

# Gas Mixes for Air Sampling

## Analytical Reference Materials for Environmental Air Sampling Methods

### did you know?

Spectra Gases manufactures our high-quality air monitoring gas mixes.

- ISO 9001:2000-approved gas manufacturer.
- Official EPA supplier of PAMS (ozone precursor) calibration gas.
- Only vendor of stable 62-component TO-15 gas mix.



**Cylinder Design:**  
**Aluminum construction.**  
**Size:** 8 x 24 cm.  
**Volume/Pressure:**  
 104 liters @ 1800psig.  
**CGA-180** outlet fitting.  
**Weight:** 1.5 lbs.

**Restek Trademarks:**  
 SilcoCan, Silcosteel, TO-Can, Turning Visions into Reality, Restek logo

**Other Trademarks:**  
 Freon (E.I. duPont de Nemours & Co., Inc.)  
 Kel-F (3M Co.)

Restek is proud to offer Spectra Gases gas mixes to meet your environmental air sampling requirements. Rigorous quality control guarantees the reproducibility and stability of every mix.

Spectra Gases production and analytical procedures ensure that each calibration mix is of the highest accuracy. Calibration mixes are produced individually and gravimetrically, using NIST (National Institute of Science and Technology) traceable weights. All calibration mixes are individually analyzed against Spectra Gases master standards, directly traceable to NIST (TO-14 component) Primary Gas Standards and NIST traceable weights.

Spectra Gases uses a proprietary cylinder passivation process that ensures proven stability and lifetime, even for complex mixes. They are the only vendor capable of delivering a stable 62-component TO-15 gas mix. Restek and Spectra Gases offer many stock mixes for environmental air analysis. Mixes not already in stock are blended in master cylinders and are ready for final product packaging, so delivery of most products requires only a minimum leadtime.

### TO-14A Calibration Mix (39 components)

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

In nitrogen, 104 liters @ 1800psig  


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**1ppm** cat. # 34400 (ea.)  


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**100ppb** cat. # 34421 (ea.)

### TO-14A Chlorinated Hydrocarbon Mix (19 components)

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

In nitrogen, 104 liters @ 1800psig  


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**1ppm** cat. # 34402 (ea.)  


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**100ppb** cat. # 34422 (ea.)

### TO-14A Aromatics Mix (14 components)

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

In nitrogen, 104 liters @ 1800psig  


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**1ppm** cat. # 34404 (ea.)  


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**100ppb** cat. # 34423 (ea.)

### TO-14A 41 Component Mix (41 components)

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

In nitrogen, 104 liters @ 1800psig  


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**1ppm** cat. # 34430 (ea.)  


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**100ppb** cat. # 34431 (ea.)

**TO-14A 43 Component Mix** (43 components)

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

In nitrogen, 104 liters @ 1800psig

**1ppm** cat. # 34432 (ea.)**100ppb** cat. # 34433 (ea.)**Ozone Precursor Mixture/PAMS** (57 components)

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

In nitrogen, 104 liters @ 1800psig

**1ppm** cat. # 34420 (ea.)**100ppb** cat. # 34429 (ea.)**Spectra Gas 7621 High-Purity VOC Regulator**

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

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

**TO-14A CFC/HCFC Mix**

trichlorofluoromethane (Freon® 11)  
dichlorodifluoromethane (Freon® 12)  
1,1,2-trichloro-1,2,2-trifluoroethane (Freon® 113)  
1,2-dichlorotetrafluoroethane (Freon® 114)

