

# SPECTRA VOC Standards

## EPA Method TOA-14A

### Description

SPECTRA VOC standards are part of the HiQ® specialty gases program from Linde and are manufactured using exacting gravimetric techniques with all gravimetric measurements directly traceable to NIST (National Institute of Standards and Technology). Furthermore The SPECTRA 39 component mix is directly traceable analytically to NIST.

TO-14A calibration standard consists of 39 components at concentrations of either one (1) ppm or one hundred (100) ppb in a balance of VOC free nitrogen (N<sub>2</sub>) with other concentrations available as custom mixtures. All TO-14A standards have one year stability. In addition Linde supplies 41 and 43 component SPECTRA TO-14A standards, as well as, a variety of subsets.

US EPA's Compendium Method TO-14A, "Determination of Volatile Organic Compounds (VOCs) in Ambient Air Using Specially Prepared Canisters With Subsequent Analysis By Gas Chromatography" is used extensively by analysts for both ambient air studies and indoor air quality (IAQ) studies.

### HiQ® Specialty Gases

The HiQ® specialty gases program from Linde supplies high purity gases, gas mixtures, precision engineered equipment and gas distribution systems, and services and support, to a wide range of industries employing specialty gases applications.

HiQ® products represent Linde's commitment to the highest available quality and global consistency across gases, equipment and services.

### TO-14A 39 Component

- Benzene [71-43-2]
- Bromomethane [74-83-9]
- Carbon Tetrachloride [56-23-5]
- Chlorobenzene [108-90-7]
- Chloroform [67-66-3]
- Chloromethane [74-87-3]
- 1,2-Dibromoethane [106-93-4]
- o-Dichlorobenzene [95-50-1]
- m-Dichlorobenzene [541-73-1]
- p-Dichlorobenzene [106-46-7]
- 1,1-Dichloroethane [75-34-3]
- 1,2-Dichloroethane [107-06-2]
- 1,1-Dichloroethene [75-35-4]
- cis-1,2-Dichloroethene [156-59-2]
- 1,2-Dichloropropane [78-87-5]
- cis-1,3-Dichloropropene [10061-01-5]
- trans-1,3-Dichloropropene [10061-02-6]
- Chloroethane [75-00-3]
- Ethyl Benzene [100-41-4]
- Trichlorofluoromethane [75-69-4] (Halocarbon 11)
- Dichlorodifluoromethane [75-71-8] (Halocarbon 12)
- 1,1,2 Trichlorotrifluoroethane [76-13-1] (Halocarbon 113)
- Dichlorotetrafluoroethane [76-14-2] (Halocarbon 114)
- Hexachloro-1,3-Butadiene [87-68-3]
- Methylene Chloride [75-09-2]
- Styrene [100-42-5]
- 1,1,2,2-Tetrachloroethane [79-34-5]
- Tetrachloroethylene [127-18-4]
- Toluene [108-88-3]
- 1,2,4-Trichlorobenzene [120-82-1]
- 1,1,1-Trichloroethane [71-55-6]
- 1,1,2-Trichloroethane [79-00-5]
- Trichloroethene [79-01-6]
- 1,2,4-Trimethylbenzene [95-63-6]
- 1,3,5-Trimethylbenzene [108-67-8]
- Vinyl Chloride [75-01-4]
- o-Xylene [95-47-6]
- m-Xylene [108-38-3]
- p-Xylene [106-42-3]

NOTE: CAS numbers are in square brackets, i.e. [00-00-0]

To enhance your QA/QC procedures, Linde stocks at least two (2) individual batches of each VOC raw material. This allows you to order two (2) independent TO-14A Calibration Standards from Linde.

### TO-14A 41 Component

- 39 component plus 1,3-Butadiene [106-99-0] and Acrylonitrile [107-13-1]

### TO-14A 43 Component

- 41 component plus 3-Chloropropene [107-05-1] and 4-Ethyltoluene [622-96-8]

**TO-14A  
Subset 1  
(1 year stability)**

- Benzene [71-43-2]
- Benzyl Chloride \* [100-44-7]
- Chlorobenzene [108-90-7]

- 1,3-Dichlorobenzene [541-73-1]
- Toluene [108-88-3]
- o-Xylene [95-47-6]

\* stability is not guaranteed

**TO-14A  
Subset 2  
(1 year stability)**

- Acetonitrile [75-05-8]
- 1,3-Butadiene [106-99-0]
- Carbon Tetrachloride [56-23-5]

- Chloroform [67-66-3]
- Methylene Chloride [75-09-2]
- Trichlorofluoromethane [75-69-4]

**TO-14A  
CFC/HFC Standard  
(1 year stability)**

- Trichlorofluoromethane (Halocarbon 11) [75-69-4]
- Dichlorodifluoromethane(Halocarbon 12 ) [75-71-8]
- 1,1,2-Trichloro-1, 2,2-Trifluoroethane (Halocarbon 113) [76-13-1]
- 1,2-Dichlorotetrafluoroethane (Halocarbon 114) [76-14-2]

**TO-14A Internal  
Standard/Tuning Standard  
(1 year stability)**

- Bromochlormethane [74-97-5]
- 1-Bromo-4-Fluorobenzene (4-Bromofluorobenzene) [460-00-4]

- Chlorobenzene-d5 [3114-55-4]
- 1,4-Difluorobenzene [540-36-3]

**TO-14A  
Internal Standard  
(1 year stability)**

- Bromochlormethane [74-97-5]
- Chlorobenzene-d5 [3114-55-4]

- 1,4-Difluorobenzene [540-36-3]

**Regulator Recommendation**

Various independent and Agency laboratories have indicated that to ensure repeatability with low level calibration gases it is best to utilize the same regulator for initial assay and for daily usage, thus minimizing the sources for potential variances and possible cross contamination. If a regulator is purchased along with the TO-14A standard, Linde will perform the initial assay and certification analysis utilizing the regulator and cylinder as a matched set.

Linde model 7621 regulator is ideal for use with the TO-14A component standard.

**Standard Available Cylinders**

Cylinder Size	Volume	Pressure	CGA
2A/152	4000 liters	2000 psig	350
4A	800 liters	2000 psig	350
6A/6R	104 liters	1800 psig	180

**Linde Electronics and Specialty Gases**

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