Worldwide Ordering Information
To find your local distributor, please visit our website at
http://www.glsciences.com/products/contact.html
Simply select your country from the list and your local distributor information will be displayed.

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• We reserve the right to change specification to make improvements without notice.

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E-mail: info@glsciencesinc.com

Distributors:
Smart Bag Air Sampling Bags

AIR Sampling Products

GL Sciences Inc.

Smart Bag Air Sampling Bags
Sampling Bags

Sampling bags are widely used as a handy sampling method for automobile interior materials/emissions, work environments, building materials and textiles.

Sampling bag method is an ideal method for the above mentioned applications as the sample gas can be directly injected to the gas chromatograph and convenient to collect samples using adsorbent products to enrich/concentrate the target compounds.

However, the composition of the target compounds can be changed depending on the materials of the sampling bags, which is caused by the adsorption or permeation of the target compounds to the materials of the sampling bag. In addition, background peaks derived from sampling bag materials can interfere the target compounds' peaks during the analysis. Therefore it is necessary to select optimal sampling bags depending on applications/methods.

GL Sciences is proud to introduce “Smart Bag” series of a new sampling bag, which were developed based on many of our experiences along with some other bag type to fulfill our customers requirement worldwide.

Please select the appropriate sampling bags from the following descriptions to achieve highly reliable test results.

Select the Appropriate Sampling Bag for your Application

**Smart Bag PA**
- Smart Bag PA is made of vinyl alcohol series polymer film
- Superior resistance to solvents, heat and permeation
- Low background
- Operating temperature limit: 120 °C
- Film thickness: 53 µ m

**Applications:** Automobile interior materials, automobile emissions, diffusion gas from materials, inorganic gas etc.

**Smart Bag 2F**
- Smart Bag 2F is made of polyvinylidene fluoride (PVDF) film
- Superior resistance to solvents and heat
- Operating temperature limit: 120 °C
- Film thickness: 50 µ m

**Applications:** Automobile interior materials, automobile emissions, diffusion gas from materials etc.

**ANALYTIC-BARRIER™ Bag**
- Good resistance to permeation
- Low background
- Operating temperature limit: 70 °C
- Film thickness: 45 µ m

**Applications:** Automobile interior materials and inorganic gas etc.

**Fluororesin Bag**
- Fluororesin Bag is made of ethylene-tetrafluoroethylene copolymer film
- Good resistance to solvents and heat
- Operating temperature limit: 110 °C
- Film thickness: 50 µ m

**Applications:** Organic solvents

**Aluminum Bag**
- Aluminum Bag is made of laminated film (from outer: nylon, polyethylene, alum foil and polyethylene)
- Good permeation resistance to inorganic gas, methane
- Operating temperature limit: 65 °C
- Film thickness: 130 µ m

**Applications:** Inorganic gas

**Polyester Bag**
- Polyester Bag is made of polyester film
- Good permeation resistance to VOC
- Film thickness: 38 µ m

**Applications:** Volatile Organic Compound, odor analysis

**Tedlar® Bag**
- Polyvinyl fluoride (PVF)
- Operating temperature limit: 100 °C
- Film thickness: 50 µ m

**Applications:** Inorganic gas, organic solvents etc.

*Please inquire for the availability of Tedlar® Bags. Please note that GL Sciences is still capable of supplying the Tedlar® Bags upon request.

Tedlar® is a registered trademark of E.I. du Pont de Nemours & Co., Inc.

As shown above, GL Sciences has a wide variety of sampling bags to offer. It is extremely important to select the appropriate sampling bag depending on the target compound you are required to sample/collect to avoid any sampling error as much as possible. Please select the appropriate sampling bag to achieve highly reliable test results.
# How to Choose a Sampling Bag

### (Example) Smart Bag PA

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>10</th>
</tr>
</thead>
</table>
| ① | Material | Smart Bag PA / Smart Bag 2F / ANALYTIC-BARRIER Bag  
Fluororesin Bag / Aluminum Bag / Polyester Bag / Tedlar Bag |
| ② | Shape | A | A |
| ③ | Connector (PTFE)  
6 φ for up to 20 L  
8 φ for above 20 L | | |
| ④ | Volume  
Liter (L) | 1 L, 2 L, 3 L, 5 L, 10 L  
Other sizes such as from 0.1 L to 500 L can be manufactured upon request. Please contact us for other sizes. |

### Sleeve with mini valve (Outer diameter 6 φ)

As the mini valve is installed to the standard sleeve(6 φ) sampling procedures can be operated very easily by opening/closing the valve. Note that 8 φ Sleeves can not be replaced with sleeve with mini valves.

