

The background of the entire page is a deep blue with lighter blue diagonal stripes. Overlaid on this are white line-art illustrations of various chromatography components: a syringe, a vial, a coiled tube, several circular gauges or valves, a large circular manifold with multiple ports, and a detector or sensor unit. The RESTEK logo is positioned in the upper right quadrant.

RESTEK[®]

Pure Chromatography

30
YEARS
1985–2015

Air Sampling

Canisters & Accessories

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Air Canisters for VOC Sampling

SilcoCan® & TO-Can® Air Sampling Canisters

- Get high-performance canisters from the innovators of silicon 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	RAVE™ diaphragm, Parker® diaphragm, Swagelok® bellows
Interior Coating	Electropolished, Siltek®-treated
Gauges	3 vacuum/pressure ranges
Applications	
Ambient Air	U.S. EPA TO-14A, TO-15, IP-1A, ASTM D5466, OSHA PV 2120, NJ DEP Low Level TO-15
Indoor Air	IP-1A, NJ DEP Low Level TO-15
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 13.3 cm	2.25 lb	1.02 kg
3 liter	11.5 x 7.25"	29.2 x 18.4 cm	3.5 lb	1.59 kg
6 liter	12.5 x 9.25"	31.8 x 23.5 cm	5.75 lb	2.61 kg
15 liter	17 x 12.25"	43.2 x 31.1 cm	11.75 lb	5.33 kg



See pages 421–422 for canister product listings or go to www.restek.com/air for more air sampling 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 110 °C during cleaning.

Newest surface technology

To ensure sample stability, SilcoCan® canisters are deactivated with innovative Siltek® surface treatment, which chemically bonds a silicon 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.

Rugged stainless steel

Canisters and valves are made of 304 and 316 stainless steel to withstand the rigors of field work.



Custom Coatings Available from Restek

- **Siltek®**—The ultimate passivation of treated surfaces, from glass to high-nickel alloys of steel; ideal for sulfurs, automotive exhaust testing, or stack gas sampling.
- **Sulfinert®**—A required treatment for metal components when analyzing for parts-per-billion levels of organo-sulfur compounds.
- **Silcosteel®-CR**—A corrosion-resistant layer that increases the lifetime of system components in acidic environments containing hydrochloric acid, nitric acid, or seawater.



The Latest in Chromatography News and Solutions Sent Right to You

It's quick and easy to have word of our new releases, applications, events, seminars, and so much more sent to you via print or e-mail. Subscribe to Restek and stay on the cutting edge today!

www.restek.com/subscribe

Introduce Your Sampling Canisters to Restek® Air Valve Excellence (RAVE™)



Available options:

- Rugged stainless steel construction with or without Siltek® treatment for added inertness.
- Choose 2 or 3 ports to accommodate optional gauge.
- Diaphragm rebuild kits available to extend the life of your valves.



RAVE™ valves feature proven long life, leak-free performance, and effortless operation. Now standard on our full line of SilcoCan®, TO-Can®, and miniature air sampling canisters, these newly redesigned valves are also great for upgrading existing canisters.

RAVE™ Diaphragm Air Valves

- **Proven long life**—durable design is engineered to exceed 15,000 cycles.
- **Leak-free performance**—every valve is helium leak-tested to 1×10^{-6} mL/sec.
- **Effortless operation**—easily finger-turn to achieve full valve closure (only 10 in-lb).
- **Enhanced damage-resistance**—W-type valve seats are work-hardened and wetted surfaces contain no moving parts.

Turn to your trusted partner for air sampling and chromatography. Order Restek® Air Valve Excellence for your air sampling canisters today.

▶ See **pages 421–423**.

www.restek.com/air

SilcoCan® Air Sampling Canisters with RAVE™ Valve

Ideal for low-level reactive sulfur (5–20 ppb), TO-14A, or TO-15 compounds

- Siltek®-treated canister with optional Siltek®-treated valve offers unsurpassed inertness, even for sulfur-containing or brominated compounds.
- High-quality, metal-to-metal seal, $2/3$ -turn valve with stainless steel diaphragms prevent sample adsorption for more-accurate results.
- Canisters and valves made of 304 and 316 stainless steel to withstand the rigors of field work.
- Both 2-port and 3-port valves available; 3-port valve includes -30" Hg/60 psi vacuum/pressure gauge (other gauges available).
- Now featuring the proven long life, leak-free performance, and effortless operation of the new RAVE™ valve. (See page 420 for more information.)

For ultimate inertness, SilcoCan® air sampling canisters feature our unique Siltek® treatment technology. Even highly active components, at low parts-per-billion concentrations, can be readily sampled and stored without loss. The RAVE™ valve is a high-quality, metal-to-metal seal, $2/3$ -turn valve with metal diaphragms to prevent sample adsorption for more-accurate results. Both stainless steel and Siltek®-treated RAVE™ valves are available, in both the 2-port and 3-port configurations. Each canister is slightly pressurized with contaminant-free nitrogen prior to shipment.

Whether you are sampling 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 they are unsuitable for collecting and storing low-level sulfur VOCs. SilcoCan® air sampling canisters, which feature a Siltek®-treated surface, offer excellent storage stability for sulfur VOCs at very low levels (5–20 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.



Canisters are the gold standard for ambient VOC sampling.

Volume discounts?

Call Restek® Customer Service or your local Restek® representative!

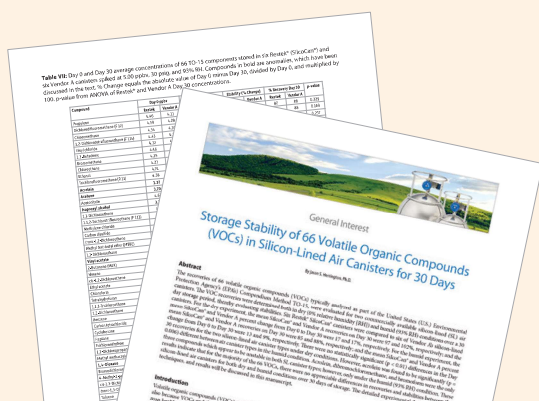
Get the ultimate insurance plan—order your SilcoCan® canister with a Siltek®-treated valve.

Description	1 L Volume cat.#	3 L Volume cat.#	6 L Volume cat.#	15 L Volume cat.#
2-Port RAVE Valve	27400	27404	27408	27412
2-Port Siltek-Treated RAVE Valve	27401	27405	27409	27413
3-Port RAVE Valve with Gauge*	27402	27406	27410	27414
3-Port Siltek-Treated RAVE Valve with Gauge*	27403	27407	27411	27415
without Valve	22090	22091	22092	22093

*Range of standard gauge is -30" Hg to 60 psi.

Do not exceed canister maximum pressure of 40 psig (2.75 bar).

Note: If attaching any of Restek's passive sampling kits to a 3 L canister, use a Siltek®-treated (cat.# 563646) or stainless steel (cat.# 563647) connector between the two components. Please contact Restek® Customer Service or your local Restek® representative to order.



Stable Storage of 66 VOCs for 30 Days With SilcoCan® Air Sampling Canisters

Download the free application note by searching for "EVAN2066-UNV" at

www.restek.com



TO-Can® Air Sampling Canisters with RAVE™ Valve

Optimized for Methods TO-14A, TO-15, IP-1A, ASTM D5466, OSHA PV 2120, and NJ DEP Low Level TO-15

- Proprietary electropolished surface maintains compound stability.
- High-quality, metal-to-metal seal, $\frac{2}{3}$ -turn valve with stainless steel diaphragms prevent sample adsorption for more-accurate results.
- Both 2-port and 3-port valves available; 3-port valve includes -30" Hg/60 psi vacuum/pressure gauge (other gauges available).
- SUMMA canister equivalent.
- Now featuring the proven long life, leak-free performance, and effortless operation of the new RAVE™ valve. (See page 420 for more information.)

U.S. EPA 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. A frame surrounds the electropolished canister, eliminating the need for weld marks on the sphere, thereby preventing active sites on the canister. The RAVE™ valve supports the excellent performance of the canister.

A 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. Each canister is slightly pressurized with contaminant-free nitrogen prior to shipment.

Quickly confirm vacuum or pressure by ordering your SilcoCan® or TO-Can® canisters with high-quality premounted gauges.



Description	1 L Volume cat.#	3 L Volume cat.#	6 L Volume cat.#	15 L Volume cat.#
2-Port RAVE Valve	27416	27418	27420	27422
3-Port RAVE Valve with Gauge*	27417	27419	27421	27423
without Valve	22094	22095	22096	22097

*Range of standard gauge is -30" Hg to 60 psi.

Do not exceed canister maximum pressure of 40 psig (2.75 bar).

also
available

Miniature
Air Sampling
Canisters

See **page 435**.



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/15 psi	-651
-30" Hg/30 psi	-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

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
by searching for "EVTG1073A"



Valves and Gauges for Air Sampling Applications

Replacement RAVE™ Diaphragm Valves

- Proven long life—durable design is engineered to exceed 15,000 cycles.
- Leak-free performance—every valve is helium leak-tested to 1×10^{-6} mL/sec.
- Effortless operation—easily finger-turn to achieve full valve closure (only 10 in-lb).
- Enhanced damage-resistance—W-type valve seats are work-hardened and wetted surfaces contain no moving parts.
- Now standard on our full line of SilcoCan®, TO-Can®, and miniature air sampling canisters.



Description	qty.	Siltek-treated cat.	Stainless Steel cat.
1/4" Replacement Diaphragm Valve, RAVE (2-port)	ea.	26386	26385
1/4" Replacement Diaphragm Valve, RAVE (3-port)	ea.	26388	26387
RAVE Diaphragm Rebuild Kit (includes: 3 diaphragms)	kit	26390	26389



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!

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.



24148

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



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

*No price difference for these substituted gauges.

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



24120



24285



24268

Ashcroft® Test Gauges

- Accurate measurement of vacuum to –30" Hg and pressure to 60 psi.
- Available in both analog and digital formats.
- Accuracy to $\pm 0.25\%$.
- 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 two AAA batteries and offers an unambiguous readout. Both gauges have an accuracy of $\pm 0.25\%$ 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	Thermal Desorption Unit (TDU) 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 hours	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 421–422 for canisters. See page 436 for gas sampling bags.
 See page 438 for canister and thermal desorption tube comparison.

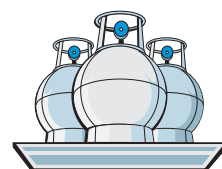
Passive Air Sampling Kits—Integrated (Stainless Steel & Siltek®-Treated)

Superior Performance—an Excellent Restek® Value

- 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.



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

*Vacuum/pressure gauge included in kit; air sampling canisters sold separately.

also available

- ▶ See **page 434** for miniature air sampling kits.
- ▶ See **page 433** for canister and flow controller repair service.

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-inch 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" 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.

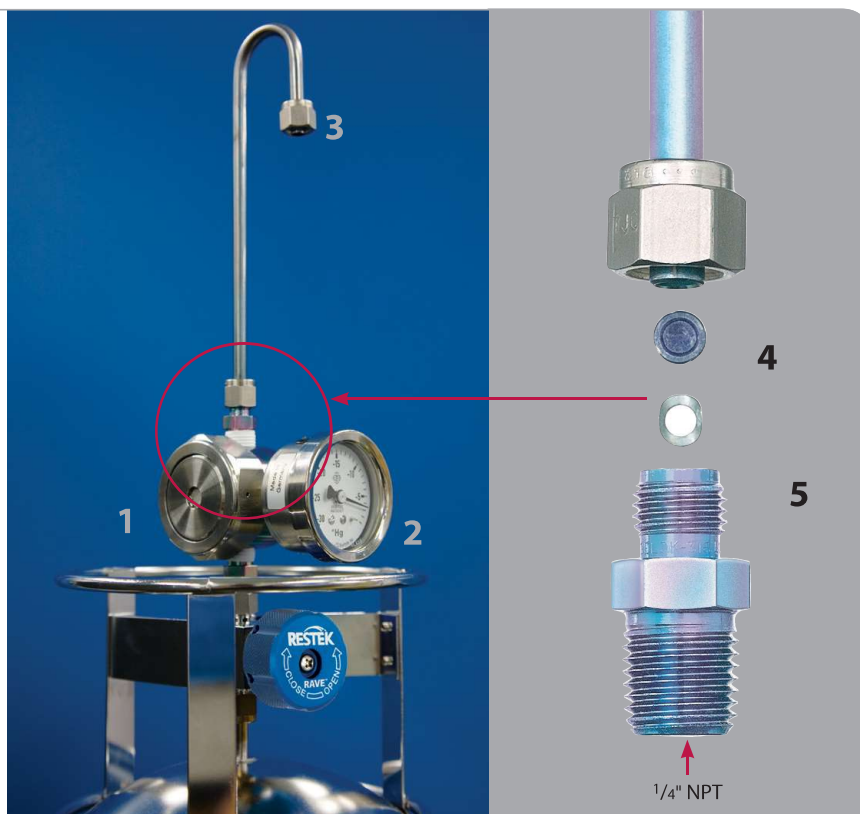
4. 2-micron frit filter and washer

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.

