



THE NEXT GENERATION OF SKC
SAMPLE BAGS

NEW high-performance materials for target compounds





SKC — A Name That Stands for Over 30 Years of Quality Sample Bags

Since 1962, SKC has manufactured quality air sampling equipment and media for occupational and environmental health and safety professionals worldwide. SKC quality products include:

- Sample pumps
- Sorbent tubes
- Sample bags
- Passive samplers
- Size-selective samplers
- Filters



SKC Sample Bags

SKC, the world leader in sampling technologies, produced its first sample bag in the late 1970s. The bag was made of Tedlar® film and soon became the classic sample bag for VOCs. Over the last 30 years, SKC Tedlar bags have been the number one choice of professionals. In March 2009, DuPont announced its plan to "phase out support" for Tedlar film in the sample bag market. In its place, SKC introduces new high-performance materials — SamplePro FlexFilm, SamplePro PVDF (also sold as Kynar®, Solef®, and Hylar®), and FlexFoil PLUS — the next generation of sample bags. These materials provide new standards of performance for storage stability and background in bag sampling applications.

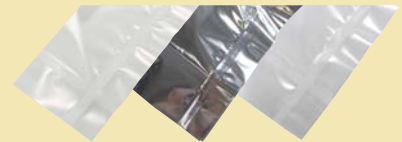
A Word About Fittings

SKC sample bag fittings are not "off-the-shelf" industrial fittings, but are designed specifically for air sampling. The fittings, offered in a choice of materials, feature an efficient design that combines the hose/valve and septum fitting into one lightweight fitting.



SKC Bag Materials and Construction

SKC manufactures its sample bags out of clean top-grade films including SamplePro FlexFilm (SKC proprietary film), FlexFoil PLUS, SKC SamplePro PVDF, and FluoroFilm (FEP). Seams are strong, evenly sealed, and leak tested.



SKC Bag Availability and Price

SKC offers the largest selection of bag materials and sizes. Bags are stocked for immediate delivery. SKC maintains the lowest bag prices.

SKC — The Future in Sample Bags

SKC has been manufacturing quality sample bags for over 30 years. When Dupont announced its discontinuation of Tedlar bags for air sampling, SKC was able to offer immediately SamplePro FlexFilm bags — an alternative to Tedlar that has the advantage of being more economical. SKC continues to actively research sample bag materials and applications to ensure that the bag you need is available when you need it. OEHS professionals rely on SKC.



Target the **Right Bag Material** for Your Application

SamplePro FlexFilm

- Low VOC background
- Good stability for a wide variety of VOCs
- Longer storage stability for many hydrocarbons, compared to other bag materials
- Good stability for CO, CO₂, methane, and SF₆
- Acceptable stability for some sulfur compounds (*see table on page 4*)
- Economically priced

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A high background for hydrogen sulfide and carbonyl sulfide make FlexFilm unsuitable for sampling these specific compounds. FlexFilm properties require the bags to be kept flat during transport and storage.

SamplePro PVDF

- Low VOC and sulfur background
- Good stability for some VOCs and many hydrocarbons
- Good stability for CO, CO₂, methane, and SF₆
- Good 24-hour storage stability for some sulfur compounds (*see table on page 8*)
- Also sold as Kynar, Solef, and Hylar

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SamplePro PVDF film, also sold as Kynar, Solef, and Hylar, does not show good VOC stability for ketones and acetates.

FlexFoil PLUS

- Low backgrounds
- Now suitable for VOCs
- Good VOC storage stability
- The only bag that effectively holds hydrogen sulfide!
- Good stability for low molecular weight compounds such as CO, CO₂, methane, and hydrogen
- Good 48-hour stability for hydrogen sulfide, carbonyl sulfide, methyl and ethyl mercaptan, and sulfur hexafluoride (SF₆)
- Ideal for light-sensitive compounds
- Good moisture barrier properties

Pages 6-7

FluoroFilm FEP

- Very low VOC and sulfur background
- Inert and mechanically strong

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FluoroFilm exhibits poor storage stability for most VOCs and sulfur compounds. Analysis within 24 hours or less is necessary for many compounds.

SamplePro FlexFilm Air Sample Bags

Economical Tedlar Alternative for VOCs



- Cost effective alternative to Tedlar for performance
- Lower total VOC background than Tedlar
- Superior storage stability for organic vapors
 - See 2-day storage stability data below
- Minimal adsorption
- Choice of fittings
 - **Single combined polypropylene** hose/valve and septum for economy and light weight
 - **Dual stainless steel** for sampling flexibility
- Stocked in a variety of sizes
- Custom bags available

SKC **SamplePro**[®] FlexFilm bags are constructed of 3-mil SKC proprietary material ideally suited for collecting air samples of VOCs. Manufactured exclusively for SKC, FlexFilm features lower total VOC background than Tedlar and shows the same sample stability for VOCs as seen with Tedlar. When combined with SKC quality fittings, the result is an economical sample bag with lower background levels and superior storage stability for collected compounds.