In nitrogen, 104 liters @ 1800psig

**1ppm** cat. # 34410 (ea.)**100ppb** cat. # 34426 (ea.)**TO-14A Internal Standard Mix**

bromochloromethane 1,4-difluorobenzene  
chlorobenzene-d5

In nitrogen, 104 liters @ 1800psig

**1ppm** cat. # 34412 (ea.)**100ppb** cat. # 34427 (ea.)**TO-14A GC/MS Tuning Mix**

4-bromofluorobenzene

In nitrogen, 104 liters @ 1800psig

**100ppb** cat. # 34424 (ea.)**2ppm** cat. # 34406 (ea.)**TO-14A Internal Standard/Tuning Mix**

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

In nitrogen, 104 liters @ 1800psig

**1ppm** cat. # 34408 (ea.)**100ppb** cat. # 34425 (ea.)**Ozone Precursor/PAMS Mix**

(57 components at EPA concentrations: ppb C)

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

In nitrogen, 104 liters @ 1800psig

cat. # 34445 (ea.)



**TO-15 62 Component Mix** (62 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
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	2-propanol
chloroform	propylene
chloromethane	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	vinyl acetate
<i>cis</i> -1,3-dichloropropene	vinyl chloride
<i>trans</i> -1,3-dichloropropene	<i>m</i> -xylene
1,4-dioxane	<i>o</i> -xylene
ethanol*	<i>p</i> -xylene
ethyl acetate	
ethyl benzene	
ethyl dibromide (1,1-dibromoethane)	
4-ethyltoluene	

In nitrogen, 104 liters @ 1800psig

**1ppm** cat. # 34436 (ea.)**100ppb** cat. # 34437 (ea.)

\*Stability of this compound cannot be guaranteed.

**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 (MIBK)
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	

In nitrogen, 104 liters @ 1800psig

**1ppm** cat. # 34434 (ea.)**100ppb** cat. # 34435 (ea.)

\*Stability of this compound cannot be guaranteed.

**BTEX Gas Mix**

benzene	<i>m</i> -xylene
ethylbenzene	<i>o</i> -xylene
toluene	<i>p</i> -xylene

In nitrogen, 104 liters @ 1800psig

**1ppm** cat. # 34414 (ea.)**100ppb** cat. # 34428 (ea.)**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	<i>n</i> -nonane
<i>n</i> -decane	<i>n</i> -octane
2,3-dimethylheptane	toluene
2,3-dimethylpentane	toluene-d8 (IS)
<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>m</i> - & <i>p</i> -xylene
isopentane	<i>o</i> -xylene
isopropylbenzene	

In nitrogen, 104 liters @ 1800psig

cat. # 34540 (ea.)

**Japan Calibration Mix** (9 components)

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

In nitrogen, 104 liters @ 1800psig

**1ppm** cat. # 34418 (ea.)please **note**

Don't see the gas mixture you need? Contact Restek for a custom gas mixture that meets your requirements

for **more info****Air Sampling & Analysis**

Our SilcoCan™ (Siltek®-treated) and TO-Can™ (electro polished) canisters are your best choice for collecting ambient air samples as specified in EPA TO-14/TO-15. In addition to the TO-listed compounds, inert SilcoCan™ canisters offer excellent stability for low ppb levels of sulfur compounds. Used in conjunction with a SilcoCan™ or TO-Can™ canister, our Passive Air Sampling Kit incorporates all of the hardware you'll need for air sample collection. Our miniature air sampling canisters are ideal for indoor air, personal, and emergency response sampling.

We also offer ultra-clean resin, fiber filters, sampling bags, thermal desorption tubes, and a range of gas reference standards to meet your environmental air sampling requirements.

To view our complete line of air sampling products, visit our website at [www.restek.com/air](http://www.restek.com/air).





## SilcoCan™ Air Monitoring Canisters

### Siltek® treated - ideal for low-level reactive sulfur compounds (1-20ppb)

- Unsurpassed inertness, even for sulfur-containing or brominated compounds.
- Sizes from 1 to 15 liters support a wide range of sampling needs.
- Optional vacuum/pressure gauge (other gauges available).
- For critical applications, order a Siltek® treated valve - add suffix “-650” to the catalog number of the canister.

