Restek Air

Gas Sampling Bags

Cost Effective Alternatives for Air Sampling

- Ideal for whole air sampling at ppb-ppm levels.
- Select from Tedlar, ALTEF, and multi-layer foil bags in a wide range of sizes.
- Extensive line of sampling accessories and replacement parts makes it quick and convenient to get fully equipped.

RESTEK Pure Chromatography www.restek.com

Gas Sampling Bags

Cost-Effective Alternatives for Air Sampling

Gas sampling bags are whole air sampling devices useful for sampling part-per-billion (ppb) to part-per-million (ppm) levels of volatile organic compounds (VOCs) and permanent gases. Sampling bags can be a cost-effective alternative to canisters and solvent/thermal desorption tubes and are appropriate for many applications, including industrial hygiene, landfill/biogas, ambient air, indoor air, and stationary source testing.

Compare gas sampling bags to other techniques and then choose the bag that's right for your air sampling program.

Gas Sampling Bags Are a Cost-Effective Alternative to Cans and Tubes for Many Applications

	Canister	Gas Sampling Bag	Solvent/Thermal Desorption Tube
Media Type	whole air	whole air	adsorption
Sensitivity	ppt-ppb	ppb-ppm	ppb-ppm
Technique	passive (no pump)	active	active/passive
Sample Type	grab or integrated	grab or integrated	grab or integrated
Analyte	wide range of VOCs & permanent gases	wide range of VOCs & permanent gases	sorbent specific
Applications	ambient, IAQ, emergency response, IH	ambient, IAQ, emission	ambient, IAQ, IH
Durability	reusable	one time use	solvent: one time use thermal: reusable *(performance is sorbent specific)*
Inertness	excellent	fair	fair
Stability	30 day	48 hrs	varies by analyte
Sample Volume	0.4–15 L	0.5–100 L	varies by analyte
Sampling Time	seconds to days	minutes to hours	minutes to days

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.
- Leak rate should not exceed 0.1" Hg/min.

During Sampling

- Do not fill bags more than 80%.
- 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.
- 3 L/min is a typical flow rate.

After Sampling

- Bags are intended for 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.

Selecting the Right Bag for Your Applications

	Tedlar bags	ALTEF Bags	Multi-Layer Foil Bags
Properties	• Low gas permeation levels for most gases. • High tensile strength. • Withstands temperatures up to 82 °C (180 °F) with polypropylene valves or 202 °C (397 °F) with stainless-steel valves.	• Developed specifically for gas sampling applications. • Chemically inert to most acids, aliphatic and aromatic organic compounds, chlorinated solvents, and alcohols. • Max. operating temp: 82 °C (180 °F).	• Ideal for collecting low molecular weight compounds such as CH_4, H_2S, CO, and CO_2. • Foil layers provide very low permeability and a complete moisture barrier. • Opaqueness protects samples from ultraviolet light. • Max. operating temp: 82 °C (180 °F).
Advantages	• Recommended in many EPA testing methods. • Bags resist puncture in the field. • Only bag available with stainless-steel valves. • Unaffected by the chemical components of commonly sampled gases, such as carbon monoxide, sulfur dioxide, hydrogen sulfide, radon, and mercaptans.	• Suitable for sampling most VOCs and many sulfur compounds. • Low VOC background. • Does not exhibit background levels of dimethylacetamide (DMAC) or phenol as Tedlar material does. • Lower permeability than Tedlar bags to CO_2, N_2, and CH_4.	• The only bag material that adequately holds H_2S. • Ideal for collecting low molecular weight compounds. • Very low permeability to O_2 and CO_2. • Good VOC stability.
Limitations	• Exhibits background levels of dimethylacetamide (DMAC) and phenol. • High permeation rate for CO_2. • Relatively high permeation rate for O_2.	• More permeable to most compounds than Tedlar bags. • Not suitable for sampling ketones and esters in high concentrations (>30%). • Less resistance to UV light than Tedlar material. • Many sulfur compounds should be analyzed within 24 hours.	• Not recommended for collecting low ppm to high ppb VOCs due to background levels from bag materials. • Recommend analyzing within 48 hours after collection for CH_4, H_2S, CO, and CO_2.
Composition	polyvinyl fluoride (PVF) polymer resin	Proprietary polyvinylidene fluoride (PVDF) film	4-layer (60 gauge nylon outer layer; polyethylene; 0.0003" aluminum foil; 0.002" polyethylene inner layer).
Thickness	0.002"	0.003"	0.004"
Tensile Strength	8000 psi	6100 psi	19 lb/in
Max. Pressure	~2 psi (~ 0.14 bar) or ≤80% filled	~2 psi (~ 0.14 bar) or ≤80% filled	~2 psi (~ 0.14 bar) or ≤80% filled
Max. Operating Temp.	Withstands temperatures up to 82 °C (180 °F) with polypropylene valves or 202 °C (397 °F) with stainless-steel valves.	82 °C (180 °F)	82 °C (180 °F)
Specific Gravity	1.7 g/mL	1.78 g/mL	1.09 g/mL
Oxygen Permeability	50 cc/m^2/day	58 cc/m^2/day	0.0078 cc/m^2/day
Water Vapor Permeability	9–57 g/m^2/day	12–15 g/m^2/day	0.0078 g/m^2/day
Carbon Dioxide Permeability	172 cc/m^2/day	172 cc/m^2/day	0.0078 cc/m^2/day