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



Stock up or buy only the parts you need now!



Replacement Orifices

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

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

2 µm Frit Filters

For use in critical orifice fitting. Includes washers.

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

Veriflo® Flow Controllers

Veriflo® 423XL flow controllers are offered in a Siltek®-treated 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.

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

7 µm In-Line Filter

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

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

Note: frit is not replaceable.

Sample Inlets

- Inlets have 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

Passive Air Sampling Kits—Grab (Stainless Steel & Siltek®-Treated)

- Use with 1, 3, or 6 L canisters for grab air sampling.
- Variety of orifice sizes for fast sampling from 5 to 60 minutes.
- Connect 1/4" compression fitting 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	Orifice Size	Siltek-Treated	Stainless Steel
1 Liter	3 Liter	6 Liter			cat.#	cat.#
60	—	300	15 mL/min	0.0018"	26280	26263
45	—	240	20 mL/min	0.0020"	26281	26264
15	60	120	45 mL/min	0.0030"	26282	26265
10	30	60	80 mL/min	0.0040"	26283	26266
5	15	30	150 mL/min	0.0055"	26284	26267
—	—	15	300 mL/min	0.0080"	26285	26268
—	5	10	390 mL/min	0.0090"	26286	26269
—	3	5	>1,000 mL/min	0.0130"	26287	26270

Air sampling canisters sold separately.

Replacement Fittings for Grab Sampling Kits

Includes fitting and orifice.

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

Replacement 10 µm Frits for Grab Sampling Kits

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

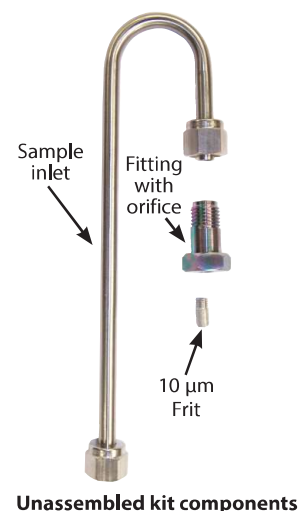
Dual Canister Sampling Manifold (Stainless Steel & Siltek®-Treated)

- Duplicate sampling with all canister sizes using one or two 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.
- Uses 1/4" compression connections.

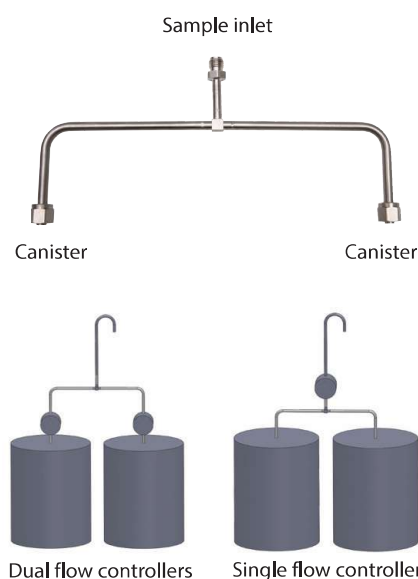
Field duplicates of canister samples frequently result in analyte concentrations with high relative standard deviations. In addition, field duplicates do not differentiate laboratory performance from sampling variability. Restek's dual canister sampling manifold (DCSM) minimizes sampling variability 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 two flow controllers to monitor individual canister vacuum.

Description	qty.	Siltek-Treated cat.#	Stainless Steel cat.#
Dual Canister Sampling Manifold	ea.	24999	24998

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



Air sampling canisters sold separately.





Assembled kit on canister
Air sampling canisters sold separately.

Passive Air Sampling Kits—Soil Gas (Stainless Steel & Siltek®-Treated)

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.
- Variety of orifice sizes for sampling from 4 minutes to 10 hours.
- 1 1/2" vacuum gauge (–30" Hg to 0" Hg).
- 2 µm frit filter for insertion into 1/4" compression sample inlet.

The 1/4" 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 4 minutes to 10 hours on a 6 L canister. Individual replacement parts are available, providing a cost-effective alternative to replacing the entire sampler.

Canister Volume/Sampling Time				Siltek-Treated	Stainless Steel
1 Liter	6 Liter	Flow	Orifice Size	cat.#	cat.#
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
30 min	3 hr	30 mL/min	0.0025"	26337	26336
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.

Replacement Tees w/Orifice for Soil Gas Sampler Kits

Description	Orifice Size	Siltek-Treated cat.#	Stainless Steel cat.#
Soil Gas Sampler Replacement Tee w/Orifice	0.0065"	22945	22940
Soil Gas Sampler Replacement Tee w/Orifice	0.0055"	22946	22941
Soil Gas Sampler Replacement Tee w/Orifice	0.0040"	22947	22942
Soil Gas Sampler Replacement Tee w/Orifice	0.0025"	26339	26338
Soil Gas Sampler Replacement Tee w/Orifice	0.0020"	22948	22943
Soil Gas Sampler Replacement Tee w/Orifice	0.0014"	22949	22944

Replacement Parts for Soil Gas Sampler Kits

Description	qty.	cat.#
Vacuum Gauge, 1 1/2"	ea.	24120
Replacement Frit Filter, Stainless Steel	3-pk.	24170
Replacement Frit Filter, Siltek-Treated	3-pk.	24171
Port Connector, 1/4", Siltek/Sulfinert-Treated	ea.	21549
Port Connector, 1/4", Stainless Steel	2-pk.	21936
Nut & Ferrule Set, 1/4", Stainless Steel	5-pk.	21911
Nut, 1/4", Stainless Steel	10-pk.	21902



also available

VCO® Fittings

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

See **page 316**.



Alicat M-Series Flow Calibrators

- Accurate—NIST-traceable and rated at 0.8% of the reading + 0.2% full-scale repeatability; calibration documents provided with each unit.
- Fast—5 ms response speed with no warm-up required.
- Convenient—no computer connection or software required and all data is visible on one screen.
- Tough—stainless steel construction; unaffected by bumps, humidity, or changes in orientation and supported by an Alicat lifetime warranty.*
- Downloadable—data can be recorded on a computer via RS-232 connection (unit has no on-board data logging).
- Long-lasting—portable models with lithium-ion battery offer 5 hours (color) or 18 hours (monochrome) of use between charges; rated for 500 cycles before decline to 85%.**

Quickly and precisely verify flow rates generated by vacuum or pressure before going into the field. These compact, convenient units are ideal for real-time calibration of air flow controllers, passive sampling kits, air canisters, sampling pumps, and more. They measure absolute pressure, mass flow, volumetric flow, and temperature of 30 different gases across a wide range of flows. Choose a lab-based or convenient battery-powered portable model.



26437



26438

Monochrome display shown;
also available in color.

Specifications:

Accuracy at Calibration Conditions After Tare:	± 0.8% of reading + 0.2% of full scale
High Accuracy at Calibration Conditions After Tare:	± 0.4% of reading + 0.2% of full scale
Accuracy for Bidirectional Meters at Calibration Conditions After Tare:	± 0.8% of reading + 0.2% of total span from positive full scale to negative full scale
Repeatability:	± 0.2% full scale
Zero Shift and Span Shift:	0.02% full scale / °C / atm
Operating Range / Turndown Ratio:	0.5% to 100% full scale / 200:1 turndown
Maximum Measurable Flow Rate:	128% full scale
Typical Response Time:	10 ms (adjustable)
Warm-Up Time:	<1 second
Operating Temperature:	-10 to +50 °C
Humidity Range (non-condensing):	0 to 100%
Maximum Internal Pressure (static):	145 psig
Wetted Materials:	303 & 302 stainless steel, Viton®, silicone RTV (rubber), glass-reinforced nylon, aluminum
Programmed Gases:	Acetylene, air, argon, butane, carbon dioxide, carbon monoxide, ethane, ethylene (ethene), helium, hydrogen, iso-butane, krypton, methane, neon, nitrogen, nitrous oxide, oxygen, propane, sulfur hexafluoride, xenon, A-25, A-75, A1025, C-2, C-8, C-10, C-25, C-75, P-5, Star29
Dimensions:	cat.#s 26434 & 26438: 3.9" H x 2.4" W x 1.1" D; 0.8 lb cat.#s 26435 & 26439: 4.1" H x 2.4" W x 1.1" D; 1.0 lb cat.#s 26432 & 26436: 6.4" H x 2.4" W x 1.1" D; 1.0 lb cat.#s 26433 & 26437: 6.7" H x 2.4" W x 1.1" D; 1.2 lb

Description	Flow capacity	qty.	Color Display cat.#	Monochrome Display cat.#
Portable Mass Flow Calibrator	0–50 sccm	ea.	26432	26436
Portable Mass Flow Calibrator	0–500 sccm	ea.	26433	26437
Lab-Based Mass Flow Calibrator	0–50 sccm	ea.	26434	26438
Lab-Based Mass Flow Calibrator	0–500 sccm	ea.	26435	26439

Monochrome display shown; also available in color.

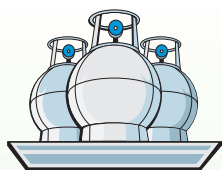
*Restek Recommends: Recalibrate your Alicat flow calibrator once every year to maintain lifetime warranty. Prolonged failure to recalibrate your unit may result in increased error. To always get the most accurate measurements, contact Restek® Customer Service to send in your flow calibrator for service, recertification, and recalibration (cat.# 26462).

** NOTE: Handling, removing, or replacing the battery will void the Alicat warranty.

coming soon

Mesa Labs Flow Calibrators

www.restek.com



Feature	Benefit
Large capacity—holds twelve 6 L cans or twenty-four 1 L 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.
Ten user defined methods.	Each cleaning cycle parameter can be configured separately to minimize overall cycle time.
Oil-free Edwards vacuum pump.	Cheaper to run and maintain than 2-pump alternatives; lowers risk of contamination.
Humidifier	Provides humidified nitrogen to improve cleaning process.
Dimensions: 44" H x 48" W x 27" D.	Small footprint saves valuable lab space.
Oven cart available as option.	Saves bench space and provides convenient mobility.

	Restek	Competitor A
Capacity	Twelve 6 L cans	Six 6 L cans
Software	Included	Separate

www.restek.com/air

for more info

Search for **EVTS1186A-UNV** at www.restek.com

Specifications:

TO-Clean Oven

Dimensions: 44" H x 48" W x 27" D
Weight: 525 lb

Cart

Dimensions: 29" H x 48" W x 30" D
Weight: 340 lb

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.

TO-Clean Canister Cleaning System High capacity, fully automated, easy-to-use canister cleaning oven dramatically increases lab efficiency.

- Oil-free pump lowers risk of contamination.
- EPA Method TO-14A/15 compliant.
- Powerful 6i pump can achieve 50 mTorr in <25 minutes for twelve 6 L canisters; higher power 10i option also available.
- Custom-built trays for different canister sizes.
- Humidifier provides humidified nitrogen to improve cleaning process.
- One-year limited warranty.
- Fully assembled and ready to use.

Cut Cleaning Time in Half

Get finished cleaning faster—the high capacity interior holds twice as many canisters as similar models, which lets you finish cleaning in half the time. EPA Method TO-14A/15 compliant unit holds up to twelve 6-liter or twenty-four 1-liter canisters.