Storage Stability of Collected Compounds in FlexFilm Bags*

Acceptability criteria: ≥ 80% recovery at ≥ 2 days based on EPA Method 0040 as tested in SKC Laboratories

| Compound | % Recovery | |
|-----------------------|--------------------|--------------------|
| | Day 1 | Day 2 |
| Acetone | 96.7 | 88.9 |
| Acetonitrile | 69.0 | 55.1 |
| Acrylonitrile | 76.1 | 62.2 |
| Allyl chloride | 95.6 | 91.9 |
| Benzene | 96.0 | 95.2 |
| Bromoethane | 95.2 | 90.9 |
| Butyl acetate | 85.1 | 91.8 |
| n-Butyl mercaptan | 69.5 | 50.0 |
| tert-Butyl mercaptan | 92.5 | 92.5 |
| Carbon disulfide | 80.0 | 74.1 |
| Carbon tetrachloride | 101.0 | 94.3 |
| Carbonyl sulfide | 114.3 [‡] | 122.0 [‡] |
| Chloroform | 98.7 | 95.9 |
| Carbon dioxide | 100.0 | 90.0 |
| Carbon monoxide | 100.0 | 100.0 |
| 1,2-Dichloroethane | 91.5 | 82.9 |
| Dichloropropane | 86.2 | 76.7 |
| Diethyl disulfide | 68.2 | 54.1 |
| Diethyl sulfide | 88.2 | 83.9 |
| Dimethyl disulfide | 77.3 | 69.3 |
| Dimethyl sulfide | 90.9 | 89.8 |
| 2,5-Dimethylthiophene | 68.6 | 54.7 |
| Ethyl acetate | 94.9 | 95.4 |
| Ethyl mercaptan | 81.3 | 76.9 |
| Ethyl methyl sulfide | 88.2 | 83.9 |
| 2-Ethylthiophene | 72.2 | 60.0 |
| Ethylene | 104.0 | 100.0 |

| Compound | % Recovery | |
|----------------------------------|-------------------|-------------------|
| | Day 1 | Day 2 |
| Heptane | 96.7 | 106.0 |
| Hexane | 99.0 | 98.9 |
| Hydrogen sulfide | 7.8 [‡] | 2.2 [‡] |
| Isobutyl mercaptan | 81.3 | 69.2 |
| Isooctane | 100.0 | 97.9 |
| Isopropyl alcohol | 99.1 | 91.7 |
| Isopropyl mercaptan | 89.3 | 86.0 |
| Methane | 95.8 | 92.5 |
| Methyl ethyl ketone (2-Butanone) | 96.2 | 95.8 |
| Methylene chloride | 93.2 | 87.2 |
| Methyl mercaptan | 78.9 [‡] | 67.8 [‡] |
| Methyl tert-butyl ether | 99.2 | 99.1 |
| 3-Methylthiophene | 75.9 | 65.5 |
| Octane | 104.0 | 98.7 |
| Perchloroethylene | 94.8 | 84.9 |
| Propylene | 100.0 | 99.0 |
| Propylene oxide | 93.3 | 90.1 |
| n-Propyl mercaptan | 80.0 | 70.0 |
| Tetrahydrofuran | 96.7 | 93.6 |
| Tetrahydrothiophene | 79.6 | 70.5 |
| Thiophene | 81.6 | 75.9 |
| Toluene | 107.0 | 92.9 |
| 1,1,1-Trichloroethane | 94.9 | 93.6 |
| Trichloroethylene | 92.4 | 82.9 |
| Vinylidene chloride | 95.6 | 91.8 |
| p-Xylene | 85.9 | 82.7 |

* Bags stored at ambient temperatures during study

‡ Blank corrected

FlexFilm and Sulfur Compounds

SamplePro FlexFilm bags provide acceptable storage stability for some sulfur compounds (see table at right).




For bag sampling pumps, see page 13.



Tech Tips

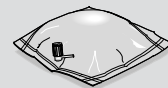
FlexFilm Bags with Single Polypropylene Fitting

| Maximum Capacity (liter) | Cat. No. | Qty. | Fitting |
|--------------------------|-----------|------|---|
| 0.5 | 236-006 | 10 |  |
| | 236-006A | ea | |
| 1 | 236-001 | 10 | |
| | 236-001A | ea | |
| 3 | 236-002 | 10 | |
| | 236-002A | ea | |
| 5 | 236-005 | 10 | |
| | 236-005A | ea | |
| 8 | 236-004 | 10 | |
| 10 | 236-003 | 10 | |
| | 236-003A | ea | |
| 25 | 236-007 | 5 | |
| 40 | 236-040 | 5 | |
| 80 | 236-080 | 5 | |
| Replacement Septa | 232-01-RS | 10 | |

- ▶ Bags are designed for single use only.
- ▶ Do not use FlexFilm bags at temperatures above 140 F (60 C).
- ▶ In addition to bag material temperature tolerance, maximum bag operating temperature can also depend on O-ring or fitting temperature tolerances. Check individual bag operating instructions for maximum operating temperature. See page 9 for related Tech Tip.
- ▶ Store bags flat. Do not roll or crease bags during storage.
- ▶ Do not ship bags by air unless the cargo cabin is pressurized. Check appropriate regulations.
- ▶ Do not fill bags > 80%.