22050

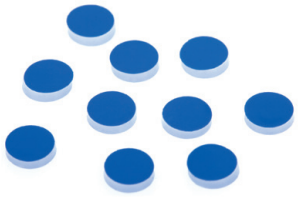
Physical Specifications
Composition: polyvinyl fluoride (PVF) polymer resin
Thickness: 0.002"
Tensile Strength: 8000 psi
Max. Operating Temp.: 82 °C (180 °F) with polypropylene valves or 202 °C (397 °F) with stainless-steel valves
Specific Gravity: 1.7 g/mL
Oxygen Permeability: 50 cc/m²/day
Water Vapor Permeability: 9–57 g/m²/day
Carbon Dioxide Permeability: 172 cc/m²/day

Tedlar Sampling Bags

- Find the bags you need—we offer sizes from 0.5 L to 100 L.
- Lightweight and easy to use.
- Available with polypropylene or stainless-steel valve; choose bags with a septum fitting for syringe sampling or standard spiking.
- Maximum operating temperature: 82 °C (180 °F) with polypropylene valves or 202 °C (397 °F) with stainless-steel valves.

Note: Use only Point Style 5 or H syringe needles.

Dimensions	Modification	Volume	qty.	cat.#
6" x 6"	Polypropylene Valve and Septum Fitting	0.5 L	10-pk.	22049
7" x 7"	Polypropylene Valve and Septum Fitting	1 L	10-pk.	22050
9.5" x 10"	Polypropylene Valve and Septum Fitting	3 L	10-pk.	22051
12" x 12.5"	Polypropylene Valve and Septum Fitting	5 L	10-pk.	22052
11.75" x 22"	Polypropylene Valve and Septum Fitting	10 L	10-pk.	22053
13" x 24"	Polypropylene Valve and Septum Fitting	12 L	10-pk.	22054
17.5" x 24"	Polypropylene Valve and Septum Fitting	25 L	5-pk.	22055
24" x 24.25"	Polypropylene Valve and Septum Fitting	40 L	5-pk.	22056
28.25" x 30.5"	Polypropylene Valve and Septum Fitting	80 L	5-pk.	22057
28" x 36"	Polypropylene Valve and Septum Fitting	100 L	3-pk.	22058
6" x 6"	Stainless-Steel Push/Pull Valve & Septum Fitting	0.5 L	10-pk.	27380
7" x 7"	Stainless-Steel Push/Pull Valve & Septum Fitting	1 L	10-pk.	27381
9.5" x 10"	Stainless-Steel Push/Pull Valve & Septum Fitting	3 L	10-pk.	27382
12" x 12.5"	Stainless-Steel Push/Pull Valve & Septum Fitting	5 L	10-pk.	27383
11.75" x 22"	Stainless-Steel Push/Pull Valve & Septum Fitting	10 L	10-pk.	27384
13" x 24"	Stainless-Steel Push/Pull Valve & Septum Fitting	12 L	10-pk.	27385
17.5" x 24"	Stainless-Steel Push/Pull Valve & Septum Fitting	25 L	5-pk.	27386
24" x 24.25"	Stainless-Steel Push/Pull Valve & Septum Fitting	40 L	5-pk.	27387
28.25" x 30.5"	Stainless-Steel Push/Pull Valve & Septum Fitting	80 L	3-pk.	27388
28" x 36"	Stainless-Steel Push/Pull Valve & Septum Fitting	100 L	3-pk.	27389
6" x 6"	Stainless-Steel Push/Pull Valve Only	0.5 L	10-pk.	27390
7" x 7"	Stainless-Steel Push/Pull Valve Only	1 L	10-pk.	27391
9.5" x 10"	Stainless-Steel Push/Pull Valve Only	3 L	10-pk.	27392
12" x 12.5"	Stainless-Steel Push/Pull Valve Only	5 L	10-pk.	27393
11.75" x 22"	Stainless-Steel Push/Pull Valve Only	10 L	5-pk.	27394
13" x 24"	Stainless-Steel Push/Pull Valve Only	12 L	5-pk.	27395
17.5" x 24"	Stainless-Steel Push/Pull Valve Only	25 L	5-pk.	27396
24" x 24.25"	Stainless-Steel Push/Pull Valve Only	40 L	5-pk.	27397
28.25" x 30.5"	Stainless-Steel Push/Pull Valve Only	80 L	3-pk.	27398
28" x 36"	Stainless-Steel Push/Pull Valve Only	100 L	3-pk.	27399