CE 26379

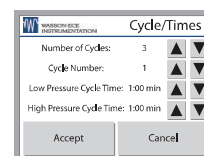
Oven Control at Your Fingertips

Isothermal oven cleans both canisters and valves faster and more completely than a heating band system. Temperature is adjustable up to 110 °C.

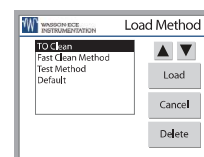
Easily Create Custom Cleaning Programs

Create up to 10 different methods using the on-board touch screen controller. Define the number of cycles, pressure, and soak times; then save the method for later use. Ensures consistent procedures are followed and makes operation as simple as pressing "start".

Easily create custom methods.

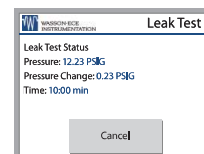


Choose a saved method for a fast start and consistent process.



Ensure Performance with Easy, On-Board Diagnostics

With embedded diagnostic software, you can check for leaks and test valve operation at the touch of a button. Quick and easy system verification ensures effective cleaning. No separate computer needed.



Description	Type	Voltage	qty.	cat.#
TO-Clean Oven w/Oil Free Pump	Edwards nXDS6i Dry Scroll Pump	120 V, 60 hz	ea.	26379
TO-Clean Oven w/Oil Free Pump	Edwards nXDS6i Dry Scroll Pump	220/230 V, 50/60 hz	ea.	26380
TO-Clean Oven w/Oil Free Pump	Edwards nXDS10i Dry Scroll Pump	120 V, 60 hz	ea.	26381
TO-Clean Oven w/Oil Free Pump	Edwards nXDS10i Dry Scroll Pump	220/230 V, 50/60 hz	ea.	26382
Optional Accessories (not included with TO-Clean Oven)				qty. cat.#
Oil-free Pump Silencer			ea.	26383
Oil-free Pump Exhaust Tubing for customer exhaust (10' PVC tubing, clamps, adapters, O-rings)			ea.	26384
Oven Cart, 29" H x 48" W x 30" D, 12 gauge steel, push handle and casters			ea.	22919
1 L Option: includes tubing, fittings, and inserts for twenty-four 1 L canisters			ea.	22920
3 L Option: includes tubing, fittings, and inserts for twelve 3 L canisters			ea.	22126
Mini-Can Option: includes tubing, fittings, and inserts for either forty-eight 400 cc or forty-eight 1,000 cc mini-canisters			ea.	22127

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

Humidification Chamber

When cleaning SilcoCan® or TO-Can® canisters, it is important to use humidified air or nitrogen to help remove volatile organic contaminants. 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



Restek's canister cleaning system with humidification chamber.

Canister Air Sampling Timer

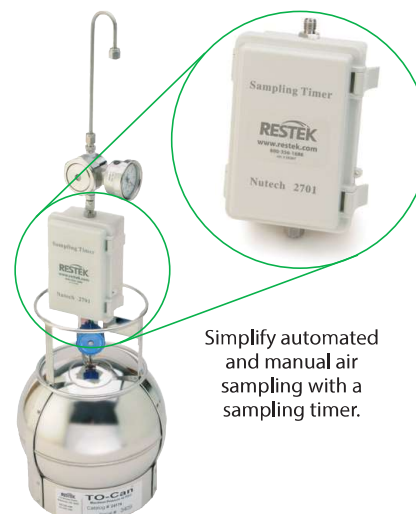
- Program up to 12 timed events!
- Capable of both manual and automated operation.
- Perfect for either grab or time-integrated sampling.
- Long battery life; recharges conveniently using the USB port on any PC.
- All stainless steel sample flow path ensures inertness, improving accuracy.



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" inlet and outlet fittings, highly inert stainless steel flow path, and waterproof exterior for outdoor use.

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



Simplify automated and manual air sampling with a sampling timer.

Canister and passive air sampling kit must be purchased separately.



Restek's Innovations and Technical Service Groups feature several chemists with hands-on EPA and environmental lab experience, particularly with air sampling and testing—and they are ready to help.



Air canister tripod conveniently holds two air canisters.

Air Canister Tripod

- Lightweight (12 lb) 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

Air Canister Tripod

qty.

cat.#

ea.

24151

*Air sampling canisters sold separately.



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

Canister Carrying Supplies

Canister Carrying Box Kit

6-liter carrying boxes with plastic handles simplify canister transport. Four carrying boxes and one shipping box per kit.

Description

Canister Carrying Box Kit

qty.

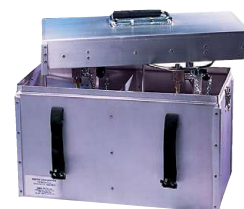
cat.#

kit

24215

Canister Carrying Case

- Heavy-duty, all-aluminum design fits two 6 L SilcoCan® or TO-Can® canisters tightly without foam.
- Weight: 9 lb.
- 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.



Description

Deluxe Canister Carrying Case

qty.

cat.#

ea.

24226

How to Extend Canister Life

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

1. Prevent leaks

Use proper handling to avoid these three 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 ¼ 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 the 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 110 °C on the gauge and 130 °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 silicon-lined cans (SilcoCan® canisters).

3. Avoid damage to silicon-lined cans

Be sure to follow method recommendations when cleaning your canisters to avoid oxygen damaging the silicon 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 and 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 Restek® Customer Service or your local Restek® representative to take advantage of this service. You will be given instructions and an RMA # to return the parts and completed health & safety declaration 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
for RAVE™ valve: cat.# 569604
for Parker: cat.# 560838
for Swagelok: cat.# 563801

Replacement Parts	Page #
Flow Controller	426
Gauge	423
Orifices	426
Sample Inlet	426



26252

Expand Air Sampling with Mini-Cans & Accessories

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

Miniature Air Sampling Kits (Stainless Steel & Siltek®-Treated)

- Provide accurate integrated sampling without a sampling pump.
- Convenient smaller size connects easily to miniature canisters.
- Available in stainless steel or with Siltek® treatment 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 use with smaller canisters.

Canister Volume/Sampling Time				Siltek-Treated cat.#	Stainless Steel cat.#
400 cc	1 Liter	Flow	Orifice Size		
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

Sampling Belt:

- Adjustable up to 50".
- Two reclosable hook-and-loop straps securely hold mini-can or other sampling device.
- Straps slide anywhere on belt.
- Versatile design, perfect for personal wear or hang for area sampling.



Sampling belt & personal sample inlet

Personal Sample Inlet:

- 3' long x 1/16" OD all PTFE tubing.
- Convenient clip can be moved along length of tubing for proper attachment in breathing zone.
- PTFE 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.
- Two out of three legs move to accommodate uneven surfaces.
- Holds 2 3/4" diameter cans securely.
- Small footprint—12" diameter x 6.5" height.

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

22124
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 PTFE tubing, Clip, PTFE 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.
- Choose 400 cc or 1,000 cc.
- Available with quick-connect fitting that is compatible with sampling and analysis instruments.
- New option: the proven long life, leak-free performance, and effortless operation of the RAVE™ 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 methods TO-14A, TO-15, IP-1A, ASTM 5466, OSHA PV 2120, and NJ DEP Low Level TO-15.

Restek offers these products in stainless steel or with Siltek® treatment, 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.

stability.

		400 cc	1,000 cc
Description	qty.	cat.#	cat.#
Miniature Canister with Quick-Connect Stem Fitting			
Electropolished Stainless Steel Canister with Quick-Connect Stem Fitting	ea.	24188	24194
Siltek-Treated Canister with Quick-Connect Stem Fitting	ea.	24189	24195
Siltek-Treated Canister with Siltek-Treated Quick-Connect Stem Fitting	ea.	24190	24196
Miniature Canister with RAVE Valve			
Electropolished Stainless Steel Canister with RAVE Valve	ea.	26456	26459
Siltek-Treated Canister with RAVE Valve	ea.	26457	26460
Siltek Treated Canister with Siltek-Treated RAVE Valve	ea.	26458	26461
Miniature Canister without Valve			
Electropolished Stainless Steel	ea.	24205	24206
Siltek-Treated	ea.	24207	24208

Do not exceed canister maximum pressure of 40 psig.



Dimensions:

400 cc = 2.75" diameter, 5.35" long (7 x 13.6 cm),
 1.25 lb (0.567 kg)
 1,000 cc = 2.75" diameter, 11.92" long (7 x 30 cm),
 2.00 lb (0.91 kg)

NEW!

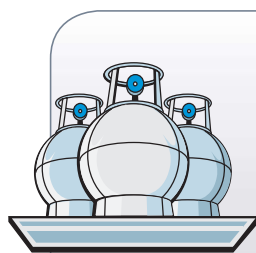
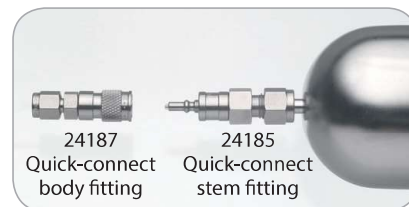
Swagelok® Quick-Connect Fittings for Miniature Air Sampling Canisters

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.

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.



Get Mini! Mini-Can Options

Sizes	400 cc or 1,000 cc
Valves	RAVE™ diaphragm, quick connect
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 319.

Gas Sampling Bags

Sampling bags are a low-cost, whole-air sampling device for high-level VOCs and permanent gases. Several EPA, NIOSH, and OSHA methods exist for bag sampling for a variety of applications: stationary sources emissions, workplace atmospheres, ambient, indoor air quality, and breath analysis. Choose the film type appropriate for your application. All our bags feature a polypropylene combo valve with hose connection to fit $\frac{3}{16}$ " ID tubing and syringe port with replaceable septum. A single eyelet provides handling convenience.

Tedlar® Sampling Bags

- Find the bags you need—we offer sizes from 0.5 L to 100 L.
- 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 $\frac{3}{16}$ " ID PTFE tubing.
- Continuous sampling temperature up to 225 °F (107 °C); short term (1–2 hours) temperature up to 350 °F (176 °C).



Description	Size	qty.	Polypropylene Valve cat.#	Stainless Steel Valve cat.#
0.5 L Tedlar Sampling Bag	6" x 6"	10-pk.	22049	22038
1 L Tedlar Sampling Bag	7" x 7"	10-pk.	22050	22039
3 L Tedlar Sampling Bag	9.5" x 10"	10-pk.	22051	22040
5 L Tedlar Sampling Bag	12" x 12.5"	10-pk.	22052	22041
10 L Tedlar Sampling Bag	11.75" x 22"	10-pk.	22053	22042
12 L Tedlar Sampling Bag	13" x 24"	10-pk.	22054	22043
25 L Tedlar Sampling Bag	17.5" x 24"	5-pk.	22055	22044
40 L Tedlar Sampling Bag	24" x 24.25"	5-pk.	22056	22045
80 L Tedlar Sampling Bag	28.25" x 30.5"	5-pk.	22057	22046
100 L Tedlar Sampling Bag	28" x 36"	3-pk.	22058	22047
Description		qty.	cat.#	
PTFE Faced Silicone Replacement Septum, 4 mm diameter		10-pk.	22104	

Multi-Layer Foil Gas Sampling Bags

- Good stability for low molecular weight compounds, such as methane, CO, CO₂, and permanent gases.
- Chemically inert with light and moisture protection.
- Not recommended for low ppm VOCs due to background levels.
- Protective 5-layer barrier minimizes gas permeability.
 - 60 gauge nylon (outer layer)
 - Metalized aluminum
 - Polyethylene
 - 0.0003" aluminum foil
 - 0.002" polyethylene (inner layer)
- Continuous sampling temperature up to 190 °F (88 °C) indefinitely; do not exceed 190 °F for any period of time.



Volume	Size	qty.	cat.#
1 L	7" x 7"	5-pk.	22950
3 L	10" x 10"	5-pk.	22951
5 L	12" x 12"	5-pk.	22952
10 L	12" x 22"	5-pk.	22953
12 L	13" x 24"	5-pk.	22966
25 L	18" x 24"	5-pk.	22967
40 L	24" x 24.5"	5-pk.	22968
PTFE Faced Silicone Replacement Septum, 4 mm diameter		10-pk.	22104

also available

ALTEF gas sampling bags

www.restek.com/air

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 adaptor/charger, battery, instruction manual, and 1-year limited warranty.

