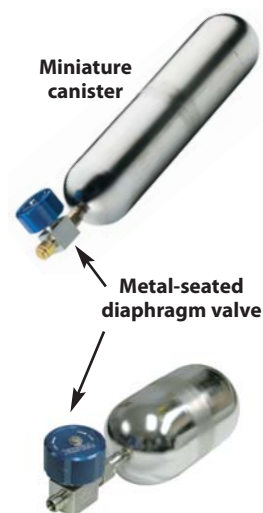
Description	Volume	qty.	cat.#
Electro-Polished Miniature Canister with Metal-Seated Diaphragm Valve	400cc	ea.	24191
	1000cc	ea.	24197
Sulfinert® Treated Miniature Canister with Metal-Seated Diaphragm Valve	400cc	ea.	24192
	1000cc	ea.	24198
Sulfinert® Treated Miniature Canister with Sulfinert® Treated Diaphragm Valve	400cc	ea.	24193
	1000cc	ea.	24199

Miniature Air Sampling Canisters with Nut & Ferrule

Description	Volume	qty.	cat.#
Electro-Polished Miniature Canister with Nut & Ferrule	400cc	ea.	24205
	1000cc	ea.	24206
Sulfinert® Treated Miniature Canister with Nut & Ferrule	400cc	ea.	24207
	1000cc	ea.	24208



Dimensions:
400cc = 2.75" diameter,
5.35" long (7 x 13.6cm)
1000cc = 2.75" diameter,
11.92" long (7 x 30cm)



for
reference books

visit www.restek.com

new!



method applications

Method	Application
US EPA	TO-17
ASTM	D-6196
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.
- 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 are now available from Restek. 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	Applications
Tenax TA	Vapour phase organics from C6/7 to C26
Graphitized Carbon	Vapour phase organics from C5/6 to C14
Tenax GR/Carbopack™ B	Vapour phase organics from n-C5/6 to n-C20 (EPA Methods TO-14/TO-15/TO-17)
Carbopack™ B/Carbosieve™ SIII	Vapour phase organics from n-C2/3 to n-C12/14 (EPA Methods TO-14/TO-15/TO-17)
Tenax TA/Graphitized Carbon/Carboxen™ 1000	Vapour phase organics from C2/3 to C20
Carbopack™ C/Carbopack™ B/Carbosieve™ SIII	Vapour phase organics from n-C2/3 to n-C16/20 (EPA Methods TO-14/TO-15/TO-17)

Thermal Desorption Unit Tubes, Unconditioned and Conditioned & Capped

Description	qty.	Unconditioned		Conditioned & Capped	
		Stainless Steel	Glass	Stainless Steel	Glass
		cat.#	cat.#	cat.#	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/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 gauze fitted, rear gauze and gauze retaining spring supplied.
- Glass: with glass frit positioned 15mm from sampling end.

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

Thermal Desorption Unit Tubes, Calibration

Description	qty.	Stainless Steel	Glass
		cat.#	cat.#
TDU Tubes, Calibration, Tenax TA 1cm Bed	10-pk.	24075	24076
Calibration Solution Loading Rig		ea.	24077
Calibration Solution Loading Rig 9.5mm Replacement Septa		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	Use for 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



Stainless Steel,
Conditioned and Capped



Glass, Unconditioned



Stainless Steel,
Unconditioned



CapLok Tool



Diffusion Caps

Sampling Supplies for Semivolatiles in Air

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

Ultra-Clean Resin: Equivalent to XAD®-2 Resin; Exclusively from Restek!

- For adsorbing semivolatiles in air.
- Cleaned, GC tested and certified by TO-13 protocol.
- 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 but still meet TO-13 method requirements, we do the cleaning for you! Ultra-Clean resin complies with the specified maximum contamination levels—we test each batch by capillary GC/flame ionization detector to ensure cleanliness.

method applications

Method	Applications
EPA 23	Dioxins
EPA TO-13A	PAHs
ASTM D6209	PAHs



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

Description	cat.#	1-4 bottles	5-9 bottles	10+ bottles
Ultra-Clean Resin, 100 grams	24230			

SDVB Resin

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

Description	qty.	cat.#
SDVB Resin	1kg	24053



Cleaned Polyurethane Foam (PUF) Cartridges

- Precleaned and ready to use for collection of semivolatiles (pesticides, PCBs, PAHs).
- Both large high-volume (220-280L/min.) and small low-volume (1-5L/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

also available

We also offer Whatman QM-A Quartz Fiber Filters. Visit www.restek.com.

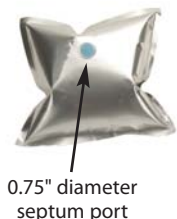


Large PUF Cartridge



Small PUF Cartridge

new!

new!**Cali-5-Bond™ Gas Sampling Bags**

- Totally nonpermeable and opaque, providing UV protection.
- Chemically inert—extremely rugged and portable.
- Extra strength—5 mil (0.14mm) thick.
- Easy to use.

Cali-5-Bond™ air and gas sampling bags provide a simple, reliable, and economic method of collecting air, gas, and liquid samples. The 5-layer construction (made by a patented process) ensures the physical integrity of any sample taken, providing a truly representative sample of the collection environment. Both grab and time-integrated samples can be taken with the use of a sampling pump. The twist-type valve with hose-barb connection enables secure attachment of $\frac{3}{16}$ " ID sample tubing. The septum port allows easy access via a gas-tight syringe. Bags should not be used at temperatures above 50°C (125°F) and should never be over inflated.