Incorrect



Correct

FlexFilm Bags with Dual Stainless Steel Fittings

| Maximum Capacity (liter) | Cat. No. | Qty. | Fitting |
|--------------------------|----------|------|--|
| 0.5 | 237-02 | 10 |  |
| | 237-02A | ea | |
| 1 | 237-01 | 10 | |
| | 237-01A | ea | |
| 3 | 237-03 | 10 | |
| | 237-03A | ea | |
| 5 | 237-05 | 10 | |
| | 237-05A | ea | |
| 10 | 237-08 | 10 | |
| | 237-08A | ea | |
| 25 | 237-25 | 5 | |
| 40 | 237-40 | 5 | |
| 80 | 237-80 | 5 | |
| Replacement Septa | 231-9-04 | 10 | |

SamplePro FlexFilm as Alternative to Tedlar

An AIHce 2010 poster showed SKC SamplePro FlexFilm bags to be an ideal alternative to Tedlar.

- Fourteen compounds tested in FlexFilm showed recoveries of > 80% after two days of ambient storage; the same compounds showed very similar results in Tedlar.
- A side-by-side Tedlar and FlexFilm background study showed FlexFilm has three times lower VOC background than Tedlar.
- FlexFilm exhibits higher levels of hydrogen sulfide and carbonyl sulfide background than Tedlar.

See FlexFilm storage stability data on page 4 and FlexFilm Evaluation Poster at www.skcinc.com/instructions/SKC_Bag_Poster.pdf.

The Unique Properties of SamplePro FlexFilm

| | |
|------------------------------|----------------------------|
| Water Vapor Transmission: | 13.5 g/m ² x d |
| Oxygen Permeability: | 52.5 cc/m ² x d |
| Carbon Dioxide Permeability: | 171 cc/m ² x d |
| Material Thickness: | 3 mil |
| Temperature Resistance: | 140 F (60 C) |



More Information

Need bags for special applications?
see www.skcinc.com/bags.asp

FlexFoil PLUS Gas Sample Bags

Now Also Suitable for Low-level VOCs



- Low backgrounds
 - New proprietary cleaning process allows for low-level (ppb) VOC detection
- Good VOC storage stability
- The only bag that effectively holds H₂S for 2 days!
- Good stability for low molecular weight compounds such as CO, CO₂, methane, and hydrogen
- Good 48-hour stability for hydrogen sulfide, carbonyl sulfide, methyl and ethyl mercaptan, and sulfur hexafluoride (SF₆)
- Strong, flexible, evenly sealed 4-ply (5-mil) material
 - Light and moisture-proof
- Choice of all-in-one polypropylene or stainless steel hose/valve and septum fittings
- Stocked in a variety of sizes; custom bags available

Durable four-ply SKC FlexFoil® PLUS sample bags are the strong choice for many sampling applications including VOCs, sulfur, and low molecular weight compounds. Light and moisture-proof, FlexFoil PLUS bags are a good choice for compounds such as hydrogen sulfide that are unstable when collected in other bag materials. Research shows good stability for VOCs and sulfur compounds, including SF₆.



Storage Stability of Collected Compounds in FlexFoil PLUS Bags[§]

Acceptability criteria: ≥ 80% recovery at ≥ 2 days based on EPA Method 0040 as tested in SKC Laboratories

| Compound | % Recovery | |
|------------------------------------|------------|--------|
| | Day 1 | Day 2 |
| Acetone | 99.0 | 97.8 |
| Acetonitrile | 94.2 | 84.5 |
| Acrylonitrile | 98.2 | 99.5 |
| Allyl chloride | 98.5 | 95.6 |
| Benzene | 93.1 | 98.2 |
| Bromoethane | 95.2 | 98.0 |
| Butyl acetate | 88.1 | 88.7 |
| n-Butyl mercaptan [‡] | 47.8 | 50.0 |
| tert-Butyl mercaptan | 82.2 | 88.9 |
| Carbon dioxide | 99.0 | 101.0 |
| Carbon disulfide [‡] | 58.9 | 54.4 |
| Carbon monoxide | 100.0 | 100.0 |
| Carbon tetrachloride | 99.1 | 95.0 |
| Carbonyl sulfide | 96.9* | 106.0* |
| Chloroform | 96.2 | 97.1 |
| 1,2-Dichloroethane | 92.0 | 88.0 |
| Dichloropropane | 99.3 | 98.5 |
| Diethyl disulfide [‡] | 11.1 | 12.2 |
| Diethyl sulfide [‡] | 25.6 | 13.3 |
| Dimethyl disulfide [‡] | 42.2 | 44.4 |
| Dimethyl sulfide | 81.4 | 74.4 |
| 2,5-Dimethylthiophene [‡] | 14.0 | 15.5 |
| Ethyl acetate | 100.0 | 97.3 |
| Ethyl mercaptan | 92.1 | 97.8 |
| Ethyl methyl sulfide [‡] | 52.2 | 40.0 |
| Ethylene | 108.0 | 94.0 |
| 2-Ethylthiophene [‡] | 17.8 | 17.8 |