Specifications:

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



22118

CE

Features:

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

Description	qty.	cat.#
Vacuum Bag Sampler Model 1062 (includes: power adaptor, 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

Physical Specifications of Gas Sampling Bags

	Tedlar® bags	ALTEF Bags	Multi-Layer Foil Bags
Composition	polyvinyl fluoride (PVF) polymer resin	Proprietary PVDF film	5-layer
Thickness	0.002"	0.003"	0.005"
Tensile Strength	8,000 psi	6,100 psi	24 lb/inch (CD)
Max. Operating Temp.	204 °C	150 °C	87 °C
Specific Gravity	1.7 g/mL	1.78 g/mL	1.09 g/mL
Oxygen Permeability	50 cc/m² x day	58 cc/m² x day	0.0006 cc/m²/day
Water Vapor Permeability	9-57 g/m² x day	12-15 g/m² x day	0.0006 g/100 in² x day
Carbon Dioxide Permeability	172 cc/m² x day	172 cc/m² x day	0.0005 cc/100 in² x day

General Guidelines for Bag Sampling

Follow these basic considerations for trouble-free air sampling using gas sampling bags.

Before Sampling

- Store unused bags in a clean environment, sealed in an outer bag to prevent adsorption of contaminants.
- Preclean bags before use by flushing with high-purity nitrogen.
- For validation, compounds must be stable at >80% for 72 hours.
- Leak rate must not exceed 0.1" Hg/min.

During Sampling

- Be sure the PTFE tubing used for bag connection is clean.
- Use a vacuum box sampler for direct bag filling in order to avoid contamination from a sampling pump.
- Typical flow rate is 3 L/min.
- Do not fill bags more than 80%.

After Sampling

- Bags are intended for a single use due to potential sample adsorption onto the bag film.
- Hold times are typically 48 hours unless validation study demonstrates longer stability.
- Protect samples from direct sunlight and store above 0 °C to prevent condensation.
- Transport in rigid, opaque container to prevent bag puncture; do not ship by air unless samples will be kept in a pressurized area.

free literature

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

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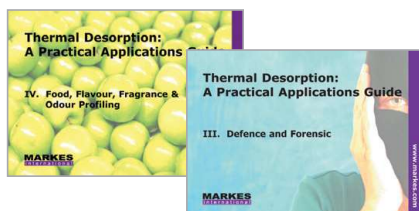
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Thermal Desorption Unit (TDU) Tubes vs. Canister Sampling

Which VOC Sampling Technique is Right for You?

Thermal desorption unit (TDU) 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	U.S. EPA TO-17 ASTM D6196 ISO 16017 ISO 16000-6 NIOSH 2549	U.S. EPA TO-14A, TO-15 ASTM D5466 OSHA PV2120 NIOSH Protocol Draft
	World-wide acceptance	Gold standard for U.S. 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	Lightweight for personal sampling 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
	One 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 multibed 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	\$50–130 each	\$200–700 each

Thermal Desorption Unit (TDU) Tubes

- Variety of sorbents to collect a wide range of VOCs.
- Use corrosion-resistant glass tubes for excellent inertness; allow monitoring of sorbent bed condition.
- Choose stainless steel tubes for greater durability in the field. No sampling pump necessary for passive sampling with diffusion caps.
- Individually etched with unique serial number for convenient sample identification.
- Robust barcode—the most reliable “code 128” format—on tube for recording and tracking.
- Each tube has an arrow indicating flow direction to reduce errors during use.
- Available unconditioned or preconditioned and ready to sample. Tubes are reusable after thermal desorption for most applications.

High-quality thermal desorption tubes are suitable for ppt to ppm concentrations of volatile organic compounds (VOCs) in ambient, indoor, personal, and industrial hygiene environments. Fit Markes (ULTRA and 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)

Tenax is a trademark of Buchem BV. Carbopack, Carbosieve, and Carboxen are trademarks of Sigma-Aldrich.



method applications

Method	Application
U.S. 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 (<10 L total volume)
Long-term storage caps are supplied with conditioned tubes

Thermal Desorption Unit Tubes (Unconditioned and Conditioned & Capped)

Sorbent Description	qty.	Unconditioned		Conditioned & Capped	
		Stainless Steel cat.#	Glass cat.#	Stainless Steel cat.#	Glass cat.#
Tenax TA (35/60 mesh)	10-pk.	24056	24062	24080	24086
Graphitized Carbon (20/40 mesh)	10-pk.	24057	24063	24081	24087
Tenax GR (35/60 mesh)/Carbopack B (60/80 mesh)	10-pk.	24058	24064	24082	24088
Carbopack B (60/80 mesh)/Carbosieve SIII (60/80 mesh)	10-pk.	24059	24065	24083	24089
Tenax TA (35/60 mesh)/Graphitized Carbon (40/60 mesh)/Carboxen 1000 (60/80 mesh)	10-pk.	24060	24066	24084	24090
Carbopack C (60/80 mesh)/Carbopack B (60/80 mesh)/Carbosieve SIII (60/80 mesh)	10-pk.	24061	24067	24085	24091

Thermal Desorption Unit Tubes (Empty)

- Empty tubes for direct desorption of VOCs from liquids, solids, or pastes.
- Stainless steel: front sorbent-retaining gauze, rear gauze, and gauze retaining spring supplied; or glass: glass frit positioned 15 mm from sampling end.
- Can be packed with any sorbent to suit any application.

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 1 cm Bed (35/60 mesh)	10-pk.	24075	24076
Description	qty.	cat.	
Calibration Solution Loading Rig	ea.	24077	
Calibration Solution Loading Rig Replacement Septa, 9.5 mm	10-pk.	24078	
Certified Reference Standard, 100 ng BTX on Tenax TA	10-pk.	24079	



Thermal Desorption Unit Tubes



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

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Polyurethane Foam (PUF) Cartridges

- 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 organophosphorus pesticides, carbamate, pyrethrin, triazine, and urea pesticides	22116
EPA IP-7	Polycyclic aromatic hydrocarbons (PAHs)	22114
EPA IP-8	Organochlorine and organophosphorus pesticides, carbamate, pyrethrin, triazine, and urea pesticides	22116
ASTM D4861	Organochlorine and organophosphorus 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



22114



22115



22116



22117

Cleaned Polyurethane Foam (PUF) Cartridges

Precleaned and ready to use.

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

Raw Polyurethane Foam (PUF) Plugs

- Unwashed PUF plugs for both low-volume and high-volume sampling.
- Flame retardant free—making them easier to clean for trace analysis.
- Compliant with EPA and ASTM methods—0.022 g/cm³ density.
- Glass holders sold separately.

Description	Size	qty.	cat.#
Large PUF Plug, Unwashed	6 cm OD x 7.6 cm length	10-pk.	22954
Large PUF Plug, Unwashed	6 cm OD x 5.1 cm length	10-pk.	22955
Large PUF Plug, Unwashed	6 cm OD x 2.5 cm length	10-pk.	22956
Small PUF Plug, Unwashed	22 mm OD x 7.6 cm length	10-pk.	22957



22954



22955



22957



22956

PUF Glass Holders

Durable and reusable, PUF glass holders reduce waste and are a cost-effective alternative to precleaned packed cartridges.

- Fit either 6 cm or 22 mm OD PUF plug or can be used with bulk SDVB resin.
- Large glass holder fitted with double stainless steel screens for support.
- Small glass holder has stem designed for secure 1/4" ID tubing connection to sampling pump.

Description	Size	qty.	cat.#
Large PUF Glass Holder	fits 6 cm OD PUF Plug (4.9" L x 2.5" OD)	ea.	22964
Small PUF Glass Holder	fits 22 mm OD PUF Plug (4.4" L x 0.9" OD)	ea.	22965



22964



22965



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

Ultra-Clean Resin Equivalent to XAD-2 Resin—Exclusively from Restek!

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

Frequently Asked Questions

- **Is Restek's Ultra-Clean resin really the same as XAD®-2 resin?**
Yes. Restek's resin has been manufactured to match the original XAD®-2 specifications of composition, pore size, and surface area. You will experience identical sampling performance for all semivolatile compounds.
- **Does Restek's Ultra-Clean resin need to be baked-out prior to use?**
No. Restek's resin is precleaned and prebaked. Unlike other resins, Restek's resin is rigorously cleaned and baked prior to being bottled. When we say our Ultra-Clean resin is precleaned, you can count on it!

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

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 cleanup, we do the cleaning for you! We test each batch by capillary GC-flame ionization detector (FID) to ensure cleanliness. However, depending on your application, additional cleaning may be required.

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



24053

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	1 kg	24053



23388

23389

Midget Glass Impingers

Use with a sampling pump to trap air contaminants into liquid collection media, as specified in OSHA and NIOSH industrial hygiene methods. Both dispersion and fritted nozzles are available as bubblers.

Description	Volume	Taper Size	qty.	cat.#
Midget Glass Impinger w/Fritted Tube	30 mL	24/40	kit	23388
Midget Glass Impinger w/Dispersion Tube	30 mL	24/40	kit	23389

Environmental Air Sampling Gas Standards

Our high-quality air sampling gas calibration standards are provided by Spectra/Linde and Scott/Air Liquide—meeting lab requirements for two separate sources of calibration standards. 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. Minimum 12-month stability on all cylinders.

TO-14A Internal Standard Mix (3 components)

Bromochloromethane	1,4-Difluorobenzene
Chlorobenzene-d5	
1 ppm in nitrogen, 104 liters @ 1,800 psi	cat.# 34412 (ea.)
1 ppm in nitrogen, 110 liters @ 1,800 psi	
Blend tolerance: ±10%; Analytical accuracy: ±5%	cat.# 26352 (ea.)
1 ppm in nitrogen, 110 liters @ 1,800 psi (Pi-marked Cylinder)	
Blend tolerance: ±10%; Analytical accuracy: ±5%	cat.# 34412-PI (ea.)
100 ppb in nitrogen, 104 liters @ 1,800 psi	cat.# 34427 (ea.)
100 ppb in nitrogen, 110 liters @ 1,800 psi	
Blend tolerance: ±20%; Analytical accuracy: ±10%	cat.# 26353 (ea.)
100 ppb in nitrogen, 110 liters @ 1,800 psi (Pi-marked Cylinder)	
Blend tolerance: ±20%; Analytical accuracy: ±10%	cat.# 34427-PI (ea.)

No data pack available.

TO-14A Internal Standard/Tuning Mix (4 components)

Bromochloromethane	Chlorobenzene-d5
1-Bromo-4-fluorobenzene	1,4-Difluorobenzene
(4-Bromofluorobenzene)	
1 ppm in nitrogen, 104 liters @ 1,800 psi	cat.# 34408 (ea.)
1 ppm in nitrogen, 110 liters @ 1,800 psi	
Blend tolerance: ±10%; Analytical accuracy: ±5%	cat.# 26354 (ea.)
1 ppm in nitrogen, 110 liters @ 1,800 psi (Pi-marked Cylinder)	
Blend tolerance: ±10%; Analytical accuracy: ±5%	cat.# 34408-PI (ea.)
100 ppb in nitrogen, 104 liters @ 1,800 psi	cat.# 34425 (ea.)
100 ppb in nitrogen, 110 liters @ 1,800 psi	
Blend tolerance: ±20%; Analytical accuracy: ±10%	cat.# 26355 (ea.)
100 ppb in nitrogen, 110 liters @ 1,800 psi (Pi-marked Cylinder)	
Blend tolerance: ±20%; Analytical accuracy: ±10%	cat.# 34425-PI (ea.)

No data pack available.

TO-14A GC-MS Tuning Mix

4-Bromofluorobenzene
1 ppm in nitrogen, 104 liters @ 1,800 psi
cat.# 34406 (ea.)
1 ppm in nitrogen, 110 liters @ 1,800 psi
Blend tolerance: ±10%; Analytical accuracy: ±5%
cat.# 26346 (ea.)
1 ppm in nitrogen, 110 liters @ 1,800 psi (Pi-marked Cylinder)
Blend tolerance: ±10%; Analytical accuracy: ±5%
cat.# 34406-PI (ea.)
100 ppb in nitrogen, 104 liters @ 1,800 psi
cat.# 34424 (ea.)
100 ppb in nitrogen, 110 liters @ 1,800 psi
Blend tolerance: ±20%; Analytical accuracy: ±10%
cat.# 26347 (ea.)
100 ppb in nitrogen, 110 liters @ 1,800 psi (Pi-marked Cylinder)
Blend tolerance: ±20%; Analytical accuracy: ±10%
cat.# 34424-PI (ea.)