22104

Replacement Septa for Gas Sampling Bags

Note: Use only Point Style 5 or H syringe needles.

Description	Diameter	Thickness	Used with	qty.	cat.#
Replacement Septa for Gas Sampling Bags*, PTFE-Faced Silicone	4.95 mm (0.195")	1.65 mm (0.065")	Polypropylene Valves	10-pk.	22104-A
Replacement Septa for Gas Sampling Bags, PTFE-Faced Silicone	9.52 mm (0.375")	2.5 mm (0.100")	Stainless-Steel Valves	10-pk.	26471

* Cat.# 22104-A is compatible with gas sampling bags purchased from Restek after June 2019.

VOC Stability in Tedlar Bags

Compound	Recovery (%)	
	Day 1	Day 2
Acetone	99.0	95.0
Acetonitrile	74.0	66.0
Acrylonitrile	90.0	80.0
Allyl chloride	102.0	94.0
Benzene	104.0	98.0
Bromoethane	99.0	100.0
1,3-Butadiene	99.0	95.0
Butane	98.0	94.0
Butyl acetate	104.0	102.0
Carbon tetrachloride	104.0	102.0
Chloroform	98.0	95.0
1,2-Dichloroethane	100.0	97.0
Dichloropropane	105.0	101.0
Ethyl acetate	98.0	96.0
Ethylene	100.0	102.0
Heptane	100.0	100.0
Hexane	101.0	101.0
Isooctane	100.0	97.0
Isopropyl alcohol	101.0	99.0
Methyl ethyl ketone	99.0	98.0
Methyl-*t*-butyl ether	101.0	101.0
Methylene chloride	102.0	97.0
Octane	100.0	97.0
Perchloroethylene	105.0	94.0
Propylene	103.0	104.0
Propylene oxide	96.0	95.0
Tetrahydrofuran	103.0	100.0
Toluene	96.0	92.0
1,1,1-Trichloroethane	104.0	101.0
Trichloroethylene	104.0	103.0
Vinylidene chloride	102.0	100.0
p-Xylene	89.0	83.0

Acceptability criteria: ≥80% recovery at ≥2 days based on EPA Method 0040.

Nitrogen Dioxide Stability in Tedlar Bags

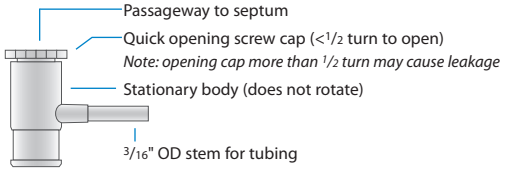
Compound	Recovery (%)	
	Day 1	Day 2
Nitrogen dioxide	54.5	36.4

ALTEF Gas Sampling Bags

- Excellent alternative to Tedlar bags for collection of most VOCs.
- Unlike Tedlar bags, ALTEF bags do not produce background levels of dimethylacetamide (DMAC) or phenol.
- Very low VOC and sulfur background compared to Tedlar bags.
- Not recommended for ketones, acetates, hydrogen sulfide, or permanent gases.
- Durable polyvinylidene fluoride (PVDF) film is resistant to abrasion and chemicals, including most acids and organic compounds.
- Contain no additives, fillers, or pigments.