Description		qty.	cat.#
0.5L	6" x 8"	5-pk.	24092
1L	8" x 8"	5-pk.	24093
2L	8" x 12"	5-pk.	24094
5L	8" x 23"	5-pk.	24095
10L	16" x 15"	5-pk.	24096
22L	16" x 25"	5-pk.	24097
44L	24" x 25"	5-pk.	24098

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.

The unique design of these Tedlar® sample bags incorporates the sampling septum directly in the valve, providing easier use and lighter weight than other styles. We offer two types of bags: one with a polypropylene valve and one with a stainless steel valve. Both valves conveniently connect to $\frac{3}{16}$ " 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 32.5"	5-pk.	22057	22046
100L	28" x 36"	3-pk.	22058	22047
Replacement Septum		10-pk.	22059	22048

Environmental Air Monitoring Gas Standards

Our high-quality air monitoring gas calibration standards are provided by Spectra Gases and Scott Specialty Gases. Mixes are produced gravimetrically using NIST (National Institute of Science and Technology) traceable weights. Each comes with a Certificate of Analysis and unique serial number. All cylinders are disposable and do not require rental or demurrage fees. Recertification of cylinders is available directly with our suppliers. All cylinders are drop-shipped from our suppliers to provide fast delivery and the "freshest" standard possible. 12-month stability on all cylinders unless otherwise specified.

TO-14A Calibration Mix (39 components)

benzene	ethyl chloride
bromomethane	hexachloro-1,3-butadiene
carbon tetrachloride	methylene chloride
chlorobenzene	styrene
chloroform	1,1,2,2-tetrachloroethane
chloromethane	tetrachloroethylene
1,2-dibromoethane	toluene
<i>m</i> -dichlorobenzene	1,2,4-trichlorobenzene
<i>o</i> -dichlorobenzene	1,1,1-trichloroethane
<i>p</i> -dichlorobenzene	1,1,2-trichloroethane
dichlorodifluoromethane	trichloroethene
1,1-dichloroethane	trichlorofluoromethane
1,2-dichloroethane	1,1,2-trichlorotrifluoroethane
1,1-dichloroethene	1,2,4-trimethylbenzene
<i>cis</i> -1,2-dichloroethene	1,3,5-trimethylbenzene
1,2-dichloropropane	vinyl chloride
<i>cis</i> -1,3-dichloropropene	<i>m</i> -xylene
<i>trans</i> -1,3-dichloropropene	<i>o</i> -xylene
dichlorotetrafluoroethane	<i>p</i> -xylene
ethyl benzene	

In nitrogen, 104 liters @ 1,800psi

1ppm cat. # 34400 (ea.)

100ppb cat. # 34421 (ea.)

In nitrogen, 110 liters @ 1,800psi (Pi-marked Cylinder)

1ppm cat. # 34400-PI (ea.)

100ppb cat. # 34421-PI (ea.)

TO-14A 41 Component Mix (41 components)

acrylonitrile	ethyl benzene
benzene	ethyl chloride
bromomethane	hexachloro-1,3-butadiene
1,3-butadiene	methylene chloride
carbon tetrachloride	styrene
chlorobenzene	1,1,2,2-tetrachloroethane
chloroform	tetrachloroethylene
chloromethane	toluene
1,2-dibromoethane	1,2,4-trichlorobenzene
<i>m</i> -dichlorobenzene	1,1,1-trichloroethane
<i>o</i> -dichlorobenzene	1,1,2-trichloroethane
<i>p</i> -dichlorobenzene	trichloroethene
dichlorodifluoromethane	trichlorofluoromethane
1,1-dichloroethane	1,1,2-trichlorotrifluoroethane
1,2-dichloroethane	1,2,4-trimethylbenzene
1,1-dichloroethene	1,3,5-trimethylbenzene
<i>cis</i> -1,2-dichloroethene	vinyl chloride
1,2-dichloropropane	<i>m</i> -xylene
<i>cis</i> -1,3-dichloropropene	<i>o</i> -xylene
<i>trans</i> -1,3-dichloropropene	<i>p</i> -xylene
dichlorotetrafluoroethane	

In nitrogen, 104 liters @ 1,800psi

1ppm cat. # 34430 (ea.)

100ppb cat. # 34431 (ea.)

In nitrogen, 110 liters @ 1,800psi (Pi-marked Cylinder)

1ppm cat. # 34430-PI (ea.)

100ppb cat. # 34431-PI (ea.)

TO-14A GC/MS Tuning Mix

4-bromofluorobenzene

In nitrogen, 104 liters @ 1,800psi

1ppm cat. # 34406 (ea.)

100ppb cat. # 34424 (ea.)

In nitrogen, 110 liters @ 1,800psi (Pi-marked Cylinder)

1ppm cat. # 34406-PI (ea.)

100ppb cat. # 34424-PI (ea.)