No data pack available.

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
1 ppm in nitrogen, 104 liters @ 1,800 psi	cat.# 34404 (ea.)
1 ppm in nitrogen, 110 liters @ 1,800 psi	
Blend tolerance: ±10%; Analytical accuracy: ±5%	cat.# 26348 (ea.)
1 ppm in nitrogen, 110 liters @ 1,800 psi (Pi-marked Cylinder)	
Blend tolerance: ±10%; Analytical accuracy: ±5%	cat.# 34404-PI (ea.)
100 ppb in nitrogen, 104 liters @ 1,800 psi	cat.# 34423 (ea.)
100 ppb in nitrogen, 110 liters @ 1,800 psi	
Blend tolerance: ±20%; Analytical accuracy: ±10%	cat.# 26349 (ea.)
100 ppb in nitrogen, 110 liters @ 1,800 psi (Pi-marked Cylinder)	
Blend tolerance: ±20%; Analytical accuracy: ±10%	cat.# 34423-PI (ea.)

No data pack available.

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	
1 ppm in nitrogen, 104 liters @ 1,800 psi	cat.# 34402 (ea.)
1 ppm in nitrogen, 110 liters @ 1,800 psi	
Blend tolerance: ±10%; Analytical accuracy: ±5%	cat.# 26350 (ea.)
1 ppm in nitrogen, 110 liters @ 1,800 psi (Pi-marked Cylinder)	
Blend tolerance: ±10%; Analytical accuracy: ±5%	cat.# 34402-PI (ea.)
100 ppb in nitrogen, 104 liters @ 1,800 psi	cat.# 34422 (ea.)
100 ppb in nitrogen, 110 liters @ 1,800 psi	
Blend tolerance: ±20%; Analytical accuracy: ±10%	cat.# 26351 (ea.)
100 ppb in nitrogen, 110 liters @ 1,800 psi (Pi-marked Cylinder)	
Blend tolerance: ±20%; Analytical accuracy: ±10%	cat.# 34422-PI (ea.)

No data pack available.

See pages 452–453 for cylinder and regulator information.

please note

Gas standards are subject to hazardous materials shipping fees by most freight carriers. All calibration gas standards are nonreturnable due to DOT hazardous shipping requirements.



SAMPLE HANDLING | AIR SAMPLING

Gas Calibration Standards

TO-14A CFC/HCFC Mix (4 components)

Trichlorofluoromethane (Freon 11)
 Dichlorodifluoromethane (Freon 12)
 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)
 1,2-Dichlorotetrafluoroethane (Freon 114)
 1 ppm in nitrogen, 104 liters @ 1,800 psig
 cat.# 34410 (ea.)
 100 ppb in nitrogen, 104 liters @ 1,800 psig
 cat.# 34426 (ea.)
 1 ppm in nitrogen, 110 liters @ 1,800 psi (Pi-marked Cylinder)
 Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$
 cat.# 34410-PI (ea.)
 100 ppb in nitrogen, 110 liters @ 1,800 psi
 Blend tolerance: $\pm 20\%$; Analytical accuracy: $\pm 10\%$
 cat.# 26356 (ea.)
 100 ppb in nitrogen, 110 liters @ 1,800 psi (Pi-marked Cylinder)
 Blend tolerance: $\pm 20\%$; Analytical accuracy: $\pm 10\%$
 cat.# 34426-PI (ea.)

No data pack available.

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	

1 ppm in nitrogen, 104 liters @ 1,800 psi
 cat.# 34400 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi
 Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$
 cat.# 26340 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi (Pi-marked Cylinder)
 Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$
 cat.# 34400-PI (ea.)

100 ppb in nitrogen, 104 liters @ 1,800 psi
 cat.# 34421 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi
 Blend tolerance: $\pm 20\%$; Analytical accuracy: $\pm 10\%$
 cat.# 26341 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi (Pi-marked Cylinder)
 Blend tolerance: $\pm 20\%$; Analytical accuracy: $\pm 10\%$
 cat.# 34421-PI (ea.)

No data pack available.

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	

1 ppm in nitrogen, 104 liters @ 1,800 psi

cat.# 34430 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi
 Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$
 cat.# 26342 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi (Pi-marked Cylinder)
 Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$
 cat.# 34430-PI (ea.)

100 ppb in nitrogen, 104 liters @ 1,800 psi
 cat.# 34431 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi
 Blend tolerance: $\pm 20\%$; Analytical accuracy: $\pm 10\%$
 cat.# 26343 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi (Pi-marked Cylinder)
 Blend tolerance: $\pm 20\%$; Analytical accuracy: $\pm 10\%$
 cat.# 34431-PI (ea.)

No data pack available.



2nd Source TO-14A/TO-15 Gas Calibration Standards

- Standards from TWO manufacturers provide second source on one order.
- 12-month stability in transportable cylinders.
- Drop-shipped for fast delivery and maximum shelf life.

A. Spectra (Linde) 104 L Cylinders
B. Scotty (Air Liquide) 110 L Cylinders
C. Scotty (Air Liquide) 110 L Cylinders (Pi-marked Cylinders for EU Regulations)

See pages 452–453 for cylinder and regulator information.

www.restek.com/air

please note

Gas standards are subject to hazardous materials shipping fees by most freight carriers. All calibration gas standards are nonreturnable due to DOT hazardous shipping requirements.

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	

1 ppm in nitrogen, 104 liters @ 1,800 psi

cat.# 34432 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi

Blend tolerance: ±10%; Analytical accuracy: ±5%

cat.# 26344 (ea.)

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

Blend tolerance: ±10%; Analytical accuracy: ±5%

cat.# 34432-PI (ea.)

100 ppb in nitrogen, 104 liters @ 1,800 psi

cat.# 34433 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi

Blend tolerance: ±20%; Analytical accuracy: ±10%

cat.# 26345 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi (Pi-marked Cylinder)

Blend tolerance: ±20%; Analytical accuracy: ±10%

cat.# 34433-PI (ea.)

No data pack available.

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 <i>tert</i> -butyl ether (MTBE)
2-Butanone (MEK)	2-Propanol
Carbon disulfide*	Propylene
Cyclohexane	Tetrahydrofuran
Dibromochloromethane	2,2,4-Trimethylpentane
<i>trans</i> -1,2-Dichloroethene	Vinyl acetate
1,4-Dioxane	Vinyl bromide
Ethyl acetate	

1 ppm in nitrogen, 104 liters @ 1,800 psi

cat.# 34434 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi

Blend tolerance: ±10%; Analytical accuracy: ±5%

cat.# 26357 (ea.)

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

Blend tolerance: ±10%; Analytical accuracy: ±5%

cat.# 34434-PI (ea.)

100 ppb in nitrogen, 104 liters @ 1,800 psi

cat.# 34435 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi

Blend tolerance: ±20%; Analytical accuracy: ±10%

cat.# 26358 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi (Pi-marked Cylinder)

Blend tolerance: ±20%; Analytical accuracy: ±10%

cat.# 34435-PI (ea.)

*Stability of this compound cannot be guaranteed.

No data pack available.

TO-15 65 Component Mix (65 components)

Acetone	4-Ethyltoluene
Acrolein	Trichlorofluoromethane (Freon 11)
Benzene	Dichlorodifluoromethane (Freon 12)
Benzyl chloride*	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)
Bromodichloromethane	1,2-Dichlorotetrafluoroethane (Freon 114)
Bromoform	Heptane
Bromomethane	Hexachloro-1,3-butadiene
1,3-Butadiene	Hexane
2-Butanone (MEK)	2-Hexanone (MBK)
Carbon disulfide*	4-Methyl-2-pentanone (MIBK)
Carbon tetrachloride	Methylene chloride
Chlorobenzene	Methyl <i>tert</i> -butyl ether (MTBE)
Chloroethane	Methyl methacrylate
Chloroform	Naphthalene
Chloromethane	2-Propanol
Cyclohexane	Propylene
Dibromochloromethane	Styrene
1,2-Dichlorobenzene	1,1,2,2-Tetrachloroethane
1,3-Dichlorobenzene	Tetrachloroethene
1,4-Dichlorobenzene	Tetrahydrofuran
1,1-Dichloroethane	Toluene
1,2-Dichloroethane	1,2,4-Trichlorobenzene
<i>cis</i> -1,2-Dichloroethene	1,1,1-Trichloroethane
<i>trans</i> -1,2-Dichloroethene	1,1,2-Trichloroethane
1,2-Dichloropropane	Trichloroethene
<i>cis</i> -1,3-Dichloropropene	1,2,4-Trimethylbenzene
<i>trans</i> -1,3-Dichloropropene	1,3,5-Trimethylbenzene
1,4-Dioxane	Vinyl acetate
Ethanol*	Vinyl chloride
Ethyl acetate	<i>m</i> -Xylene
Ethyl benzene	<i>o</i> -Xylene
Ethylene dibromide (1,2-dibromoethane)	<i>p</i> -Xylene

1 ppm in nitrogen, 104 liters @ 1,800 psi

cat.# 34436 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi

Blend tolerance: ±10%; Analytical accuracy: ±5%

cat.# 26359 (ea.)

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

Blend tolerance: ±10%; Analytical accuracy: ±5%

cat.# 34436-PI (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi

Blend tolerance: ±20%; Analytical accuracy: ±10%

cat.# 26360 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi (Pi-marked Cylinder)

Blend tolerance: ±20%; Analytical accuracy: ±10%

cat.# 34437-PI (ea.)

*Stability of this compound cannot be guaranteed.

No data pack available.



75 Comp TO15 + NJ Mix

(75 components)

Acetone	4-Ethyltoluene
Acrolein	Trichlorofluoromethane (Freon 11)
Benzene	Dichlorodifluoromethane (Freon 12)
Benzyl chloride*	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)
Bromodichloromethane	1,2-Dichlorotetrafluoroethane (Freon 114)
Bromoform	Heptane
Bromomethane	Hexachloro-1,3-butadiene
1,3-Butadiene	Hexane
<i>n</i> -Butane	2-Hexanone (MBK)
2-Butanone (MEK)	4-Methyl-2-pentanone (MIBK)
<i>tert</i> -Butyl alcohol	Methylene chloride
Carbon disulfide*	Methyl <i>tert</i> -butyl ether (MTBE)
Carbon tetrachloride	Methyl methacrylate
Chlorobenzene	Naphthalene
Chloroethane	<i>n</i> -Nonane
Chloroform	<i>n</i> -Pentane
Chloromethane	2-Propanol
3-Chloroprene	<i>n</i> -Propylbenzene
2-Chlorotoluene	Propylene
Cumene	Styrene
Cyclohexane	1,1,2,2-Tetrachloroethane
Dibromochloromethane	Tetrachloroethene
1,2-Dichlorobenzene	Tetrahydrofuran
1,3-Dichlorobenzene	Toluene
1,4-Dichlorobenzene	1,2,4-Trichlorobenzene
1,1-Dichloroethane	1,1,1-Trichloroethane
1,2-Dichloroethane	1,1,2-Trichloroethane
1,1-Dichloroethene	Trichloroethene
<i>cis</i> -1,2-Dichloroethene	1,2,4-Trimethylbenzene
<i>trans</i> -1,2-Dichloroethene	1,3,5-Trimethylbenzene
1,2-Dichloropropane	2,2,4-Trimethylpentane
<i>cis</i> -1,3-Dichloropropene	Vinyl acetate
<i>trans</i> -1,3-Dichloropropene	Vinyl bromide
1,4-Dioxane	Vinyl chloride
Ethanol*	<i>m</i> -Xylene
Ethyl acetate	<i>o</i> -Xylene
Ethyl benzene	<i>p</i> -Xylene
Ethylene dibromide (1,2-dibromoethane)	

1 ppm in nitrogen, 104 liters @ 1,800 psig
 Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$
 cat.# 34396 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psig
 Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$
 cat.# 34392 (ea.)