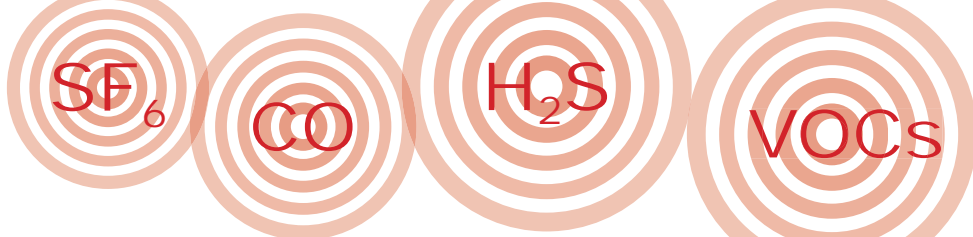
| Compound | % Recovery | |
|----------------------------------|------------|-------|
| | Day 1 | Day 2 |
| Heptane | 99.2 | 101.0 |
| Hexane | 95.8 | 99.4 |
| Hydrogen sulfide | 104.0 | 102.0 |
| Isobutyl mercaptan [‡] | 62.2 | 64.4 |
| Isooctane | 87.5 | 86.1 |
| Isopropyl alcohol | 101.0 | 100.0 |
| Isopropyl mercaptan | 92.9 | 98.8 |
| Methane | 99.0 | 100.0 |
| Methyl ethyl ketone (2-Butanone) | 96.5 | 101.0 |
| Methylene chloride | 98.7 | 101.0 |
| 3-Methylthiophene [‡] | 32.0 | 32.0 |
| Methyl mercaptan | 93.4 | 102.0 |
| Methyl tert-butyl ether | 92.0 | 88.0 |
| Octane | 98.4 | 93.1 |
| Perchloroethylene | 85.3 | 82.4 |
| n-Propyl mercaptan | 77.8 | 82.2 |
| Propylene | 98.6 | 97.9 |
| Propylene oxide | 102.0 | 101.0 |
| Tetrahydrofuran | 101.0 | 99.3 |
| Tetrahydrothiophene [‡] | 0 | 0 |
| Thiophene [‡] | 61.1 | 62.2 |
| Toluene | 90.5 | 91.5 |
| 1,1,1-Trichloroethane | 86.5 | 84.6 |
| Trichloroethylene | 93.7 | 94.6 |
| Vinylidene chloride | 98.3 | 99.5 |
| p-Xylene | 97.0 | 89.0 |

[‡] Sample degradation begins within 3 hours; compound should be analyzed as soon as possible or use alternative method.
[§] Polypropylene and stainless steel fittings were used in this study. * Blank corrected




More Information


Visit www.skcin.com/instructions/1805.pdf.



FlexFoil PLUS Bags with Single Polypropylene Fitting

| Maximum Capacity (liter) | Cat. No. | Qty. | Fitting |
|--------------------------|-------------------|----------|---|
| 1 | 252-01 252-01A | 10 ea |  |
| 3 | 252-03 252-03A | 10 ea | |
| 5 | 252-05 | 10 | |
| 10 | 252-10 | 10 | |
| 25 | 252-25 | 5 | |
| 50 | 252-50 | 5 | |
| Replacement Septa | 232-01-RS | 10 | |

FlexFoil PLUS Bags with Single Stainless Steel Fitting

| Maximum Capacity (liter) | Cat. No. | Qty. | Fitting |
|--------------------------|-------------------|----------|---|
| 1 | 253-01 253-01A | 10 ea |  |
| 3 | 253-03 253-03A | 10 ea | |
| 5 | 253-05 | 10 | |
| 10 | 253-10 | 10 | |
| 25 | 253-25 | 5 | |
| 50 | 253-50 | 5 | |
| Replacement Septa | 233-01-RS | 10 | |

ABOUT

FlexFoil PLUS Sample Bag Applications

- Biogas and landfill gas (LFG) sampling
- CO₂ - OSHA ID-172
- CO₂ - NIOSH 6603
- CO - OSHA ID-210*
- Sulfur compounds
- VOCs
- Pollution level monitoring
- Site sampling/mobile surveys
- Breath analysis
- Calibration gas transfer
- Calibration mixtures
- Leak/spill exposure assessment
- Indoor air studies (CO, CO₂, SF₆)


Specifies 5-layer foil bags. SKC 4-ply FlexFoil PLUS bags hold 100 ppm CO for 5 days without loss. See www.skcinc.com/instructions/1706.pdf.

FlexFoil PLUS Breath-gas Analysis Bags

A *Journal of Chromatography B* article identified SKC FlexFoil PLUS sample bags as the best choice for storing volatile sulfur compounds (VSCs)—important biomarkers in human breath—for up to 24 hours. For an abstract of the article, go to <http://dx.doi.org/10.1016/j.jchromb.2008.12.003>.