Get the convenience of having both a hose connection and a syringe port in a single valve!

Polypropylene Combo Valve
- Inert polypropylene
- 3/16" diameter valve stem
- Replaceable PTFE-faced septum



Physical Specifications
Composition: proprietary polyvinylidene fluoride (PVDF) film
Thickness: 0.003"
Tensile Strength: 6100 psi
Max. Operating Temp.: 82 °C (180 °F)
Specific Gravity: 1.78 g/mL
Oxygen Permeability: 58 cc/m²/day
Water Vapor Permeability: 12-15 g/m²/day
Carbon Dioxide Permeability: 172 cc/m²/day

Note: Use only Point Style 5 or H syringe needles.

Dimensions	Modification	Volume	qty.	cat.#
6" x 6"	Polypropylene Combo Valve and Septum	0.5 L	10-pk.	22958
7" x 7"	Polypropylene Combo Valve and Septum	1 L	10-pk.	22959
10" x 10"	Polypropylene Combo Valve and Septum	3 L	10-pk.	22960
12" x 12"	Polypropylene Combo Valve and Septum	5 L	10-pk.	22961
12" x 22"	Polypropylene Combo Valve and Septum	10 L	10-pk.	22962
13" x 24"	Polypropylene Combo Valve and Septum	12 L	10-pk.	26328
18" x 24"	Polypropylene Combo Valve and Septum	25 L	5-pk.	22963
24" x 24.25"	Polypropylene Combo Valve and Septum	40 L	5-pk.	26329
28.25" x 30.5"	Polypropylene Combo Valve and Septum	80 L	3-pk.	26330
28" x 36"	Polypropylene Combo Valve and Septum	100 L	3-pk.	26331

Multi-Layer Foil Gas Sampling Bags

- Good stability for low molecular weight compounds, such as methane, CO, CO_2, and permanent gases.
- Chemically inert with light and moisture protection.
- Not recommended for low ppm VOCs due to background levels.
- Protective 4-layer barrier minimizes gas permeability:
  - 60 gauge nylon (outer layer)
  - Polyethylene
  - 0.0003" aluminum foil
  - 0.002" polyethylene (inner layer)
  - Maximum operating temperature: 82 °C (180 °F).

Physical Specifications
Composition: 4-layer— 60 gauge nylon (outer layer); Polyethylene; 0.0003" aluminum foil; 0.002" polyethylene (inner layer)
Thickness: 0.004"
Tensile Strength: 19 lb/in
Max. Operating Temp.: 82 °C (180 °F)
Specific Gravity: 1.09 g/mL
Oxygen Permeability: 0.0078 cc / m² / day @ 0% RH, 23 °C
Water Vapor Permeability: 0.0078 g / m² / day @ 90% RH, 40 °C
Carbon Dioxide Permeability: 0.0078 cc / m² / day

Note: Use only Point Style 5 or H syringe needles.

Dimensions	Modification	Volume	qty.	cat.#
7" x 7"	Polypropylene Combo Valve and Septum	1 L	5-pk.	22950
10" x 10"	Polypropylene Combo Valve and Septum	3 L	5-pk.	22951
12" x 12"	Polypropylene Combo Valve and Septum	5 L	5-pk.	22952
12" x 22"	Polypropylene Combo Valve and Septum	10 L	5-pk.	22953
13" x 24"	Polypropylene Combo Valve and Septum	12 L	5-pk.	22966
18" x 24"	Polypropylene Combo Valve and Septum	25 L	5-pk.	22967
24" x 24.5"	Polypropylene Combo Valve and Septum	40 L	5-pk.	22968

Application Recommendations for ALTEF and Multi-Layer Foil Gas Sampling Bags

Sulfur Compounds

Compound	Recommended Sampling Bag Material	
	ALTEF	Multi-Layer Foil
n-Butyl mercaptan	✖	✖
tert-Butyl mercaptan	✪	✪
Carbon disulfide*	✔	✖
Carbonyl sulfide	✪	✪
Diethyl disulfide	✖	✖
Diethyl sulfide*	✔	✖
Dimethyl disulfide	✖	✖
Dimethyl sulfide*	✔	✖
2,5-Dimethylthiophene	✖	✖
Ethyl mercaptan*	✔	✪
Ethyl methyl sulfide*	✔	✖
2-Ethylthiophene	✖	✖
Hydrogen sulfide	✖	✪
Isobutyl mercaptan*	✔	✖
Isopropyl mercaptan*	✔	✪
3-Methylthiophene	✖	✖
Methyl mercaptan*	✔	✪
n-Propyl mercaptan*	✔	✪
Tetrahydrothiophene	✖	✖
Thiophene*	✔	✖

✪ = Recommended
✔ = May be suitable
✖ = Not suitable

* ALTEF bags can be used to sample these sulfur compounds if the sample is analyzed within 24 hours.