<table>
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</thead>
<tbody>
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<td>Sleeve with mini valve (6 φ)</td>
<td>3008-39998</td>
</tr>
</tbody>
</table>

Sampling pump and other adsorbent material products are available.

For more details, please refer from P.9 ~ 11.
**Smart Bag PA**

Smart Bag PA is made of vinyl alcohol series polymer film and delivers superior resistance to solvents, heat and adsorption with low background. Smart Bag PA also avoids the permeation of most gas. This feature enables a wide range of sampling from inorganic to organic gases.

Operating temperature limit: 120 °C

**Blank Test**

*Testing Procedure*

Put each *sampling bag (1L) filled up with nitrogen to a chamber at 60 °C. 1 hour later, collect the atmosphere inside of each bag with a gas tight micro syringe and inject it directly to a GC/MS.

* Please note that both bags were not flushed/cleaned with nitrogen.

**Aldehydes / Acetone Blank Test**

*Testing Procedure*

Fill each *sampling bag with nitrogen, seal them and put them into a chamber at 60°C. 1 hour later, vacuum 1L of gases from each bag with a pump to DNPH cartridges and elute, then analyze by HPLC.

* Please note that both bags were not flushed cleaned with nitrogen.

**Storage Stability of Organic solvent gas in Smart bag PA and Tedlar® Bag.**

*Testing Procedure*

Constant amount of vaporized standards were introduced to each bag. Then nitrogen was added to each bag and were measured by a GC/FID.

**Standard Compound List**

Acetone, Methyl ethyl ketone, Methyl isobutyl ketone, Isopropyl alcohol, Isobutyl alcohol, 1-Butanol, Ethylbenzene, Cyclohexane, n-Hexane, o-Xylene, m-Xylene, Toluene, Dichloromethane, Methyl acetate, Ethyl acetate, Isobutyl acetate, n-Butyl acetate (50 ng/mL each)

**Smart Bag PA**

![Graph showing the concentration of various compounds over time for Smart Bag PA](image)

**Tedlar® Bag**

![Graph showing the concentration of various compounds over time for Tedlar® Bag](image)
Storage Stability of Malodorous Compounds in Smart Bag PA and Tedlar® Bag

**Testing Procedure**

Arrange the concentration of each malodorous compounds as described below and fulfill a 5L Smart Bag PA and a 5L Tedlar® Bag with the malodorous compounds together with nitrogen gas. Damping rate was calculated using a detecting tube at certain times.

---

### Gas Permeability Test

**Testing Procedure**

Permeation rates of O₂, N₂, CH₄, and CO₂ were measured using a permeation rate measurement system on each sampling bag.

---

### Smart Bag PA Ordering Guide

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<thead>
<tr>
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<th>10 L</th>
<th>20 L</th>
<th>30 L</th>
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</table>

*Other bag sizes available upon request.*
Smart Bag 2F

Smart Bag 2F is made of polyvinylidene fluoride (PVDF) film and delivers superior resistance to solvents and heat. In addition, Smart Bag 2F is suitable for sampling gassy organics such as materials used indoors and work environments etc.

Operating temperature limit: 120 °C

◆ Blank Test

[Testing Procedure]

Put each *sampling bag (1L) filled up with nitrogen to a chamber at 60°C. 1 hour later, collect the atmosphere inside of each bag with a gas tight micro syringe and inject it directly to a GC/MS.

* Please note that both bags were not flushed/cleaned with nitrogen.

◆ Aldehydes / Acetone Blank Test

[Testing Procedure]

Fill each *sampling bag with nitrogen, seal them and put them into a chamber at 60°C. 1 hour later, vacuum 1L of gases from each bag with a pump to DNPH cartridges and elute, then analyze by HPLC.