FlexFoil PLUS Bags for Breath-gas Analysis

| Maximum Capacity (liter) | Cat. No. | Qty. | Fitting |
|--------------------------|----------|------|---|
| 1 | 239-01 | 3 |  |
| 3 | 239-03 | 3 | |

Select a Fitting

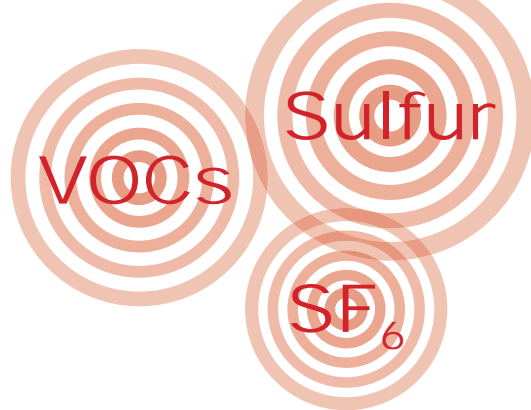
SKC sample bags are stocked with a choice of fitting to meet your applications. SKC bag fittings are not “off-the-shelf” industrial fittings, but are designed specifically for air sampling. Choose from SKC quality fittings including dual stainless steel or all-in-one single polypropylene, stainless steel, or PTFE fittings that combine the hose/valve and septum into one lightweight fitting.



For bag sampling pumps, see page 13.

SamplePro PVDF Air Sample Bags

Tedlar Alternative for VOCs and Sulfur Compounds



High-grade PVDF

- Low VOC and sulfur background
- Also sold as Kynar, Solef, and Hylar

Good stability for

- VOCs
- CO, CO₂, methane, and SF₆
- Some sulfur compounds up to 24 hours

Tough and strong 2-mil material

Tough, durable SamplePro PVDF bags are made of transparent high-grade polyvinylidene (PVDF) film. With low VOC and sulfur background levels, SamplePro PVDF bags can hold some sulfur compounds for analysis within 24 hours, some VOCs up to two days, and CO, CO₂, methane, and sulfur hexafluoride (SF₆). Choose SamplePro PVDF bags, also sold as Kynar, Solef, and Hylar, as an alternative to Tedlar.

Storage Stability of Collected VOCs in SamplePro PVDF Bags

Acceptability criteria: ≥ 80% recovery at ≥ 2 days based on EPA Method 0040 as tested in SKC Laboratories

| Compound | % Recovery | |
|----------------------|------------|-------|
| | Day 1 | Day 2 |
| Acetone | 81.6 | 69.8 |
| Acetonitrile | 55.0 | 36.3 |
| Acrylonitrile | 59.0 | 54.1 |
| Allyl chloride | 95.7 | 90.8 |
| Benzene | 94.9 | 93.9 |
| Bromoethane | 94.5 | 95.4 |
| Butyl acetate | 71.6 | 59.6 |
| Carbon tetrachloride | 99.0 | 95.3 |
| Chloroform | 97.5 | 95.4 |
| Carbon dioxide | 100.0 | 100.0 |
| Carbon monoxide | 100.0 | 90.0 |
| 1,2-Dichloroethane | 84.0 | 80.0 |
| Dichloropropane | 101.0 | 99.9 |
| Ethyl acetate | 83.5 | 74.5 |
| Ethylene | 101.0 | 104.0 |
| Heptane | 93.0 | 86.9 |
| Hexane | 97.3 | 101.0 |

| Compound | % Recovery | |
|-------------------------|------------|-------|
| | Day 1 | Day 2 |
| Isooctane | 99.1 | 96.9 |
| Isopropyl alcohol | 97.4 | 90.5 |
| Methane | 99.9 | 100.8 |
| MEK (2-Butanone) | 70.4 | 63.3 |
| Methylene chloride | 101.0 | 94.5 |
| Methyl tert-butyl ether | 96.0 | 98.0 |
| Octane | 105.0 | 91.0 |
| Perchloroethylene | 93.0 | 87.3 |
| Propylene | 100.8 | 97.1 |
| Propylene oxide | 91.8 | 84.4 |
| Sulfur hexafluoride | 96.8 | 92.0 |
| Tetrahydrofuran | 91.8 | 84.8 |
| Toluene | 77.8 | 76.2 |
| 1,1,1-Trichloroethane | 96.7 | 94.6 |
| Trichloroethylene | 95.1 | 89.1 |
| Vinylidene chloride | 98.8 | 96.2 |
| p-Xylene | 69.0 | 49.0 |

Storage Stability of Collected Sulfur Compounds in SamplePro PVDF Bags*


Acceptability criteria: ≥ 80% recovery at ≥ 2 days based on EPA Method 0040 as tested in SKC Laboratories