** Multi-layer foil bags can be used to sample most VOCs but are not recommended for collecting low ppm to high ppb VOCs due to background levels from bag materials.

ALTEF bags are recommended for most VOCs, if analyzed within 48 hours, and for many sulfur compounds, if analyzed within 24 hours.

Multi-layer foil bags are recommended for methane, hydrogen sulfide, carbon monoxide, and carbon dioxide, if analyzed within 48 hours.

VOCs

Compound	Recommended Sampling Bag Material	
	ALTEF	Multi-Layer Foil**
Acetone	✖	✔
Acetonitrile	✖	✔
Acrylonitrile	✖	✔
Allyl chloride	✪	✔
Benzene	✪	✔
Bromoethane	✪	✔
Butyl acetate	✖	✔
Carbon tetrachloride	✪	✔
Chloroform	✪	✔
Carbon dioxide	✪	✔
Carbon monoxide	✪	✔
1,2-Dichloroethane	✪	✔
Dichloropropane	✪	✔
Ethyl acetate	✖	✔
Ethylene	✪	✔
Heptane	✪	✔
Hexane	✪	✔
Isooctane	✪	✔
Isopropyl alcohol	✪	✔
Methane	✪	✔
Methyl ethyl ketone	✖	✔
Methylene chloride	✪	✔
Methyl *tert*-butyl ether	✪	✔
Octane	✪	✔
Perchloroethylene	✪	✔
Propylene	✪	✔
Propylene oxide	✪	✔
Tetrahydrofuran	✪	✔
Toluene	✖	✔
1,1,1-Trichloroethane	✪	✔
Trichloroethylene	✪	✔
Vinylidene chloride	✪	✔
p-Xylene	✖	✔

22118

Vacuum Bag Sampler

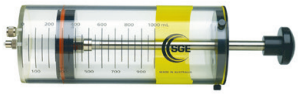
Description	Includes	Certification/Compliance	qty.	cat.#
Vacuum Bag Sampler Model 1062	power adaptor, battery, manual	CE	ea.	22118

Replacement Parts for Vacuum Bag Sampler

22120

Description	qty.	cat.#
Replacement Battery for Vacuum Bag Sampler Model 1062	ea.	22119
Universal Battery Charger for Vacuum Bag Sampler Model 1062 (115/230 VAC)	ea.	22120

SGE Jumbo Syringe



21276

Volume	Vendor Model #	Vendor cat.#	qty.	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

SGE Syringe O-Rings

21278

Volume	Vendor cat.#	qty.	cat.#
500 mL	032527	ea.	21278
1000 mL	032532	ea.	21279

Rocker Vacuum Pumps

27424

Flow Capacity	Instrument	Used with	Voltage	qty.	cat.#
21 L/min	Rocker 300		AC110 V, 60 Hz	ea.	27424
18 L/min	Rocker 300		AC220 V, 50 Hz	ea.	27425
25 L/min	Rocker 300DC	For use with automotive type 12 V battery.	DC Power (12 V)	ea.	27447
37 L/min	Rocker 400		AC110 V, 60 Hz	ea.	27432
34 L/min	Rocker 400		AC220 V, 50 Hz	ea.	27433
23 L/min	Rocker 410		AC110 V, 60 Hz	ea.	27434
20 L/min	Rocker 410		AC220 V, 50 Hz	ea.	27435
28 L/min	Rocker 500		AC110 V, 60 Hz	ea.	27436
23 L/min	Rocker 500		AC220 V, 50 Hz	ea.	27437

Learn more at **www.restek.com/air**

RESTEK
Pure Chromatography

Questions? Contact us or your local Restek representative (www.restek.com/contact-us).

www.restek.com

Lit. Cat.# EVSS1335C-UNV