100 ppb in nitrogen, 110 liters @ 1800 psig
 Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$
 cat.# 34393 (ea.)

*Stability of this compound cannot be guaranteed.
 No data pack available.

10 Comp NJ Subset Test Mix (10 components)

<i>n</i> -Butane	<i>n</i> -Nonane
<i>tert</i> -Butyl alcohol	<i>n</i> -Pentane
3-Chloroprene	<i>n</i> -Propylbenzene
2-Chlorotoluene	2,2,4-Trimethylpentane
Cumene	Vinyl bromide

1 ppm in nitrogen, 104 liters @ 1,800 psig
 Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$
 cat.# 34398 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psig
 Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$
 cat.# 34394 (ea.)

100 ppb in nitrogen, 104 liters @ 1,800 psig
 Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$
 cat.# 34399 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psig
 Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$
 cat.# 34395 (ea.)

No data pack available.

74 Comp TO15 + NJ Mix, (no Acrolein)

(74 components)

Acetone	Trichlorofluoromethane (Freon 11)
Benzene	Dichlorodifluoromethane (Freon 12)
Benzyl chloride*	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)
Bromodichloromethane	1,2-Dichlorotetrafluoroethane (Freon 114)
Bromoform	Heptane
Bromomethane	Hexachloro-1,3-butadiene
1,3-Butadiene	Hexane
<i>n</i> -Butane	2-Hexanone (MBK)
2-Butanone (MEK)	4-Methyl-2-pentanone (MIBK)
<i>tert</i> -Butyl alcohol	Methylene chloride
Carbon disulfide*	Methyl <i>tert</i> -butyl ether (MTBE)
Carbon tetrachloride	Methyl methacrylate
Chlorobenzene	Naphthalene
Chloroethane	<i>n</i> -Nonane
Chloroform	<i>n</i> -Pentane
Chloromethane	2-Propanol
3-Chloroprene	<i>n</i> -Propylbenzene
2-Chlorotoluene	Propylene
Cumene	Styrene
Cyclohexane	1,1,2,2-Tetrachloroethane
Dibromochloromethane	Tetrachloroethene
1,2-Dichlorobenzene	Tetrahydrofuran
1,3-Dichlorobenzene	Toluene
1,4-Dichlorobenzene	1,2,4-Trichlorobenzene
1,1-Dichloroethane	1,1,1-Trichloroethane
1,2-Dichloroethane	1,1,2-Trichloroethane
1,1-Dichloroethene	Trichloroethene
<i>cis</i> -1,2-Dichloroethene	1,2,4-Trimethylbenzene
<i>trans</i> -1,2-Dichloroethene	1,3,5-Trimethylbenzene
1,2-Dichloropropane	2,2,4-Trimethylpentane
<i>cis</i> -1,3-Dichloropropene	Vinyl acetate
<i>trans</i> -1,3-Dichloropropene	Vinyl bromide
1,4-Dioxane	Vinyl chloride
Ethanol*	<i>m</i> -Xylene
Ethyl acetate	<i>o</i> -Xylene
Ethyl benzene	<i>p</i> -Xylene
Ethylene dibromide (1,2-dibromoethane)	
4-Ethyltoluene	

100 ppb in nitrogen, 104 liters @ 1,800 psig
 Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$
 cat.# 34397 (ea.)

*Stability of this compound cannot be guaranteed.
 No data pack available.



NEW!

NEW!

2nd Source TO-14A/TO-15 Gas Calibration Standards

- Standards from TWO manufacturers provide second source on one order.
- 12-month stability in transportable cylinders.
- Drop-shipped for fast delivery and maximum shelf life.

A. Spectra (Linde) 104 L Cylinders
B. Scotty (Air Liquide) 110 L Cylinders
C. Scotty (Air Liquide) 110 L Cylinders (Pi-marked Cylinders for EU Regulations)

See pages 452–453 for cylinder and regulator information.

www.restek.com/air

Massachusetts APH Mix (26 components)

Benzene	<i>p</i> -Isopropyltoluene
1,3-Butadiene	Methyl <i>tert</i> -butyl ether
Butylcyclohexane	1-Methyl-3-ethylbenzene
Cyclohexane	Naphthalene
<i>n</i> -Decane	<i>n</i> -Nonane
2,3-Dimethylheptane	<i>n</i> -Octane
2,3-Dimethylpentane	Toluene
<i>n</i> -Dodecane	1,2,3-Trimethylbenzene
Ethylbenzene	1,3,5-Trimethylbenzene
<i>n</i> -Heptane	<i>n</i> -Undecane
<i>n</i> -Hexane	<i>o</i> -Xylene
Isopentane	<i>m/p</i> -Xylene (combined)
Isopropylbenzene	

1 ppm in nitrogen, 104 liters @ 1,800 psi

cat.# 34540 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi

Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$

cat.# 26366 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psig (Pi-marked cylinder)

Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$

cat.# 34540-PI (ea.)

No data pack available.

▶ See pages 452–453 for cylinder and regulator information.

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)

1 ppm in nitrogen, 104 liters @ 1,800 psi

cat.# 34420 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi

Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$

cat.# 26368 (ea.)

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

Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$

cat.# 34420-PI (ea.)

100 ppb in nitrogen, 104 liters @ 1,800 psi

cat.# 34429 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi

Blend tolerance: $\pm 20\%$; Analytical accuracy: $\pm 10\%$

cat.# 26369 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi (Pi-marked Cylinder)

Blend tolerance: $\pm 20\%$; Analytical accuracy: $\pm 10\%$

cat.# 34429-PI (ea.)

No data pack available.

Japan Calibration Mix (9 components)

Acrylonitrile	Dichloromethane
Benzene	Tetrachloroethylene
1,3-Butadiene	Trichloroethylene
Chloroform	Vinyl chloride
1,2-Dichloroethane	

1 ppm in nitrogen, 104 liters @ 1,800 psi

cat.# 34418 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi

Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$

cat.# 26367 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi (Pi-marked cylinder)

Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$

cat.# 34418-PI (ea.)

No data pack available.

Custom Gas Calibration Standards Quote

www.restek.com/customgas



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

20–60 ppbC (parts per billion expressed as carbon) in nitrogen, 104 liters @ 1,800 psi

cat.# 34445 (ea.)

20–60 ppbC (parts per billion expressed as carbon) in nitrogen, 110 liters @ 1,800 psi

Blend tolerance: $\pm 20\%$; Analytical accuracy: $\pm 10\%$

cat.# 26370 (ea.)

20–60 ppbC (parts per billion expressed as carbon) in nitrogen, 110 liters @ 1,800 psi (Pi-marked Cylinder)

Blend tolerance: $\pm 20\%$; Analytical accuracy: $\pm 10\%$

cat.# 34445-PI (ea.)

No data pack available.

please note

Gas standards are subject to hazardous materials shipping fees by most freight carriers. All calibration gas standards are nonreturnable due to DOT hazardous shipping requirements.

SAMPLE HANDLING | AIR SAMPLING

Gas Calibration Standards

Sulfur 5-Component Mix (5 components)

Stability is 12 months from date of manufacture.
+/- 10% accuracy.

Carbonyl sulfide	Hydrogen sulfide
Dimethyl sulfide	Methyl mercaptan
Ethyl mercaptan	

1 ppm in nitrogen, 110 liters @ 1,800 psi

cat.# 34561 (ea.)

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

Blend tolerance: ±10%; Analytical accuracy: ±5%

cat.# 34561-PI (ea.)

BTEX Gas Mix (6 components)

Benzene (71-43-2)	<i>m</i> -Xylene (108-38-3)
Ethylbenzene (100-41-4)	<i>o</i> -Xylene (95-47-6)
Toluene (108-88-3)	<i>p</i> -Xylene (106-42-3)

1 ppm in nitrogen, 104 liters @ 1,800 psi

cat.# 34414 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi

cat.# 26361 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi (Pi-marked cylinder)

Blend tolerance: ±10%; Analytical accuracy: ±5%

cat.# 34414-PI (ea.)

100 ppb in nitrogen, 104 liters @ 1,800 psi

cat.# 34428 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi

Blend tolerance: ±20%; Analytical accuracy: ±10%

cat.# 26362 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi (Pi-marked cylinder)

Blend tolerance: ±20%; Analytical accuracy: ±10%

cat.# 34428-PI (ea.)

No data pack available.

BTEX and MTBE Gas Mix (7 components)

Benzene	<i>m</i> -Xylene
Ethylbenzene	<i>o</i> -Xylene
Methyl <i>tert</i> -butyl ether (MTBE)	<i>p</i> -Xylene
Toluene	

1 ppm in nitrogen, 104 liters @ 1,800 psi

cat.# 34541 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi

Blend tolerance: ±10%; Analytical accuracy: ±5%

cat.# 26363 (ea.)

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

Blend tolerance: ±20%; Analytical accuracy: ±10%

cat.# 34541-PI (ea.)

100 ppb in nitrogen, 104 liters @ 1,800 psi

cat.# 34542 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi

Blend tolerance: ±20%; Analytical accuracy: ±10%

cat.# 26364 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi (Pi-marked Cylinder)

Blend tolerance: ±10%; Analytical accuracy: ±5%

cat.# 34542-PI (ea.)

No data pack available.

Reference Standards Search

Search by compound name, synonym, or CAS #.

www.restek.com/reference





2nd Source TO-14A/TO-15 Gas Calibration Standards

- Standards from TWO manufacturers provide second source on one order.
- 12-month stability in transportable cylinders.
- Drop-shipped for fast delivery and maximum shelf life.

A. Spectra (Linde) 104 L Cylinders
B. Scotty (Air Liquide) 110 L Cylinders
C. Scotty (Air Liquide) 110 L Cylinders
(Pi-marked Cylinders for EU Regulations)

See pages 452–453 for cylinder and regulator information.

www.restek.com/air

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.	Natural Gas Standard #2 cat.# 34439, ea.	Natural Gas Standard #3 cat.# 34440, ea.
	% each compound*	% each compound*	% 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
<i>n</i> -butane	0.300	1.000	3.000
isopentane	0.150	0.500	1.000
<i>n</i> -pentane	0.150	0.500	1.000
hexanes plus	0.100	0.250	0.500
Concentration	mole	mole	mole
Volume	13.16 L @ 200 psig (1,379 kPa)	13.16 L @ 200 psig (1,379 kPa)	5.5 L @ 75 psig (517 kPa)
Ideal Heating Value (Dry BTU/SCF)	1,048 gross	1,142 gross	1,317 gross

Ideal Heating Value: Dry BTU/SCF @ 14.696 psia & 60 °F.

*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.	Refinery Gas Standard #2 cat.# 34442, ea.	Refinery Gas Standard #5 cat.# 34443, ea.
	% each compound*	% each compound*	% 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
<i>n</i> -butane	4.000	4.000	4.000
isobutylene	2.000	1.000	1.000
1,3 butadiene	3.000	3.000	3.000
<i>cis</i> -2-butene	2.000	2.000	2.000
<i>trans</i> -2-butene	2.000	3.000	3.000
1-butene	2.000	2.000	2.000
2-methyl-2-butene	—	0.200	0.200
isopentane	1.000	1.000	1.000
<i>n</i> -pentane	1.000	1.000	1.000
<i>cis</i> -2-pentene	—	0.400	0.400
<i>trans</i> -2-pentene	—	0.160	0.200
pentene-1	—	0.400	0.400
<i>n</i> -hexane	0.500	0.100	—
hexanes plus	—	—	0.100
Concentration	mole	mole	mole
Volume	5.2 L @ 70 psig (483 kPa)	4.9 L @ 60 psig (414 kPa)	4.6 L @ 60 psig (414 kPa)

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

please note

Gas standards on this page are not available in Pi-marked cylinders for EU countries.



cylinder design

DCG Partnership Cylinders:

Size: 7.6 x 24 cm
Connection: CGA-170/110
U.S. DOT Specs: DOT-4B-240ET

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

also available

See page 453 for regulators.





Scotty/Air Liquide Transportable Pure Gases and Mixtures in 14 L, 48 L, and 110 L Sizes

We offer a wide range of Scotty/Air Liquide transportable gases, from pure gases for purging or calibrating to multicomponent mixes, which are ideal for peak identification work.

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

See **pages 452–453** for cylinder and regulator information.