For ultimate inertness, we treat SilcoCan™ air monitoring canisters with our unique Siltek® passivation technology. Even highly active components, at low parts-per-billion concentrations, can be readily sampled and stored without loss. The valve is a high quality, metal-to-metal seal, 2/3-turn valve with metal diaphragms. Both stainless steel and Siltek®-treated valves are available, in both the 2-port and 3-port configurations.

### Alternative

#### Vacuum/Pressure Gauges

The standard vacuum/pressure range on a SilcoCan™ or TO-Can™ canister fitted with a gauge is 30" Hg to 60psig. To order a different gauge for the canister, *add the appropriate suffix number to the canister catalog number*. There is no price difference for these substituted gauges.

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

Description	qty.	cat.#
<b>1L Volume</b>		
SilcoCan™ Canister, 1/4" Valve	ea.	24180
SilcoCan™ Canister, Siltek®-Treated 1/4" Valve	ea.	24180-650
SilcoCan™ Canister with Gauge, 1/4" Valve	ea.	24140
SilcoCan™ Canister with Gauge, Siltek®-Treated 1/4" Valve	ea.	24140-650
<b>3L Volume</b>		
SilcoCan™ Canister, 1/4" Valve	ea.	24181
SilcoCan™ Canister, Siltek®-Treated 1/4" Valve	ea.	24181-650
SilcoCan™ Canister with Gauge, 1/4" Valve	ea.	24141
SilcoCan™ Canister with Gauge, Siltek®-Treated 1/4" Valve	ea.	24141-650
<b>6L Volume</b>		
SilcoCan™ Canister, 1/4" Valve	ea.	24182
SilcoCan™ Canister, Siltek®-Treated 1/4" Valve	ea.	24182-650
SilcoCan™ Canister with Gauge, 1/4" Valve	ea.	24142
SilcoCan™ Canister with Gauge, Siltek®-Treated 1/4" Valve	ea.	24142-650
<b>15L Volume</b>		
SilcoCan™ Canister, 1/4" Valve	ea.	24183
SilcoCan™ Canister, Siltek®-Treated 1/4" Valve	ea.	24183-650
SilcoCan™ Canister with Gauge, 1/4" Valve	ea.	24143
SilcoCan™ Canister with Gauge, Siltek®-Treated 1/4" Valve	ea.	24143-650

## did you know?

All Restek canisters are equipped with high-quality Parker Hannifin diaphragm valves. Each valve is helium leak-tested to  $4 \times 10^{-9}$  cc/sec. The all-stainless steel construction eliminates contamination and the valve operates at temperatures from -100°C to 250°C. Compression outlet fitting, indicator plate to display open or closed position, 1/4" inlet and outlet.

We also ship our canisters cleaned, batch-tested per USEPA TO-14, and under 30psig pressure with dry nitrogen.

## TO-Can™ Air Monitoring Canisters

### Optimized for US EPA Methods TO-14 and TO-15

- High quality, metal-to-metal seal, 2/3-turn valve with metal diaphragms.
- Sizes from 1 to 15 liters.
- Optional 30" Hg/60psig vacuum/pressure gauge (other gauges available).

Description	qty.	cat.#
<b>1L Volume</b>		
TO-Can™ Canister, 1/4" Valve	ea.	24172
TO-Can™ Canister with Gauge, 1/4" Valve	ea.	24176
<b>3L Volume</b>		
TO-Can™ Canister, 1/4" Valve	ea.	24173
TO-Can™ Canister with Gauge, 1/4" Valve	ea.	24177
<b>6L Volume</b>		
TO-Can™ Canister, 1/4" Valve	ea.	24174
TO-Can™ Canister with Gauge, 1/4" Valve	ea.	24178
<b>15L Volume</b>		
TO-Can™ Canister, 1/4" Valve	ea.	24175
TO-Can™ Canister with Gauge, 1/4" Valve	ea.	24179



Lit. Cat.# 59276B

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