TO-14A 43 Component Mix (43 components)

acrylonitrile	ethyl benzene
benzene	ethyl chloride
bromomethane	4-ethyltoluene
1,3-butadiene	hexachloro-1,3-butadiene
carbon tetrachloride	methylene chloride
chlorobenzene	styrene
chloroform	1,1,2,2-tetrachloroethane
chloromethane	tetrachloroethylene
3-chloropropene	toluene
1,2-dibromoethane	1,2,4-trichlorobenzene
<i>m</i> -dichlorobenzene	1,1,1-trichloroethane
<i>o</i> -dichlorobenzene	1,1,2-trichloroethane
<i>p</i> -dichlorobenzene	trichloroethene
dichlorodifluoromethane	trichlorofluoromethane
1,1-dichloroethane	1,1,2-trichlorotrifluoroethane
1,2-dichloroethane	1,2,4-trimethylbenzene
1,1-dichloroethene	1,3,5-trimethylbenzene
<i>cis</i> -1,2-dichloroethene	vinyl chloride
1,2-dichloropropane	<i>m</i> -xylene
<i>cis</i> -1,3-dichloropropene	<i>o</i> -xylene
<i>trans</i> -1,3-dichloropropene	<i>p</i> -xylene
dichlorotetrafluoroethane	

In nitrogen, 104 liters @ 1,800psi

1ppm cat. # 34432 (ea.)

100ppb cat. # 34433 (ea.)

In nitrogen, 110 liters @ 1,800psi (Pi-marked Cylinder)

1ppm cat. # 34432-PI (ea.)

100ppb cat. # 34433-PI (ea.)

TO-14A Aromatics Mix (14 components)

benzene	toluene
chlorobenzene	1,2,4-trichlorobenzene
<i>m</i> -dichlorobenzene	1,2,4-trimethylbenzene
<i>o</i> -dichlorobenzene	1,3,5-trimethylbenzene
<i>p</i> -dichlorobenzene	<i>m</i> -xylene
ethyl benzene	<i>o</i> -xylene
styrene	<i>p</i> -xylene

In nitrogen, 104 liters @ 1,800psi

1ppm cat. # 34404 (ea.)

100ppb cat. # 34423 (ea.)

In nitrogen, 110 liters @ 1,800psi (Pi-marked Cylinder)

1ppm cat. # 34404-PI (ea.)

100ppb cat. # 34423-PI (ea.)

TO-14A Chlorinated Hydrocarbon Mix

(19 components)

carbon tetrachloride	hexachloro-1,3-butadiene
chloroform	methyl chloride
1,1-dichloroethane	methylene chloride
1,2-dichloroethane	1,1,2,2-tetrachloroethane
1,1-dichloroethene	tetrachloroethylene
<i>cis</i> -1,2-dichloroethylene	1,1,1-trichloroethane
1,2-dichloropropane	1,1,2-trichloroethane
<i>cis</i> -1,3-dichloropropene	trichloroethene
<i>trans</i> -1,3-dichloropropene	vinyl chloride
ethyl chloride	

In nitrogen, 104 liters @ 1,800psi

1ppm cat. # 34402 (ea.)

100ppb cat. # 34422 (ea.)

In nitrogen, 110 liters @ 1,800psi (Pi-marked Cylinder)

1ppm cat. # 34402-PI (ea.)

100ppb cat. # 34422-PI (ea.)

please note

Gas standards are subject to hazardous materials shipping fees by most freight carriers.

it's a fact

Higher concentration =
MORE STANDARD
for your money!

cylinder design

Spectra 104L Cylinders:

Aluminum construction.

Size: 8 x 24 cm.

Volume/Pressure:

104 liters of gas
@ 1,800psi

CGA-180

outlet fitting.

Weight:

1.5 lbs./0.7 kg



Scotty 110L Cylinders (Pi-marked Cylinders for EU Regulations):

Aluminum construction.

Size: 8.3 x 29.5 cm.

Volume/Pressure:

110 liters of gas
@ 1,800psi

CGA-180

outlet fitting.

Weight:

2.2 lbs./1 kg

U.S. D.O.T. Specs:

3AL2216



ordering note

Other cylinder sizes available on request.

also available

See page 415 for high-purity regulator.

new!

Pi-marked Gas Cylinders Now Available for EU Countries

Our new Pi-marked gas standards from Scott Specialty Gases meet the requirements of Transportable Pressure Equipment Directive (TPED) implemented in 2001 that regulates the safe transport of pressurized containers used throughout the European community.

TO-14A Internal Standard Mix

bromochloromethane 1,4-difluorobenzene
chlorobenzene-d5

In nitrogen, 104 liters @ 1,800psi

1ppm cat. # 34412 (ea.)

100ppb cat. # 34427 (ea.)

In nitrogen, 110 liters @ 1,800psi (Pi-marked Cylinder)

1ppm cat. # 34412-PI (ea.)

100ppb cat. # 34427-PI (ea.)

TO-14A Internal Standard/Tuning Mix

bromochloromethane chlorobenzene-d5
1-bromo-4-fluorobenzene 1,4-difluorobenzene
(4-bromofluorobenzene)

In nitrogen, 104 liters @ 1,800psi

1ppm cat. # 34408 (ea.)

100ppb cat. # 34425 (ea.)

In nitrogen, 110 liters @ 1,800psi (Pi-marked Cylinder)

1ppm cat. # 34408-PI (ea.)

100ppb cat. # 34425-PI (ea.)

BTEX Gas Mix

benzene *m*-xylene
ethylbenzene *o*-xylene
toluene *p*-xylene

In nitrogen, 104 liters @ 1,800psi

1ppm cat. # 34414 (ea.)

100ppb cat. # 34428 (ea.)

In nitrogen, 110 liters @ 1,800psi (Pi-marked Cylinder)

1ppm cat. # 34414-PI (ea.)

100ppb cat. # 34428-PI (ea.)