| Compound | % Recovery | |
|-----------------------|-------------------|-------------------|
| | Day 1 | Day 2 |
| n-Butyl mercaptan | 62.5 | 39.8 |
| tert-Butyl mercaptan | 96.8 | 85.0 |
| Carbon disulfide | 88.3 | 77.7 |
| Carbonyl sulfide | 93.3 [†] | 80.0 [†] |
| Diethyl disulfide | 53.3 | 36.7 |
| Diethyl sulfide | 84.2 | 71.6 |
| Dimethyl disulfide | 77.3 | 59.1 |
| Dimethyl sulfide | 89.1 | 78.3 |
| 2,5-Dimethylthiophene | 48.9 | 33.3 |
| Ethyl mercaptan | 88.0 | 75.0 |
| Ethyl methyl sulfide | 93.3 | 78.9 |
| 2-Ethylthiophene | 65.1 | 45.8 |
| Hydrogen sulfide | 73.1 | 46.2 |
| Isobutyl mercaptan | 81.5 | 62.0 |
| Isopropyl mercaptan | 90.4 | 77.7 |
| 3-Methylthiophene | 67.5 | 50.6 |
| Methyl mercaptan | 87.0 | 73.9 |
| n-Propyl mercaptan | 84.6 | 64.8 |
| Tetrahydrothiophene | 71.6 | 53.4 |
| Thiophene | 80.7 | 64.8 |


* It is recommended that analysis be performed within 24 hours when collecting sulfur compounds in sample bags.

† Blank corrected

SamplePro PVDF Bags with Single Polypropylene Fitting

| Maximum Capacity (liter) | Cat. No. | Qty. | Fitting |
|--------------------------|----------|------|---|
| 1 | 247-01 | 10 |  |
| 3 | 247-03 | 10 | |
| 5 | 247-05 | 10 | |
| 10 | 247-10 | 10 | |
| 25 | 247-25 | 5 | |

SamplePro PVDF Bags with Dual Stainless Steel Fittings

| Maximum Capacity (liter) | Cat. No. | Qty. | Fitting |
|--------------------------|----------|------|---|
| 1 | 248-01 | 10 |  |
| 3 | 248-03 | 10 | |
| 5 | 248-05 | 10 | |
| 10 | 248-10 | 10 | |
| 25 | 248-25 | 5 | |

0.5, 25, 50, 75, and 100-liter SamplePro PVDF bags are available. Contact SKC.

FluoroFilm FEP Air Sample Bags

For Low-level Sampling with Analysis in < 1 Day

VOCS

- ▶ FluoroFilm FEP (fluorinated ethylene propylene) is the most chemically inert of all bag material
- ▶ Very low VOC and sulfur background
- ▶ Choice of all-in-one PTFE or stainless steel hose/valve and septum fittings
- ▶ Mechanically strong 2-mil FEP — resists impact and tearing
- ▶ Custom bags available

Storage Stability of Collected Compounds in FluoroFilm Bags

Acceptability criteria: ≥ 80% recovery at ≥ 2 days based on EPA Method 0040 as tested in SKC Laboratories


| Compound | % Recovery | |
|----------------------|------------|-------|
| | Day 1 | Day 2 |
| Acetone | 89.0 | 85.0 |
| Acetonitrile | 65.0 | 42.0 |
| Acrylonitrile | 77.0 | 59.0 |
| Allyl chloride | 92.0 | 89.0 |
| Benzene | 93.0 | 79.0 |
| Bromoethane | 88.0 | 86.0 |
| Butyl acetate | 72.0 | 66.0 |
| Carbon dioxide | 90.0 | 50.0 |
| Carbon monoxide | 90.0 | 50.0 |
| Carbon tetrachloride | 95.0 | 91.0 |
| Chloroform | 96.0 | 93.0 |
| 1,2-Dichloroethane | 89.0 | 79.0 |
| Dichloropropane | 90.0 | 86.0 |
| Ethyl acetate | 94.0 | 94.0 |
| Ethylene | 99.0 | 94.0 |
| Heptane | 88.0 | 87.0 |
| Hexane | 98.0 | 95.0 |

| Compound | % Recovery | |
|----------------------------------|------------|-------|
| | Day 1 | Day 2 |
| Isooctane | 97.0 | 96.0 |
| Isopropyl alcohol | 102.0 | 98.0 |
| Methane | 84.1 | 71.5 |
| Methyl ethyl ketone (2-Butanone) | 90.0 | 83.0 |
| Methylene chloride | 84.0 | 77.0 |
| Methyl tert-butyl ether | 99.0 | 97.0 |
| Octane | 91.0 | 84.0 |
| Perchloroethylene | 81.0 | 69.0 |
| Propylene | 97.0 | 91.0 |
| Propylene oxide | 94.0 | 89.0 |
| Tetrahydrofuran | 90.0 | 88.0 |
| Toluene | 81.0 | 74.0 |
| 1,1,1-Trichloroethane | 100.0 | 97.0 |
| Trichloroethylene | 80.0 | 69.0 |
| Vinylidene chloride | 96.0 | 92.0 |
| p-Xylene | 76.0 | 65.0 |


Tech Tips

- ▶ Use only PTFE tubing for bag sampling to prevent sample loss through adsorption to the tubing's inner surface. See page 13 for tubing
- ▶ Sample bag maximum operating temperature can be dictated by the temperature tolerances of the bag material, fitting material, and/or fitting components such as O-rings.
 - SKC single stainless steel, dual stainless steel, and PTFE fittings: Maximum temperature is 225 F (107.2 C) due to the fitting O-ring.
 - SKC single polypropylene fitting: Maximum temperature is 200 F (93.3 C) due to the fitting material.
 - SKC FlexFilm sample bags: Maximum temperature is 140 F (60 C) due to the bag material.