* Please note that both bags were not flushed/cleaned with nitrogen.

◆ Storage Stability of Organic Solvent gas in Smart Bag 2F and Tedlar® Bag

[Testing Procedure]

Constant amount of vaporized standards were introduced to each bag. Then nitrogen was added to each bag and were measured by a GC/FID.

[Standard Compound List]

Acetone, Methyl ethyl ketone, Methyl isobutyl ketone, Isopropyl alcohol, Isobutyl alcohol, 1-Butanol, Ethylbenzene, Cyclohexane, n-Hexane, o-Xylene, m-Xylene Toluene, Dichloromethane, Methyl acetate, Ethyl acetate, Isobutyl acetate, n-Butyl acetate (50 ng/mL each)

Smart Bag 2F

Tedlar® Bag
Storage Stability of Malodorous Compounds in Smart Bag 2F and Tedlar® Bag

[Testing Procedure]
Arrange the concentration of each malodorous compounds as described below and fulfill a 5L Smart Bag 2F and a 5 L Tedlar® Bag together with nitrogen gas. Damping rate was calculated using a detecting tube at certain times.

Gas Permeability Test

[Testing Procedure]
Permeation rates of O₂, N₂, CH₄, and CO₂ were measured using a permeation rate measurement system on each sampling bag.

Smart Bag 2F Ordering Guide

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*Other bag sizes available upon request.*
**ANALYTIC-BARRIER™ Bag**

- Good resistance to permeation
- Low background
- Operating temperature limit: 70 °C

**Applications:** Automobile interior materials and inorganic gas etc.

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*Other bag sizes available upon request.*

**Fluororesin Bag**

- Fluororesin Bag is made of ethylene-tetrafluoroethylene copolymer film
- Good resistance to solvents and heat
- Operating temperature limit: -70 °C ~ 110 °C

**Applications:** Organic solvents

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*Other bag sizes available upon request.*

**Aluminum Bag**

- Aluminum Bag is made of laminated film (from outer: nylon, polyethylene, aluminum foil and polyethylene)
- Good permeation resistance to inorganic gas, methane
- Adsorbs high-boiling organic solvents, which generates background for organic compounds
- Operating temperature limit: 65 °C

**Applications:** Inorganic gas

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*Other bag sizes available upon request.*

**Polyester Bag**

- Polyester Bag is made of polyester film
- Good permeation resistance to Valatile Organic Compound
- Compatible with sampling of malodorous compounds at boundary lines for environmental analysis

**Applications:** Valatile Organic Compound, odor analysis

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<tr>
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*Other bag sizes available upon request.*
Custom Size Sampling Bags

Many of our experiences in this industry enable providing custom size sampling bags from 0.1 L to 500 L upon request. Feel free to contact us for your custom size sampling bags. When ordering, please don’t forget to select your preferred bag material, shape and connector type. For more details, please refer to P2.

GL Sciences’ sampling bags have proven outstanding performance across various industries

Automobile interior materials

Environmental air

Odor-fighting fibers

Automobile emissions

Work Environment

Soil gas

…… etc

Sampling Pump/Sampling Kit

SP208-20Dual / SP208-100Dual / SP208-1000Dual

- Employs two flow lines and two pumps for collection, and each system independently integrates the suction volume
- The 20 mL type provides a high level of accuracy at extremely low flow rates and the 100 mL type provides it at low flow rates, and is optimal for heating desorption, while the 1000 mL type enables collection in collection cartridges such as formaldehyde and VOCs whose resistance varies greatly.
- The pump adjusts the flow rate when the collection material or cartridge resistance change, maintaining a stable flow and suction. In particular, this function provides lower noise and power consumption by reducing the pump motor rotation speed when the resistance and suction load are low.
- Offering multi-functions such as suction start/end time setting and data log function