BTEX and MTBE Gas Mix

benzene *m*-xylene
ethylbenzene *o*-xylene
methyl *tert*-butyl ether (MTBE) *p*-xylene
toluene

In nitrogen, 104 liters @ 1,800psi

1ppm cat. # 34541 (ea.)

100ppb cat. # 34542 (ea.)

In nitrogen, 110 liters @ 1,800psi (Pi-marked Cylinder)

1ppm cat. # 34541-PI (ea.)

100ppb cat. # 34542-PI (ea.)

TO-15 Subset 25 Component Mix (25 components)

acetone 4-ethyltoluene
allyl chloride heptane
benzyl chloride* hexane
bromodichloromethane 2-hexanone (MBK)
bromoform 4-methyl-2-pentanone
1,3-butadiene methyl *tert*-butyl ether (MTBE)
2-butanone (MEK) 2-propanol
carbon disulfide* propylene
cyclohexane tetrahydrofuran
dibromochloromethane 2,2,4-trimethylpentane
trans-1,2-dichloroethene vinyl acetate
1,4-dioxane vinyl bromide
ethyl acetate

In nitrogen, 104 liters @ 1,800psi

1ppm cat. # 34434 (ea.)

100ppb cat. # 34435 (ea.)

In nitrogen, 110 liters @ 1,800psi (Pi-marked Cylinder)

1ppm cat. # 34434-PI (ea.)

100ppb cat. # 34435-PI (ea.)

*Stability of this compound cannot be guaranteed.

TO-15 64 Component Mix

(64 components)

acetone
acrolein
benzene
benzyl chloride*
bromodichloromethane
bromoform
bromomethane
1,3-butadiene
2-butanone (MEK)
carbon disulfide*
carbon tetrachloride
chlorobenzene
chloroethane
chloroform
chloromethane
cyclohexane
dibromochloromethane
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
1,1-dichloroethane
1,2-dichloroethane
1,1-dichloroethene
cis-1,2-dichloroethene
trans-1,2-dichloroethene
1,2-dichloropropane
cis-1,3-dichloropropene
trans-1,3-dichloropropene
1,4-dioxane
ethanol*
ethyl acetate
ethyl benzene
ethylene dibromide
(1,2-dibromoethane)
4-ethyltoluene

trichlorofluoromethane
(Freon® 11)
dichlorodifluoromethane
(Freon® 12)
1,1,2-trichloro-1,2,2-trifluoroethane (Freon® 113)
1,2-dichlorotetrafluoroethane (Freon® 114)
heptane
hexachloro-1,3-butadiene
hexane
2-hexanone (MBK)
methyl methacrylate
4-methyl-2-pentanone (MIBK)
methylene chloride
methyl *tert*-butyl ether (MTBE)
2-propanol
propylene
styrene
1,1,2,2-tetrachloroethane
tetrachloroethene
tetrahydrofuran
toluene
1,2,4-trichlorobenzene
1,1,1-trichloroethane
1,1,2-trichloroethane
trichloroethene
1,2,4-trimethylbenzene
1,3,5-trimethylbenzene
vinyl acetate
vinyl chloride
m-xylene
o-xylene
p-xylene

In nitrogen, 104 liters @ 1,800psi

1ppm cat. # 34436 (ea.)

100ppb cat. # 34437 (ea.)

In nitrogen, 110 liters @ 1,800psi (Pi-marked Cylinder)

1ppm cat. # 34436-PI (ea.)

100ppb cat. # 34437-PI (ea.)

*Stability of this compound cannot be guaranteed.

Massachusetts APH Mix (26 components)

benzene *p*-isopropyltoluene
1,3-butadiene methyl *tert*-butyl ether
butylcyclohexane 1-methyl-3-ethylbenzene
cyclohexane *n*-nonane
n-decane *n*-octane
2,3-dimethylheptane toluene
2,3-dimethylpentane toluene-d8 (IS)
n-dodecane 1,2,3-trimethylbenzene
ethylbenzene 1,3,5-trimethylbenzene
n-heptane *n*-undecane
n-hexane *o*-xylene
isopentane *m/p*-xylene (combined)
isopropylbenzene

In nitrogen, 104 liters @ 1,800psi

1ppm cat. # 34540 (ea.)

In nitrogen, 110 liters @ 1,800psi (Pi-marked Cylinder)

1ppm cat. # 34540-PI (ea.)

Japan Calibration Mix (9 components)

acrylonitrile dichloromethane
benzene tetrachloroethylene
1,3-butadiene trichloroethylene
chloroform vinyl chloride
1,2-dichloroethane

In nitrogen, 104 liters @ 1,800psi

1ppm cat. # 34418 (ea.)

In nitrogen, 110 liters @ 1,800psi (Pi-marked Cylinder)

1ppm cat. # 34418-PI (ea.)

please note

Gas standards are subject to hazardous materials shipping fees by most freight carriers.

ordering note

Other cylinder sizes available on request.