FluoroFilm Bags with Single Stainless Steel Fitting

| Maximum Capacity (liter) | Cat. No. | Qty. | Fitting |
|--------------------------|-----------|------|---|
| 0.5 | 243-02 | 5 |  |
| 1 | 243-01 | 5 | |
| 3 | 243-03 | 5 | |
| Replacement Septa | 233-01-RS | 10 | |

FluoroFilm Bags with Single PTFE Fitting

| Maximum Capacity (liter) | Cat. No. | Qty. | Fitting |
|--------------------------|-----------|------|---|
| 0.5 | 240-02 | 5 |  |
| 1 | 240-01 | 5 | |
| 3 | 240-03 | 5 | |
| Replacement Septa | 233-01-RS | 10 | |



CUSTOM AIR SAMPLE BAGS

MADE TO YOUR SPECIFICATIONS

Need a special bag size?

SKC provides single or multiple-cell sample bags in the size you need.

Need a specific combination of fitting and bag material?

SKC offers a wide choice of fittings and bag materials that can be combined to your specifications.

Fittings:

- Stainless Steel
- Polypropylene
- Nickel-plated brass
- PTFE
- PVC

Sample bag materials:

- SamplePro FlexFilm (3 mil)
- FluoroFilm FEP (2 mil)
- 4-ply FlexFoil PLUS (5 mil)
- SamplePro PVDF (2 mil)
(also sold as Kynar, Solef, and Hylar)



Indoor air



Biogas/landfill
gas sampling



Soil vapor



Beverage testing

Contact SKC today for your custom sample bags!
www.skcin.com/custom/85177.pdf

Vac-U-Tube

For Quick Bag Samples Without a Pump

- ▶ No electronic pump required
- ▶ Setup takes less than 20 seconds
- ▶ Convenient for testing monitoring wells

The Vac-U-Tube acrylic syringe with removable face plate allows a specially designed 0.7-liter sample bag to be placed inside. The bag is attached to the face plate that is then secured to the syringe. Sample by pulling the plunger or purge by pushing the plunger. The Vac-U-Tube can be used for headspace soil gas sampling.

| Description | Cat. No. | Qty. |
|--|--------------------|--------------------|
| Vac-U-Tube includes Vac-U-Tube and carry case, <i>requires either sample bag below (not included)</i> | 231-945 | ea |
| Vac-U-Tube Bags , 0.7 liter | SamplePro PVDF | 247-945A 10 |
| | SamplePro FlexFilm | 236-945A 10 |

PTFE Tubing

Inert Tubing for Bag Sampling

- ▶ Heat and corrosion resistant
- ▶ Chemically inert
- ▶ Strong

Chemically inert SKC PTFE tubing is ideal for bag sampling to prevent sample loss through adsorption to the tubing's inner surface. SKC offers PTFE tubing with different diameters to fit over or inside bag fittings.

| PTFE Tubing | Cat. No. | Length |
|--|-----------------|--------------|
| Fits over all SKC bag fittings and Grab Air pump fittings 3/16-inch ID, 1/4-inch OD | 231-9-23 | 10 ft |
| Fits inside bag fitting 1/16-inch ID, 1/8-inch OD | 231-9-21 | 10 ft |
| Fits Vac-U-Chamber sample inlet and 222 pump fittings 1/4-inch ID, 5/16-inch OD | 231-937 | 10 ft |
| | 231-924 | 50 ft |
| Twin Port Pocket Pump Tubing Adapter Kit Includes two lengths of silicone tubing: 1/8-inch ID, 1/4-inch OD for bag fitting and 3/16-inch ID, 3/8-inch OD for pump fitting; use with 231-9-23 PTFE tubing (above) | 231-926 | |

Tech Tip

- ▶ Use only PTFE tubing for bag sampling to prevent sample loss through adsorption to the tubing's inner surface.

Vac-U-Chamber

Eliminates Pump Contamination During Bag Sampling



Vapor Intrusion Monitoring

Soil Gas Sampling

Soil gas sampling can identify underground contamination and trace the source, extent, and movement of pollutants.

U.S. EPA Standard Operating Procedure (SOP) # 2042 for Soil Gas Sampling specifies sample bags as containers inside an airtight chamber (e.g., Vac-U-Chamber). A sample pump creates negative pressure in the chamber, causing soil gas to enter into the bag directly. Stainless steel canisters are an alternative. Samples are analyzed in the field with direct-reading instruments and/or in a qualified laboratory.

ASTM D5314-92 Standard Guide for Soil Gas Monitoring in the Vadose Zone recommends collection by a whole air/sorbent method or a bulk soil/water sample for sampling headspace. Per the standard, the whole air/sorbent method is preferable because headspace sampling has significant disadvantages:

- Headspace is not true soil gas; therefore, it is not representative of the true vadose zone.
- It is a poor method for determining compounds that are more volatile.