NOTE: Scotty 14 and Scotty 48 cylinders are not approved for use in Canada.

Description	Product Grade	Shelf Life	Scotty 14 (14 L) cat.#	Scotty 48 (48 L) cat.#	Scotty 110 (110 L) cat.#
Pure Gases					
Air, zero	THC < 1 ppm	—	34448	34449	34449-PI
Argon	99.995%	—	34457	—	34457-PI
Carbon dioxide	99.80%	—	34451	34452	34452-PI
Hydrogen	99.99%	—	34453	—	34453-PI
Methane	99.00%	—	34454	—	34454-PI
Oxygen	99.60%	—	34455	—	—
Two-Component Mixtures					
Benzene in air (1 ppm)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	—	34458	34458-PI
Benzene in air (100 ppm)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	—	34459	34459-PI
1,3-Butadiene in nitrogen (10 ppm)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	34460	34461	34461-PI
Carbon dioxide in helium (100 ppm)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	34462	—	34462-PI
Carbon dioxide in nitrogen (100 ppm)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	34463	34464	34464-PI
Carbon dioxide in nitrogen (1,000 ppm)	Blend tolerance: $\pm 5\%$; Analytical accuracy: $\pm 2\%$	3 yr	34465	34466	34466-PI
Ethylene in air (8–10 ppm)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	34467	34468	34468-PI
Ethylene in helium (100 ppm)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	34489	—	34489-PI
Hydrogen in helium (100 ppm)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	34469	—	34469-PI
Hydrogen in nitrogen (1%)	Blend tolerance: $\pm 5\%$; Analytical accuracy: $\pm 2\%$	3 yr	34471	34472	34472-PI
Hydrogen in nitrogen (100 ppm)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	34473	34474	34474-PI
Methane in helium (100 ppm)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	34476	34477	34477-PI
Methane in nitrogen (100 ppm)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	34478	—	34478-PI
Methane in nitrogen (1%)	Blend tolerance: $\pm 5\%$; Analytical accuracy: $\pm 2\%$	3 yr	34482	34483	34483-PI
Nitrogen in helium (100 ppm)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	34479	—	34479-PI
Nitrous oxide in nitrogen (1 ppm)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	34484	34485	34485-PI

Description	Product Grade	Shelf Life	Scotty 14 (14 L) cat.#	Scotty 48 (48 L) cat.#	Scotty 110 (110 L) cat.#
Two-Component Mixtures					
Oxygen in helium (100 ppm)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	34480	—	34480-PI
Oxygen in nitrogen (2%)	Blend tolerance: $\pm 5\%$; Analytical accuracy: $\pm 2\%$	3 yr	34487	34488	34488-PI
Oxygen in nitrogen (6%)	Blend tolerance: $\pm 5\%$; Analytical accuracy: $\pm 2\%$	3 yr	34491	34492	34492-PI
1,1,1-Trichloroethane in nitrogen (10 ppm)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	—	34493	34493-PI
Trichloroethylene in nitrogen (10 ppm)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	34494	34495	34495-PI
Vinyl chloride in nitrogen (1 ppm)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	34496	34497	34497-PI
Vinyl chloride in nitrogen (10 ppm)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	34498	34499	34499-PI
Vinyl chloride in nitrogen (50 ppm)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	34500	—	34500-PI
Vinyl chloride in nitrogen (100 ppm)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	34501	—	34501-PI
Vinyl chloride in nitrogen (1,000 ppm)	Blend tolerance: $\pm 5\%$; Analytical accuracy: $\pm 2\%$	3 yr	34502	—	34502-PI
Multi-Component Mixtures					
Carbon monoxide, carbon dioxide, hydrogen, and oxygen in nitrogen (0.5% each)	Blend tolerance: $\pm 5\%$; Analytical accuracy: $\pm 2\%$	3 yr	34504	34505	34505-PI
Carbon monoxide, carbon dioxide, hydrogen, and oxygen in nitrogen (1% each)	Blend tolerance: $\pm 5\%$; Analytical accuracy: $\pm 2\%$	3 yr	34507	34508	34508-PI
Carbon monoxide, carbon dioxide, methane, ethane, ethylene, and acetylene in nitrogen (1% each)	Blend tolerance: $\pm 5\%$; Analytical accuracy: $\pm 2\%$	3 yr	—	34511	34511-PI
Carbon monoxide, carbon dioxide, nitrogen, and oxygen (5% each), and methane and hydrogen (4% each) in helium	Blend tolerance: $\pm 5\%$; Analytical accuracy: $\pm 2\%$	3 yr	34512	—	34512-PI*
Carbon monoxide (7%), carbon dioxide (15%), and oxygen (5%) in nitrogen	Blend tolerance: $\pm 5\%$; Analytical accuracy: $\pm 2\%$	3 yr	34514	—	34514-PI
Carbon monoxide (7%), oxygen (4%), carbon dioxide (15%), and methane (4.5%) in nitrogen	Blend tolerance: $\pm 5\%$; Analytical accuracy: $\pm 2\%$	3 yr	34515	34516	34516-PI
C1–C6 <i>n</i> -Paraffins: methane, ethane, propane, butane, pentane, hexane in nitrogen (15 ppm each)	Blend tolerance: $\pm 20\%$; Analytical accuracy: $\pm 10\%$	3 yr	34518	34519	34519-PI
C1–C6 <i>n</i> -Paraffins: methane, ethane, propane, butane, pentane, hexane in helium (100 ppm each)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	34521	34522	34522-PI
C1–C6 <i>n</i> -Paraffins: methane, ethane, propane, butane, pentane, hexane in helium (1,000 ppm each)	Blend tolerance: $\pm 5\%$; Analytical accuracy: $\pm 2\%$	3 yr	34524	34525	34525-PI
C1–C6 <i>n</i> -Paraffins: methane, ethane, propane, butane, pentane, hexane in nitrogen (100 ppm each)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	34527	34528	34528-PI
C2–C6 Olefins: ethylene, propylene, 1-butene, 1-pentene, 1-hexene in helium (100 ppm each)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	34529	34530	34530-PI
C2–C6 Olefins: ethylene, propylene, 1-butene, 1-pentene, 1-hexene in nitrogen (100 ppm each)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	34531	34532	34532-PI
Branched Paraffins: 2,2-dimethylbutane, 2,2-dimethylpropane, isobutane, 2-methylbutane, 2-methylpentane, 3-methylpentane in nitrogen (15 ppm each)	Blend tolerance: $\pm 20\%$; Analytical accuracy: $\pm 10\%$	3 yr	34534	—	34534-PI
Methane, ethane, ethylene, acetylene, propane, propylene, <i>n</i> -butane, propyne in nitrogen (15 ppm each)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	—	34537	34537-PI
<i>n</i> -butane, isobutane, <i>cis</i> -2-butene, <i>trans</i> -2-butene, 1-butene, iso-butylene, 1,3-butadiene, ethyl acetylene in nitrogen (15 ppm each)	Blend tolerance: $\pm 10\%$; Analytical accuracy: $\pm 5\%$	3 yr	—	34539	34539-PI

*Cat.# 34512-PI is 30 L at 500 psig (34.5 bar).

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

All calibration gas standards are nonreturnable due to DOT hazardous shipping requirements.





DCG Partnership Cylinders:
 Size: 7.6 x 24 cm
 Connection: CGA-170/110
 U.S. DOT Specs: DOT-4B-240ET
Please note: This cylinder is not approved for use in Canada.
Recommended regulator:
 cat.# 22032



Scotty® (Air Liquide) 110 L (Pi-marked Cylinders for EU Regulations):
 Aluminum construction
 Size: 8.3 x 29.5 cm
 Volume/Pressure:
 110 liters of gas @ 1,800 psi
 Outlet Fitting: CGA-180
 Weight: 2.2 lb/1 kg
 DOT Specifications: 3AL2216
Recommended regulators:
 cat.# 26371, 26372, 21572, or 21572-R100



Spectra (Linde) 104 L:
 Aluminum construction
 Size: 8 x 24 cm
 Volume/Pressure:
 104 liters of gas @ 1,800 psi
 Outlet Fitting: CGA-180
 Weight: 1.5 lb/0.7 kg
Recommended regulators:
 cat.# 21572, 21572-R100, 26371, or 26372



Scotty® (Air Liquide) 110 L:
 Aluminum construction
 Size: 8.3 x 29.5 cm
 Volume/Pressure:
 110 liters of gas @ 1,800 psi
 Outlet Fitting: CGA-180
 Weight: 2.2 lb/1 kg
 DOT Specifications: 3AL2216
Recommended regulators:
 cat.# 26371, 26372, 21572, or 21572-R100



Scotty® (Air Liquide) 14 L:
 Contents: 14 liters
 Pressure: 240 psig (17 bar)
 Outlet Fitting: CGA-160
 Weight: 1.5 lb/0.7 kg
 Dimensions: 3" diameter x 11" height (7.6 x 28 cm)
 DOT Specifications: 4B240
Please note: This cylinder is not approved for use in Canada.
Recommended regulators:
 cat.# 22690



Scotty® (Air Liquide) 48 L:
 Contents: 48 liters
 Pressure: 300 psig (21 bar)
 Outlet Fitting: CGA-165
 Weight: 1.75 lb/0.8 kg
 Dimensions: 4" diameter x 16 1/4" height (10.2 x 41 cm)
 DOT Specifications: 39 NRC
Please note: This cylinder is not approved for use in Canada.
Recommended regulators:
 cat.# 22691



24129

Small Cylinder Stand

- Supports and stabilizes disposable gas cylinders.
- Fits cylinders up to 3 3/8" (8 cm) in diameter.
- Adjustable screw secures cylinder in place.

This cylinder stand is designed to support small-diameter cylinders, such as 104 L and 110 L disposable cylinders. It is a simple, safe, and economical way to stabilize the position of small cylinders, while keeping them within close proximity. The stand is constructed of heavyweight painted steel and includes an adjustable screw for safely securing cylinders.

Description	qty.	cat.#
Small Cylinder Stand	ea.	24129

Mini-Regulator for natural gas and refinery gas standards

- 0–300 psig inlet pressure range.
- 0–15 psig outlet pressure range.
- Supplied with 0–15 psig outlet pressure gauge, brass CGA 170 nut and nipple, and 1/8-inch compression outlet.

Description	qty.	cat.#
Mini-Regulator	ea.	22032



High-Purity VOC Regulators

- Single-stage, stainless steel.
- Two pressure gauges and CGA-180 fitting.
- Stainless steel diaphragm and Kel-F® seat.
- Accurate pressure control even at low flow rates.
- Individually tested for leaks and impurities.

Spectra Gas 7621 High-Purity VOC Regulators

Specifications:	Outlet Connection: 1/8" tube compression
Maximum Inlet Pressure: 3,000 psig	Internal Volume: 3.03 cc

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



21572

Air Liquide High-Purity VOC Regulators

Specifications:	Outlet Connection: 1/4" NPT female
Maximum Inlet Pressure: 3,000 psig	Internal Volume: 3.03 cc

Description	qty.	cat.#
CGA-180 (0–30 psig)	ea.	26371
CGA-180 (0–100 psig)	ea.	26372



26371

Regulators for use with 14 L and 48 L Scott/Air Liquide transportable gases

Use the CGA-160 inlet connection with 14 L Scott/Air Liquide transportable gases.
Use the CGA-165 inlet connection with 48 L Scott/Air Liquide transportable gases.

Specifications:	Materials of Construction:
Maximum Inlet Pressure: 300 psig	Body: Brass
Outlet Pressure Range: 2–10 psig	Diaphragm: Viton®
Maximum Delivery Pressure: 25 psig	Seat: Acetal
Operating Temperature Range: 35 °F to 150 °F (2 °C to 65 °C)	Seal: Viton®
Outlet Connection: 1/4" female NPT	

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



22690

also available

Single-Stage and Dual-Stage
Ultra-High Purity Gas Regulators
See **pages 301–303**.