<table>
<thead>
<tr>
<th>Description</th>
<th>Suction Flow Rate Range</th>
<th>Cat.No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP208-20Dual II (DC12V AC100-240V 50/60Hz)</td>
<td>2 ~ 20 mL/min</td>
<td>2702-17585</td>
</tr>
<tr>
<td>SP208-100Dual III (DC12V AC100-240V 50/60Hz)</td>
<td>10 ~ 100 mL/min</td>
<td>2702-17576</td>
</tr>
<tr>
<td>SP208-10000Dual III (DC12V AC100-240V 50/60Hz)</td>
<td>100 ~ 1000 mL/min</td>
<td>2702-17581</td>
</tr>
<tr>
<td>Piping Kit for SP208 Dual III</td>
<td>-</td>
<td>3001-11541</td>
</tr>
</tbody>
</table>

* Not UL Listed. Not CE marked.

TVOC Sampling Kit

- The kit includes a pump, but with the compact design, it enables to carry this kit very easily
- The pump included in this kit is a multifunction pump which offers flow control valve, flow meter and timer function battery (optional product)
- The gas contact materials are all glass and PTFE except for the sampling bag

<table>
<thead>
<tr>
<th>Description</th>
<th>Cat.No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVOC Sampling Kit</td>
<td>3008-81030</td>
</tr>
<tr>
<td>Battery for SP205 (Optional Product)</td>
<td>2702-35250</td>
</tr>
<tr>
<td>Battery Charger for SP205 (Optional Product, DC12V AC100V-0.3A)</td>
<td>2702-35251</td>
</tr>
</tbody>
</table>

* The sampling pump SP205 included in the TVOC Sampling Kit is Not UL Listed and Not CE marked.
InertSep™ mini AERO series

Aldehyde, Ketone Sampling

InertSep™ mini AERO DNPH

The adsorbent material is spherical silica-gels coated with 2,4-Dinitrophenylhydrazine, which is appropriate for the sampling of aldehyde and ketone. The particle size of the adsorbent material is 120 um and delivers better air permeability and higher sampling efficiency compared to irregular particle type silica-gels. In addition, the background is exceptionally low due to our rigorous quality control inspection tests.

<table>
<thead>
<tr>
<th>Description</th>
<th>Adsorbent Volume</th>
<th>Pieces/Set</th>
<th>Cat.No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>InertSep mini AERO DNPH</td>
<td>300 mg</td>
<td>20</td>
<td>5010-23500</td>
</tr>
</tbody>
</table>

* This is a "keep cool" product. Please store this product immediately in a refrigerator.

Ozone Removal Cartridge

InertSep™ mini AERO Ozone Scrubber

Potassium iodide is packed to the cartridge to remove ozone in air. It is known that ozone decomposes DNPH derivative and influences the analysis results. The above phenomenon can be prevented by installing this cartridge in front of the DNPH cartridge, providing highly reliable testing results.

<table>
<thead>
<tr>
<th>Description</th>
<th>Adsorbent Volume</th>
<th>Pieces/Set</th>
<th>Cat.No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>InertSep mini AERO Ozone Scrubber</td>
<td>1,500 mg</td>
<td>20</td>
<td>5010-23510</td>
</tr>
</tbody>
</table>

Removal of Unreacted DNPH Cartridge

InertSep™ mini AERO SC

Strong cation-exchange resin is packed to the cartridge to remove unreacted DNPH. It is known that unreacted DNPH interferes the analysis using a gas chromatograph. The above phenomenon can be prevented by installing this cartridge at the end of the DNPH cartridge, providing highly reliable testing results.

<table>
<thead>
<tr>
<th>Description</th>
<th>Adsorbent Volume</th>
<th>Pieces/Set</th>
<th>Cat.No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>InertSep mini AERO SC</td>
<td>250 mg</td>
<td>20</td>
<td>5010-23520</td>
</tr>
</tbody>
</table>