for reference books

Visit www.restek.com

Ozone Precursor Mixture/PAMS (57 components)

acetylene	isopropylbenzene
benzene	methylcyclohexane
<i>n</i> -butane	methylcyclopentane
1-butene	2-methylheptane
<i>cis</i> -2-butene	3-methylheptane
<i>trans</i> -2-butene	2-methylhexane
cyclohexane	3-methylhexane
cyclopentane	2-methylpentane
<i>n</i> -decane	3-methylpentane
<i>m</i> -diethylbenzene	<i>n</i> -nonane
<i>p</i> -diethylbenzene	<i>n</i> -octane
2,2-dimethylbutane	<i>n</i> -pentane
2,3-dimethylbutane	1-pentene
2,3-dimethylpentane	<i>cis</i> -2-pentene
2,4-dimethylpentane	<i>trans</i> -2-pentene
<i>n</i> -dodecane	propane
ethane	<i>n</i> -propylbenzene
ethylbenzene	propylene
ethylene	styrene
<i>m</i> -ethyltoluene	toluene
<i>o</i> -ethyltoluene	1,2,3-trimethylbenzene
<i>p</i> -ethyltoluene	1,2,4-trimethylbenzene
<i>n</i> -heptane	1,3,5-trimethylbenzene
<i>n</i> -hexane	2,2,4-trimethylpentane
1-hexene	2,3,4-trimethylpentane
isobutane	<i>n</i> -undecane
isopentane	<i>o</i> -xylene
isoprene	<i>m/p</i> -xylene (combined)

In nitrogen, 104 liters @ 1,800psi

1ppm cat. # 34420 (ea.)**100ppb** cat. # 34429 (ea.)

In nitrogen, 110 liters @ 1,800psi (PI-marked Cylinder)

1ppm cat. # 34420-PI (ea.)**100ppb** cat. # 34429-PI (ea.)**Ozone Precursor/PAMS Mix**

(57 components at EPA concentrations: ppbC)

acetylene	40	isopropylbenzene	40
benzene	30	methylcyclohexane	30
<i>n</i> -butane	40	methylcyclopentane	25
1-butene	30	2-methylheptane	25
<i>cis</i> -2-butene	35	3-methylheptane	25
<i>trans</i> -2-butene	25	2-methylhexane	25
cyclohexane	40	3-methylhexane	25
cyclopentane	20	2-methylpentane	20
<i>n</i> -decane	30	3-methylpentane	40
<i>m</i> -diethylbenzene	40	<i>n</i> -nonane	25
<i>p</i> -diethylbenzene	25	<i>n</i> -octane	30
2,2-dimethylbutane	40	<i>n</i> -pentane	25
2,3-dimethylbutane	50	1-pentene	25
2,3-dimethylpentane	50	<i>cis</i> -2-pentene	35
2,4-dimethylpentane	40	<i>trans</i> -2-pentene	25
<i>n</i> -dodecane	40	propane	40
ethane	25	<i>n</i> -propylbenzene	30
ethylbenzene	25	propylene	25
ethylene	20	styrene	40
<i>m</i> -ethyltoluene	25	toluene	40
<i>o</i> -ethyltoluene	30	1,2,3-trimethylbenzene	25
<i>p</i> -ethyltoluene	40	1,2,4-trimethylbenzene	40
<i>n</i> -heptane	25	1,3,5-trimethylbenzene	25
<i>n</i> -hexane	30	2,2,4-trimethylpentane	30
1-hexene	60	2,3,4-trimethylpentane	25
isobutane	25	<i>n</i> -undecane	30
isopentane	40	<i>o</i> -xylene	25
isoprene	40	<i>m/p</i> -xylene (combined)	40

In nitrogen, 104 liters @ 1,800psi

20-60ppb C cat. # 34445 (ea.)

In nitrogen, 110 liters @ 1,800psi (PI-marked Cylinder)

20-60ppb C cat. # 34445-PI (ea.)also **available****Custom air standards!**Visit www.restek.com for our custom air standards ordering form.**TO-14/TO-15/TO-17 Performance Test Standard** **new!**

Restek is pleased to offer the Performance Testing/VOC Audit Sample Program in cooperation with Spectra Gases. This is an on-going testing program in which laboratories, and/or other users of VOC standards, are able to evaluate their own capabilities, as well as compare their results and accuracy against other laboratories. As a participant in the program, you will receive a disposable cylinder, directly from Spectra Gases, containing multiple unknown TO-14A/TO-15/TO-17 components at varying concentrations that are to be identified, quantified, and reported via the Spectra Gases P-T Audit Program forms. The results will be published and distributed for peer review. To ensure confidentiality, all participating laboratories will be anonymous, and only the individual laboratory will know their own results. To provide statistical analysis, the audit sample will be shipped to all laboratories at the same time, once a year during the fourth quarter.

170 liters @ 2,015psi

cat. # 34560 (ea.)

cylinder design**TO-14/TO-15/TO-17****Performance Test Standard:****Size:** 5A disposable (3.2" x 12")**Volume/Pressure:**

170L @ 2,015psi

CGA 180 outlet fitting**Weight:** 2.2lbs.**Sulfur 5-Component Mix**

12-month stability. +/- 10% accuracy.

carbonyl sulfide	hydrogen sulfide
dimethyl sulfide	methyl mercaptan
ethyl mercaptan	

In nitrogen, 110 liters @ 1,800psi

1ppm cat. # 34561 (ea.)

In nitrogen, 110 liters @ 1,800psi (PI-marked Cylinder)

1ppm cat. # 34561-PI (ea.)**Spectra Gas 7621 High-Purity VOC Regulator**

- Single-stage, stainless steel.
- Two pressure gauges and CGA-180 fitting.
- 3000psig maximum inlet pressure.
- Stainless steel diaphragm and Kel-F® seat.
- 1/8-inch tube compression outlet.
- Low internal volume: 3.03cc.
- Accurate pressure control even at low flow rates.
- Individually tested for leaks and impurities.