Syringe Adaptor 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 nickel-plated brass 1/4" NPT to female luer fitting, which can be used with an A-2 Luer syringe (cat.# 20162 or 20163), 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 Adaptor Kit	kit	21118



21118

Gas Sampling

Sample Cylinders.....	454
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Gas Sampling Valves & Loops	457



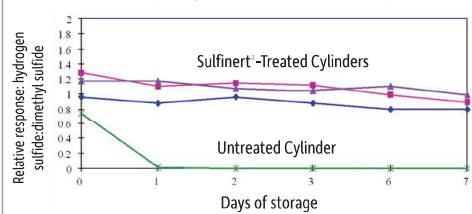
Sample Cylinders

- All cylinders have 1/4" female NPT threads on both ends.
- TPED compliant cylinders available for EU community.

Swagelok® sample cylinders are made of 304L and 316L stainless steel to resist corrosion and DOT rated to 1,800 and 5,000 psig (TPED cylinders rated to 1,450 and 4,350 psig), which allows sampling at gas wellheads as well as on-site refineries. Each cylinder is hydrostatically tested to at least 5/3 the working pressure.

Sulfur compounds are stable in Sulfinert®-treated stainless steel systems.

17 ppbv hydrogen sulfide in 500 mL cylinders



Applications:

- ASTM D1265
- Hydrocarbon sampling in refineries & petrochemical plants

Analyzing sulfur or mercury?

- Sulfinert® coating provides stable storage of sulfur and mercury at ppb levels.
- Inert coating doesn't flake; more durable than PTFE.

Sample Cylinders, High Pressure (Stainless Steel & Sulfinert®-Treated)

- 304L stainless steel; DOT rating to 1,800 psig (TPED cylinders to 1,450 psig).
- Range of cylinder sizes, 75 cc to 2,250 cc.

Size	1,800 psig (12,411 kPa), 304L SS		TPED, 1,450 psig (9,997 kPa), 304L SS	
	Stainless Steel cat.#	Sulfinert-Treated cat.#	Stainless Steel cat.#	Sulfinert-Treated cat.#
75 cc	22921	24130	22921-PI	24130-PI
150 cc	22922	24131	22922-PI	24131-PI
300 cc	22923	24132	22923-PI	24132-PI
500 cc	22924	24133	22924-PI	24133-PI
1,000 cc	22925	24134	22925-PI	24134-PI
2,250 cc	22926	21394	22926-PI	21394-PI

Sample Cylinders, Ultra-High Pressure (Stainless Steel & Sulfinert®-Treated)

- 316L stainless steel; DOT rating to 5,000 psig (TPED cylinders to 4,350 psig).
- Range of cylinder sizes, 150 cc to 500 cc.

Size	5,000 psig (34,474 kPa), 316L SS		TPED, 4,350 psig (29,992 kPa), 316L SS	
	Stainless Steel cat.#	Sulfinert-Treated cat.#	Stainless Steel cat.#	Sulfinert-Treated cat.#
150 cc	22927	22111	22927-PI	22111-PI
300 cc	22928	22112	22928-PI	22112-PI
500 cc	22929	22113	22929-PI	22113-PI

also available

Certificates are available upon request.

Sample Cylinder Valves (Stainless Steel & Sulfinert®-Treated)

- Multiple valve configurations, including dip tube and rupture discs.
- Large, durable, Kel-F® seat ensures leak-free operation.
- Temperature range: -40 °C to 120 °C
- 303 stainless steel.

Alta-Robbins' unique valve design incorporates a fully contained soft seat that provides durability and longer lifetime. Tight shut-off is easily achieved with very low torque, yet the valve is rugged enough to withstand overtightening.

Multiple valve configurations are available for both high-pressure and ultra-high-pressure sample cylinders. An outage tube or dip tube provides a headspace above liquefied gases so that, should expansion occur with an increase in temperature, the pressure is not dramatically increased. Outage is expressed as a percent of the total cylinder volume, based on the ratio of the length of headspace to the total length of the cylinder, with a maximum available outage of 50%. The dip tube is welded directly to the male inlet of the valve and cut to a length of up to 5.25 inches. Rupture discs function to protect sample cylinders from over-pressurization by venting to the atmosphere. The pressure rating on the rupture disc should always be lower than the cylinder.

Description	Stainless Steel cat.#	Sulfinert-Treated cat.#
3,500 psig (24,132 kPa) DOT Pressure Rating		
1/4" Male NPT x 1/4" Male NPT	26297	21400
1/4" Male NPT x 1/4" Female NPT	26298	26299
1/4" Male NPT x 1/4" Male Compression	26300	21401
1/4" Male NPT x 1/4" Male NPT w/5.25" Dip Tube*	26301	21402*
1/4" Male NPT x 1/4" Male NPT w/1,800 psi (12,411 kPa) Rupture Disc	26302	26303
1/4" Male NPT x 1/4" Female NPT w/1,800 psi (12,411 kPa) Rupture Disc	26304	26305
Replacement Rupture Disc, 1,800 psig (12,411 kPa)	26320	—
5,000 psig (34,474 kPa) DOT Pressure Rating		
1/4" Male NPT x 1/4" Male NPT	26306	26307
1/4" Male NPT x 1/4" Female NPT	26308	26309
1/4" Male NPT x 1/4" Male Compression	26310	26311
1/4" Male NPT x 1/4" Male NPT w/5.25" Dip Tube*	26312	26313
1/4" Male NPT x 1/4" Male NPT w/2,850 psi (19,650 kPa) Rupture Disc	26314	26315
1/4" Male NPT x 1/4" Female NPT w/2,850 psi (19,650 kPa) Rupture Disc	26316	26317
Replacement Rupture Disc, 2,850 psig (19,650 kPa)	26324	—

*To order a sample cylinder valve with dip tube, please call Restek® 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" / 13.3 cm).

Note: End of part will not be treated after cutting tube to length.

Rupture Disc Tee (Stainless Steel & Sulfinert®-Treated)

Unlike other designs, Alta-Robbins rupture disc tee is NOT permanently soldered to the disc, making the discs replaceable. Discs are easily changed without removing the valve or tee from the cylinder. These tees are designed to be installed into existing systems to provide reliable over-pressure protection.

Description	Stainless Steel cat.#	Sulfinert-Treated cat.#
1,800 psig DOT Pressure Rating		
Rupture Disc Tee, 1/4" Male NPT x 1/4" Female NPT	26318	26319
Replacement Rupture Disc	26320	—
2,850 psig DOT Pressure Rating		
Rupture Disc Tee, 1/4" Male NPT x 1/4" Female NPT	26322	26323
Replacement Rupture Disc	26324	—

Metering Control Valves (Stainless Steel & Sulfinert®-Treated)

- Reduces pressure between sample cylinder and GC injector.
- Maintains fine metering control.
- Contains Kel-F® seat.

Description	Stainless Steel cat.#	Sulfinert-Treated cat.#
3,500 psig (24,132 kPa) DOT Pressure Rating		
Metering Control Valve, 1/4" Male NPT x 1/4" Male NPT	26326	26327



21400



21401



21402



26298



26300



26314



26318



26323



26324



26326

Sample Cylinder Accessories

Description	Fittings	qty.	cat.#
Sample Cylinder Carrying Handle, 304 SS for 1.9" & 2" OD Cylinders (Includes handle and two attachment rings)	—	ea.	26373
Sample Cylinder Carrying Handle, 304 SS for 3.5" & 4" OD Cylinders (Includes handle and two attachment rings)	—	ea.	26374
Sample Cylinder 316 SS End Pipe Plug, Stainless Steel	1/4" Male NPT	ea.	26375
Sample Cylinder 316 SS End Pipe Plug, Sulfinert-Treated	1/4" Male NPT	ea.	26376
Sample Cylinder 316 SS Hollow Hex Plug	1/4" Male NPT	ea.	26377
Sample Cylinder SS Pipe Cap w/Lanyard	1/4" Female NPT & 20" Lanyard	ea.	26378
Sample Cylinder SS Pipe Cap, Stainless Steel	1/4" Female NPT	ea.	22969
Sample Cylinder SS Pipe Cap, Sulfinert-Treated	1/4" Female NPT	ea.	22970

SS=stainless steel

Protecting Your Sulfinert®-Treated Products

Cleaning Tips

When cleaning a treated part, rinse with a solvent that will dissolve probable surface contaminants (i.e., use a nonpolar solvent to remove hydrocarbon contaminants, or a more polar solvent to remove more active contaminants).

Avoid using cleaners containing abrasives as they can scratch the layer. Mild sonication may assist in contaminant removal, but do not oversonicate—this could damage the layer. Solids can be removed with a soft nylon bristle brush using light pressure.

Caution! Do not use basic solutions or soaps with pH>8. Do not steam clean Sulfinert®-treated components or lines as this could damage the layer.

Preventing Galling

As with any threaded fitting, galling may occur when assembling two treated parts. To prevent thread damage, use a PTFE tape.

A scouring pad can be used to remove coating from the threads to reduce galling.

Ferrules used in compression fittings should not be coated—leaks may occur.

Troubleshooting

Under normal use, your treated items should deliver outstanding performance for years to come. However, effective lifetime is dependent on the severity of the environment. Factors that can reduce performance are:

- *Contamination*—Failure to properly clean the surface can allow increased surface activity. If performance changes, thoroughly clean the surface and inspect the layer for damage.
- *Erosion*—Contact with abrasives can accelerate surface wear.
- *Bases*—Contact with a base (pH 8 or higher) can accelerate deterioration of the layer.

Surface finish and color should stay consistent throughout the life of the product. Changes in the finish or color may indicate a partial loss of the layer. To prevent further loss, ensure no exposure to bases or abrasives.

Gas Sampling Valves and Sample Loops (Sulfinert®-Treated)

- Ideal for samples containing low concentrations of sulfur or other active compounds.
- Sample loop sizes from 5 µL to 5 mL.

Sulfinert® treatment eliminates active sites in the valve or loop for better recovery of active compounds.

Gas Sampling Valves & Replacement Rotors (Sulfinert®-Treated)

(¹/₁₆" Fittings, 0.40 mm Port Diameter; "W Type" Valve)

Description	qty.	cat.#
Sulfinert Gas Sampling Valve; 4-Port	ea.	20584
Sulfinert Gas Sampling Valve; 6-Port	ea.	20585
Sulfinert Gas Sampling Valve; 10-Port	ea.	20586

Replacement Rotors (Not Coated)

Description	qty.	cat.#
Replacement Rotor (not coated) for 4-Port Sulfinert Gas Sampling Valve	ea.	20587
Replacement Rotor (not coated) for 6-Port Sulfinert Gas Sampling Valve	ea.	20588
Replacement Rotor (not coated) for 10-Port Sulfinert Gas Sampling Valve	ea.	20589

Gas Sample Loops (Sulfinert®-Treated)

(¹/₁₆" fittings, 1 mm ID, for "W Type" valves)

Description	Size	qty.	cat.#
Sample Loops, Sulfinert-Treated	5 µL	ea.	22840
Sample Loops, Sulfinert-Treated	10 µL	ea.	22841
Sample Loops, Sulfinert-Treated	20 µL	ea.	22842
Sample Loops, Sulfinert-Treated	25 µL	ea.	22843
Sample Loops, Sulfinert-Treated	50 µL	ea.	22844
Sample Loops, Sulfinert-Treated	100 µL	ea.	22845
Sample Loops, Sulfinert-Treated	250 µL	ea.	22846
Sample Loops, Sulfinert-Treated	500 µL	ea.	22847
Sample Loops, Sulfinert-Treated	1 mL	ea.	22848
Sample Loops, Sulfinert-Treated	2 mL	ea.	22849
Sample Loops, Sulfinert-Treated	5 mL	ea.	22850



Jumbo Syringe

Clear acrylic syringes, ideal for holding and dispensing large volumes of gas. An adjustable plunger on the O-ring ensures that the syringe is gas-tight over a long period of time. The central port is supplied with a luer lock fitting; the secondary port is supplied with a septum nut. This enables access to the gas sample for adding standards or removing a subsample. The plunger stem is detachable, making sample storage easy.

Volume	Model	SGE cat.#	qty.	Restek cat.#
500 mL	500MAR-LL-GT	009910	ea.	21275
1000 mL	1000MAR-LL-GT	009920	ea.	21276
2000 mL	2000MAR-LL-GT	009930	ea.	21277



Syringe O-Rings

Syringe Volume	SGE cat.#	qty.	Restek cat.#
500 mL	032527	ea.	21278
1,000 mL	032532	ea.	21279