Thermal Desorption Tubes AERO TD Tube series

<table>
<thead>
<tr>
<th>Description</th>
<th>Adsorbent Material</th>
<th>Pieces/Set</th>
<th>Cat.No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AERO TD Tube (for T-Dex, ATD, Markes)</td>
<td></td>
<td>10</td>
<td>1003-74101</td>
</tr>
<tr>
<td>Tenax TA 35/60 150 mg</td>
<td></td>
<td>10</td>
<td>1003-74102</td>
</tr>
<tr>
<td>Tenax TA 60/80 150 mg</td>
<td></td>
<td>10</td>
<td>1003-74201</td>
</tr>
<tr>
<td>Tenax GR 35/60 150 mg</td>
<td></td>
<td>10</td>
<td>1003-74301</td>
</tr>
<tr>
<td>Carbopack B 190 mg + Carboxen 1000 140 mg</td>
<td></td>
<td>10</td>
<td>1003-74302</td>
</tr>
<tr>
<td>Carbotrap 50 mg + Carboxen 1000 75 mg</td>
<td></td>
<td>10</td>
<td>1003-74302</td>
</tr>
</tbody>
</table>

Detection Tubes

<table>
<thead>
<tr>
<th>Target Gas</th>
<th>Tube No.</th>
<th>Measuring Concentration</th>
<th>Pieces/Set</th>
<th>Cat.No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonia</td>
<td>3La</td>
<td>2.5 ~ 200 ppm</td>
<td>10</td>
<td>1065-91036</td>
</tr>
<tr>
<td>Acetaldehyde</td>
<td>92L</td>
<td>1 ~ 20 ppm</td>
<td>10</td>
<td>1065-91924</td>
</tr>
<tr>
<td>Acetic acid</td>
<td>81</td>
<td>1 ~ 100 ppm</td>
<td>10</td>
<td>1065-91810</td>
</tr>
<tr>
<td>Pyridine</td>
<td>182</td>
<td>0.2 ~ 35 ppm</td>
<td>10</td>
<td>1065-92820</td>
</tr>
<tr>
<td>Methylmercaptan</td>
<td>70L</td>
<td>0.1 ~ 8 ppm</td>
<td>10</td>
<td>1065-91704</td>
</tr>
<tr>
<td></td>
<td>70</td>
<td>0.35 ~ 64 ppm</td>
<td>10</td>
<td>1065-91700</td>
</tr>
<tr>
<td>Hydrogen sulfide</td>
<td>4LT</td>
<td>0.1 ~ 4 ppm</td>
<td>10</td>
<td>1065-91040</td>
</tr>
<tr>
<td></td>
<td>4LB</td>
<td>0.5 ~ 12 ppm</td>
<td>10</td>
<td>1065-91039</td>
</tr>
</tbody>
</table>
Sample Tube Conditioner STC-4000

- Maximum of 12 sample tubes can be installed
- Maximum of 5 temperature program steps can be set (including rising and lowering steps)
- Compatible with sample tubes having a dimensions of 6-6.35 mm O.D. and 35-178 mm length

◆ Specification
- Temperature Range: +10 °C ~ 450 °C
- Dimension: 562 (W) × 520 (D) × 450 (H) mm
- Weight : 44 Kg

<table>
<thead>
<tr>
<th>Description</th>
<th>Cat.No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Tube Conditioner STC-4000, AC100V</td>
<td>2701-13071</td>
</tr>
<tr>
<td>Sample Tube Conditioner STC-4000, AC220V</td>
<td>2701-13072</td>
</tr>
</tbody>
</table>

Sample Tube Conditioner STC-4000, AC220V. Not UL Listed. Not CE marked.

For Multi-Compound Sampling Bag Analysis

Heated Sampling Bag Selector

This is an instrument to analyze multi-compounds using a sampling bag. The sample line from the instrument to the GC is heated, resulting in providing reproducible testing results.

◆ Chromatogram at each temperature
By heating the sample line and valve, adsorption of compounds to the said parts can be prevented, offering reproducible results.

Sampling Oven System

◆ Features
- Gas supplying unit is installed to the unit
  (Nitrogen gas is not available and must be prepared at site)
- Cleaning of sampling bag can be operated
- Sampling to 2 adsorbent tubes can be done at once.

◆ Specification
- Includes a temperature program step function
- Temperature Range: Room temperature +10 °C ~ 210 °C
- Arrival of Time to the Maximum Temperature: 50 mins
- Oven Dimension : 450(W) × 450(D) × 400(H) mm
- Total Dimension : 526(W) × 550(D) × 795(H) mm
- Weight : 48 kg