Description	qty.	cat.#
0-30psig outlet pressure gauge	ea.	21572
0-100psig outlet pressure gauge	ea.	21572-R100





Scott Transportable Pure Gases and Mixtures in 14-, 48-, and 110-Liter Sizes

We offer a wide range of Scott Transportable Gases, from pure gases for purging or calibrating to multi-component mixes which are ideal for peak identification work.

The 14-liter container has a CGA 160 connection for more precise integration with analytical systems. The 48-liter cylinder has a CGA 165 connection, and can deliver large volumes of sample. The 110-liter cylinder has a CGA 180 connection.

Scotty® 14

Contents: 14 liters
Pressure: 240psig (17 bar)
Outlet Fitting: CGA 160

Weight: 1.5 lbs/0.7 kg
Dimensions: 3" diameter x 11" height (7.6 x 28cm)
D.O.T. Specifications: 4B240

Scotty® 48

Contents: 48 liters
Pressure: 300psig (21 bar)
Outlet Fitting: CGA 165

Weight: 1.75 lbs/0.8 kg
Dimensions: 4" diameter x 16 1/4" height (10.2 x 41cm)
D.O.T. Specifications: 39 NRC

Scotty® 110 (Pi-marked Cylinders for EU Regulations)

Contents: 110 liters
Pressure: 1800psig (124 bar)
Outlet Fitting: CGA 180

Weight: 2.2 lbs/1 kg
Dimensions: 3.25" diameter x 11.625" height (8.3 x 29.5cm)
D.O.T. Specifications: 3AL2216

Description	Shelf Life	Scotty® 14 (14 Liter) cat.#	Scotty® 48 (48 Liter) cat.#	Scotty® 110 (110 Liter) cat.#
Pure Gases				
Air, zero (THC < 1ppm)	2 yrs.	34448	34449	34449-PI
Argon, 99.995%	2 yrs.	34457	—	34457-PI
Carbon dioxide, 99.80%	2 yrs.	34451	34452	34452-PI
Hydrogen, 99.99%	2 yrs.	34453	—	34453-PI
Methane, 99.00%	2 yrs.	34454	—	34454-PI
Oxygen, 99.60%	2 yrs.	34455	—	34455-PI

new!

Pi-marked Gas Cylinders Now Available for EU Countries

Our new Pi-marked gas standards from Scott Specialty Gases meet the requirements of Transportable Pressure Equipment Directive (TPED) implemented in 2001 that regulates the safe transport of pressurized containers used throughout the European community.

Two-Component Mixtures

Benzene in air (1ppm)	1 yr.	—	34458	34458-PI
Benzene in air (100ppm)	1 yr.	—	34459	34459-PI
1,3-Butadiene in nitrogen (10ppm)	2 yrs.	34460	34461	34461-PI
Carbon dioxide in helium (100ppm)	2 yrs.	34462	—	34462-PI
Carbon dioxide in nitrogen (100ppm)	2 yrs.	34463	34464	34464-PI
Carbon dioxide in nitrogen (1000ppm)	2 yrs.	34465	34466	34466-PI
Ethylene in air (8-10ppm)	2 yrs.	34467	34468	34468-PI
Ethylene in helium (100ppm)	2 yrs.	34489	—	34489-PI
Hydrogen in helium (100ppm)	2 yrs.	34469	—	34469-PI
Hydrogen in nitrogen (1%)	2 yrs.	34471	34472	34472-PI
Hydrogen in nitrogen (100ppm)	2 yrs.	34473	34474	34474-PI
Methane in helium (100ppm)	2 yrs.	34476	34477	34477-PI
Methane in nitrogen (100ppm)	2 yrs.	34478	—	34478-PI
Methane in nitrogen (1%)	2 yrs.	34482	34483	34483-PI
Nitrogen in helium (100ppm)	2 yrs.	34479	—	34479-PI
Nitrous oxide in nitrogen (1ppm)	2 yrs.	34484	34485	34485-PI
Oxygen in helium (100ppm)	2 yrs.	34480	—	34480-PI
Oxygen in nitrogen (2%)	2 yrs.	34487	34488	34488-PI
Oxygen in nitrogen (6%)	2 yrs.	34491	34492	34492-PI
1,1,1-Trichloroethane in nitrogen (10ppm)	2 yrs.	—	34493	34493-PI
Trichloroethylene in nitrogen (10ppm)	2 yrs.	34494	34495	34495-PI
Vinyl chloride in nitrogen (1ppm)	2 yrs.	34496	34497	34497-PI
Vinyl chloride in nitrogen (10ppm)	2 yrs.	34498	34499	34499-PI
Vinyl chloride in nitrogen (50ppm)	2 yrs.	34500	—	34500-PI
Vinyl chloride in nitrogen (100ppm)	2 yrs.	34501	—	34501-PI
Vinyl chloride in nitrogen (1000ppm)	2 yrs.	34502	—	34502-PI