- ▶ **Allows direct filling of air sample bags**
 - Uses negative pressure provided by most personal air sample pumps
 - Designed to contain SKC sample bags
- ▶ **Rugged, heavy-duty construction**
 - Will not collapse under vacuum
- ▶ **Two sizes available**
 - Large for sample volumes up to 8 liters
 - Small for sample volumes up to 1 liter
- ▶ **Protects from contamination**
 - Sample does not pass through the pump
 - Inert surfaces eliminate sample contamination
- ▶ **Multiple applications**
 - Groundwater testing
 - Soil gas sampling
 - Stack sampling
 - Ventilation studies
 - Hazmat testing
 - Ambient or indoor air
 - EPA Method 0040

For Convenient, Reliable Bag Sampling

The SKC Vac-U-Chamber is a rigid air sample box that allows sample bags to be filled directly by using negative pressure provided by most personal air sample pumps. Because the sample does not pass through the pump, both sample and pump contamination are eliminated. All surfaces in contact with the sample are constructed of inert materials. The Vac-U-Chamber's rigid walls will not collapse under vacuum conditions.

Large Vac-U-Chamber

| Description | Cat. No. |
|--|--|
| Complete Vac-U-Chamber Kit includes PCXR4 sample pump, single PowerFlex charger with cable, large Vac-U-Chamber, and 10 SamplePro FlexFilm sample bags (Cat. No. 236-004) | 100-240 V 224-4115 |
| Large Vac-U-Chamber only with stainless steel fittings (supplied without pump), suitable for use with SKC 8-liter sample bags | 231-939 |
| 8-liter Sample Bag with single polypropylene fitting, for use with large Vac-U-Chamber (Cat. No. 231-939), pk/10 | SamplePro FlexFilm 236-004 SamplePro PVDF 247-939 FlexFoil PLUS 252-08 |

Small Vac-U-Chamber

| Description | Cat. No. |
|--|---|
| Complete Vac-U-Chamber Kit includes PCXR4 sample pump, single PowerFlex charger with cable, small Vac-U-Chamber, and 10 SamplePro FlexFilm sample bags (Cat. No. 236-001) | 100-240 V 224-4124 |
| Small Vac-U-Chamber only with polypropylene fittings (supplied without pump), suitable for use with 1-liter sample bags | 231-940 |
| 1-liter Sample Bag with single polypropylene fitting, for use with small Vac-U-Chamber (Cat. No. 231-940), pk/10 | SamplePro FlexFilm 236-001 SamplePro PVDF 247-01 FlexFoil PLUS 252-01 |

Twin Port Pocket Pump — 20 to 225 ml/min

Programmable Sample Bag Sampling



CE

- ▶ 12-hour run time with rechargeable NiMH battery
- ▶ Constant flows from 20 to 225 ml/min — suitable for other applications
- ▶ Simple 3-button operation or program with a PC using DataTrac software accessory
- ▶ Continuous sample volume calculations

The twin port Pocket Pump® is ideal for bag sampling and other applications. Operate Pocket Pump from the simple 3-button integral keypad for quick grab samples. Or, program Pocket Pump from a PC using DataTrac® for Pocket Pump Software. Pocket Pump can be programmed for delayed start and timed runs.

| Description | Cat. No. |
|--|-----------|
| Twin Port Pocket Pump* with NiMH battery pack, <i>requires charger</i> 223-228 (115 V) or 223-229 (230 V); for tubing, see Cat. Nos. 231-9-23 and 231-9-26 on p. 11 | 210-1002A |

* Use in non-explosive environments only. Not UL Listed for intrinsic safety.

Grab Air Sample Pump — 1 L/min

Economy Pump for Filling Bags



- ▶ 9-volt alkaline battery for approximately 1000 liters volume on one battery
- ▶ 1 L/min flow rate

The SKC Grab Air Sample Pump is an economical choice for grab-and-go bag sampling. Grab Air operates at a fixed flow rate of 1 L/min for up to 1000 liters volume on one 9-volt battery. Simply attach a sample bag to the outlet port and turn on the pump. Simple, quick, reliable — Grab Air.

| Description | Cat. No. |
|--|----------|
| Grab Air Pump* with 9-volt alkaline battery; for tubing, see Cat. No. 231-9-23 on p. 11 | 222-2301 |
| Grab Air Hazmat Kit* includes pump as described above and ten 1-liter SamplePro PVDF bags with single polypropylene fitting (Cat. No. 247-01) | 222-2111 |

* Use in non-explosive environments only. Not UL Listed for intrinsic safety. Not CE marked

222 Pump — 50 to 200 ml/min

Pressure and Suction Applications



CE

UL LISTED

- ▶ Rechargeable NiCad battery for approximately 10 hours run time
- ▶ Adjustable flow rate — suitable for other applications including sorbent tubes
- ▶ Intrinsically safe

The durable, dependable, and lightweight SKC 222 Sample Pump features a suction port for tube sampling and a pressure port for bag sampling. Simple, reliable stroke counter technology provides for accurate air volume calculation.

| Description | Cat. No. |
|---|----------|
| 222 Pump , 50 to 200 ml/min, with charger; for tubing, see Cat. No. 231-937 on p. 11 | 222-3KC |

SKC Inc.
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Eighty Four, PA 15330 USA



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