Description	Shelf Life	Scotty® 14 (14 Liter) cat.#	Scotty® 48 (48 Liter) cat.#	Scotty® 110 (110 Liter) cat.#
Multi-Component Mixtures				
Carbon monoxide, carbon dioxide, hydrogen and oxygen in nitrogen (0.5% each)	2 yrs.	34504	34505	34505-PI
Carbon monoxide, carbon dioxide, hydrogen and oxygen in nitrogen (1% each)	2 yrs.	34507	34508	34508-PI
Carbon monoxide, carbon dioxide, methane, ethane, ethylene and acetylene in nitrogen (1% each)	1 yr.	—	34511	34511-PI
Carbon monoxide, carbon dioxide, nitrogen, and oxygen, (5% each) and methane and hydrogen (4% each) in helium	2 yrs.	34512	—	34512-PI
Carbon monoxide (7%), carbon dioxide (15%) and oxygen (5%) in nitrogen	2 yrs.	34514	—	34514-PI
Carbon monoxide (7%), oxygen (4%), carbon dioxide (15%) and methane (4.5%) in nitrogen	2 yrs.	34515	34516	34516-PI
C1-C6 <i>n</i> -Paraffins: methane, ethane, propane, butane, pentane, hexane in nitrogen (15ppm each)	2 yrs.	34518	34519	34519-PI
C1-C6 <i>n</i> -Paraffins: methane, ethane, propane, butane, pentane, hexane in helium (100ppm each)	2 yrs.	34521	34522	34522-PI
C1-C6 <i>n</i> -Paraffins: methane, ethane, propane, butane, pentane, hexane in helium (1000ppm each)	2 yrs.	34524	34525	34525-PI
C1-C6 <i>n</i> -Paraffins: methane, ethane, propane, butane, pentane, hexane in nitrogen (100ppm each)	2 yrs.	34527	34528	34528-PI
C2-C6 Olefins: ethylene, propylene, 1-butene, 1-pentene, 1-hexene in helium (100ppm each)	2 yrs.	34529	34530	34530-PI
C2-C6 Olefins: ethylene, propylene, 1-butene, 1-pentene, 1-hexene in nitrogen (100ppm each)	2 yrs.	34531	34532	34532-PI
Branched Paraffins: 2,2-dimethylbutane, 2,2-dimethylpropane, isobutane, 2-methylbutane, 2-methylpentane, 3-methylpentane in nitrogen (15ppm each)	2 yrs.	34534	—	34534-PI
Methane, ethane, ethylene, acetylene, propane, propylene, <i>n</i> -butane, propyne in nitrogen (15ppm each)	1 yr.	—	34537	34537-PI
<i>n</i> -butane, isobutane, <i>cis</i> -2-butene, <i>trans</i> -2-butene, 1-butene, isobutylene, 1,3-butadiene, ethyl acetylene in nitrogen (15ppm each)	1 yr.	—	34539	34539-PI



Brenda Spicer
Returns Coordinator
10+ years of service!

also available

Custom air standards!
Visit www.restek.com for our custom air standards ordering form.

Regulators for use with 14-liter and 48-liter Scott Transportable Gases

Specifications:

Maximum Inlet Pressure: 300psig
Outlet Pressure Range: 2–10psig
Maximum Delivery Pressure: 25psig
Operating Temperature Range: 35°F to 150°F (2°C to 65°C)
Outlet Connection: 1/4" female NPT

Materials of Construction:

Body: Brass
Diaphragm: Viton®
Seat: Acetal
Seal: Viton®

Use the CGA 160 inlet connection with 14-liter Scott Transportable Gases. Use the CGA 165 inlet connection with 48-liter Scott Transportable Gases.

Description	qty.	cat.#
Regulator with CGA 160 Inlet Connection	ea.	22690
Regulator with CGA 165 Inlet Connection	ea.	22691



also available

Regulators with CGA-180 connections for the 110L cylinders are listed on **page 415**.

Syringe Adapter Kit for Single-Stage VOC Regulator

Use to withdraw sample from a high-pressure cylinder after pressure reduction through the high-purity VOC single-stage regulator.

Kit contains one stainless steel 1/4" NPT to female luer fitting, which can be used with an A-2 Luer syringe (cat.# 20162 or 20163, page 292), and one stainless steel 1/4" NPT x 1/8" compression fitting with septum (can be used with any syringe needle).

Description	qty.	cat.#
Syringe Adapter Kit	kit	21118





Silvia Martinez
Innovations Chemist
5+ years of service!



cylinder
design

DCG Partnership Cylinders:

Size: 7.6 x 24 cm.

CGA-170/110 connection.

U.S. D.O.T. Specs:

DOT-4B-240ET

Please note: This cylinder is not approved for use in Canada.

Natural Gas and Refinery Gas Standards

- Each available in three varying concentrations.
- Mini-regulator designed specially for these standards.

Natural Gas Standards

Available in three mixes, from lean to rich. Each has an extended list of C6+ components.

	Natural Gas Standard #1 cat.# 34438, ea. % each compound**	Natural Gas Standard #2 cat.# 34439, ea. % each compound**	Natural Gas Standard #3 cat.# 34440, ea. % each compound**
nitrogen	1.000	2.500	5.000
carbon dioxide	0.500	1.000	1.500
methane UHP	94.750	85.250	70.000
ethane UHP	2.000	5.000	9.000
propane	0.750	3.000	6.000
isobutane	0.300	1.000	3.000
n-butane	0.300	1.000	3.000
isopentane	0.150	0.500	1.000
n-pentane	0.150	0.500	1.000
hexanes plus EX2*	0.100	0.250	0.500
Concentration	mole	mole	mole
Volume	13.16L @ 200psig	13.16L @ 200psig	5.5L @ 75psig
Ideal Heating Value (Dry BTU/SCF)	1048 gross	1142 gross	1317 gross

*Contact Restek or your Restek representative for a complete list of hexanes plus EX2.

**Precise concentrations are provided on the data sheet included with each cylinder and may vary slightly from those listed here.

Refinery Gas Standards

Available in three mixes with varying C5 unsaturates or extended C6+ components.

	Refinery Gas Standard #1 cat.# 34441, ea. % each compound**	Refinery Gas Standard #2 cat.# 34442, ea. % each compound**	Refinery Gas Standard #5 cat.# 34443, ea. % each compound**
hydrogen	40.750	12.500	12.500
argon	0.500	1.000	1.000
nitrogen	4.000	37.200	37.200
carbon monoxide	1.000	1.000	1.000
carbon dioxide	3.000	3.000	3.000
methane	8.500	5.000	5.000
ethane	6.000	4.000	4.000
ethylene	2.000	2.000	2.000
acetylene	—	1.000	1.000
propane	7.000	6.000	6.000
propylene	3.000	3.000	3.000
propadiene	0.850	1.000	1.000
cyclopropane	—	0.040	—
isobutane	6.000	5.000	5.000
n-butane	4.000	4.000	4.000
isobutylene	2.000	1.000	1.000
1,3 butadiene	3.000	3.000	3.000
cis-2-butene	2.000	2.000	2.000
trans-2-butene	2.000	3.000	3.000
butene-1	2.000	2.000	2.000
2-methyl-2-butene	—	0.200	0.200
isopentane	1.000	1.000	1.000
n-pentane	1.000	1.000	1.000
cis-2-pentene	—	0.400	0.400
trans-2-pentene	—	0.160	0.200
pentene-1	—	0.400	0.400
n-hexane	0.500	0.100	—
hexanes plus EX	—	—	0.100
Concentration	mole	mole	mole
Volume	5.2L @ 70psig	4.9L @ 60psig	4.6L @ 60psig

**Precise concentrations are provided on the data sheet included with each cylinder and may vary slightly from those listed here.



Mini-Regulator for natural gas and refinery gas standards

- 0–300psig inlet pressure range.
- 0–15psig outlet pressure range.
- Supplied with 0–15psig outlet pressure gauge, brass CGA 170 nut and nipple.

Description
Mini-Regulator

qty.
ea. cat.#
22032

Sulfinert® Treated Swagelok® Sample Cylinders

- Stable storage of samples containing ppb levels of sulfur compounds.
- Manufactured by Swagelok®; U.S. D.O.T. rated to 1800psi at room temperature.
- 304 grade stainless steel with 1/4" female NPT threads on both ends.

Ideal for collecting and storing samples, such as natural gas or beverage-grade carbon dioxide, because active compounds remain stable during transport.

Description	Size	qty.	cat.#
Sulfinert® Sample Cylinder	75cc	ea.	24130
Sulfinert® Sample Cylinder	150cc	ea.	24131
Sulfinert® Sample Cylinder	300cc	ea.	24132
Sulfinert® Sample Cylinder	500cc	ea.	24133
Sulfinert® Sample Cylinder	1000cc	ea.	24134
Sulfinert® Sample Cylinder	2250cc	ea.	21394

Sulfinert® Treated Alta-Robbins Sample Cylinder Valves

- All wetted parts are Sulfinert® treated for inertness.
- Compatible with Sulfinert® treated Swagelok® sample cylinders.
- Large, durable, Kel-F® seat ensures leak-free operation; temperature range: -40°C to 120°C.

Description	qty.	cat.#
1/4" NPT Exit	ea.	21400
1/4" Compression Exit	ea.	21401
1/4" NPT with Dip Tube*	ea.	21402
1/4" NPT with 2850psi Rupture Disc	ea.	21403
1/4" NPT Male Inlet x 1/4" Female Outlet with 2850psi Rupture Disc	ea.	21404

*To order catalog #21402 (Sulfinert Alta-Robbins Sample Cylinder Valve, 1/4" NPT with Dip Tube), please call Customer Service at 800-356-1688, ext. 3, or contact your Restek representative. Specify dip tube length or % outage when ordering (maximum length = 5.25" / 13.3cm). Note: End of part will not be treated after cutting tube to length.

Sulfinert® Treated Rupture Disc Tee

2850psig rating; 1/4" NPT connections.

Description	qty.	cat.#
Sulfinert® Treated Rupture Disc Tee (1/4" NPT connections)	ea.	21396
Replacement Rupture Disc (not Sulfinert® treated)	ea.	24298

Sulfinert® Treated Ultra-High Pressure Sample Cylinders and Valves

- Stable storage of samples containing sulfur compounds and mercury.
- Cylinders manufactured by Swagelok® and U.S. D.O.T. rated to 5000psig.
- Valves rated to 6000psig.

Ideal for collecting samples at gas wellhead or other applications requiring sampling at extremely high pressures.

Sample Cylinders	Size	qty.	cat.#
Sulfinert® Sample Cylinder, 1/4" Female NPT Thread	150cc	ea.	22111
Sulfinert® Sample Cylinder, 1/4" Female NPT Thread	300cc	ea.	22112
Sulfinert® Sample Cylinder, 1/4" Female NPT Thread	500cc	ea.	22113
Sample Cylinder Valves		qty.	cat.#
Sulfinert® Treated Sample Cylinder Valve, 1/4" Male NPT (both ends)		ea.	22109
Sulfinert® Treated Sample Cylinder Valve, 1/4" Male NPT x 1/4" Female NPT		ea.	22110

for more info

Descriptions of surface treatments and data from the analysis of sulfur-containing compounds can be found in the *Restek Performance Coatings* section of this catalog, starting on **page 378**.

also available

Certificates are available upon request.



new!



also available

Sampling valves, sample loops, treated tubing, and all your other air sampling needs. Visit www.restek.com.