

# SPECTRA VOC STANDARDS

## Method TO-15/TO-17

**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).

The TO-15/TO-17 Calibration Standard consists of 65 components at standard concentrations of one (1) ppm or one hundred (100) ppb in a balance gas of VOC free nitrogen (N<sub>2</sub>). Other concentrations are available as custom mixtures. Stability of a TO-15/TO-17 standard is 12 months.

Whether you are performing Compendium Method TO-15; "Determination of Volatile Organic Compounds (VOCs) In Air Collected in Specially Prepared Canisters And Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)" or Compendium Method TO-17; "Determination of Volatile Organic Compounds in Ambient Air Using Active Sampling Onto Sorbent Tubes", Linde's Calibration Standard is the standard of choice.

**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. In addition to the line of SPECTRA high purity gases the HiQ® program includes the REDLINE® and BASELINE® trademarked equipment product ranges and the SPECTRA-SEAL®, ECOCYL® and VERISEQ® specialty gas ranges.

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

→ Acetone [67-64-1]	→ 1,2-Dibromoethane [106-93-4]
→ Acrolein [107-02-8]	→ 4-Ethyltoluene [622-96-8]
→ Benzene [71-43-2]	→ Halocarbon 11 (Trichlorofluoromethane) [75-69-4]
→ Benzyl Chloride [100-44-7]	→ Halocarbon 12 (Dichlorodifluoromethane) [75-71-8]
→ Bromoform [75-25-2]	→ Halocarbon 113(1,1,2-Trichlorotrifluoroethane) [76-13-1]
→ Bromomethane [74-83-9]	→ Halocarbon 114 (1,2-Dichlorotetrafluoroethane) [76-14-2]
→ Bromodichloromethane [75-27-4]	→ Heptane [142-82-5]
→ 1,3-Butadiene [106-99-0]	→ Hexachloro-1,3-butadiene [87-68-3]
→ 2-Butanone (MEK) [78-93-3]	→ Hexane [110-54-3]
→ Carbon Disulfide [75-15-0]	→ 2-Hexanone (MBK) [591-78-6]
→ Carbon Tetrachloride [56-23-5]	→ 4-Methyl-2-Pentanone (MIBK) [108-10-1]
→ Chlorobenzene [108-90-7]	→ Methylene Chloride [75-09-2]
→ Chloroethane [75-00-3]	→ Methyl methacrylate [80-62-6]
→ Chloroform [67-66-3]	→ Methyl-tert-Butylether (MTBE) [1634-04-4]
→ Cyclohexane [110-82-7]	→ Naphthalene [91-20-3]
→ Chloromethane [74-87-3]	→ 2-Propanol [67-63-0]
→ Dibromochloromethane [124-48-1]	→ Propylene [115-07-1]
→ 1,2-Dichlorobenzene [95-50-1]	→ Styrene [100-42-5]
→ 1,3-Dichlorobenzene [541-73-1]	→ 1,1,2,2-Tetrachloroethane [79-34-5]
→ 1,4-Dichlorobenzene [106-46-7]	→ Tetrachloroethene [127-18-4]
→ 1,1-Dichloroethane [75-34-3]	→ Tetrahydrofuran [109-99-9]
→ 1,2-Dichloroethane [107-06-2]	→ Toluene [108-88-3]
→ 1,1-Dichloroethene [75-35-4]	→ 1,1,1-Trichloroethane [71-55-6]
→ cis-1,2-Dichloroethene [156-59-2]	→ 1,1,2-Trichloroethane [79-00-5]
→ trans-1,2-Dichloroethene [156-60-5]	→ Trichloroethene [79-01-6]
→ 1,2-Dichloropropane [78-87-5]	→ 1,2,4-Trichlorobenzene [120-82-1]
→ cis-1,3-Dichloropropene [10061-01-5]	→ 1,2,4-Trimethylbenzene [95-63-6]
→ trans-1,3-Dichloropropene [10061-02-6]	→ 1,3,5-Trimethylbenzene [108-67-8]
→ 1,4-Dioxane [123-91-1]	→ Vinyl Acetate [108-05-4]
→ Ethanol [64-17-5]	→ Vinyl Chloride [75-01-4]
→ Ethyl Acetate [141-78-6]	→ o-Xylene [95-47-6]
→ Ethyl Benzene [100-41-4]	→ m-Xylene [108-38-3]
	→ p-Xylene [106-42-3]

**Specifications**

Blend Tolerance	100 ppb to 1 ppm +/- 10%
	>1 ppm to 10 ppm +/- 5%
Analytical Accuracy	100 ppb to 1 ppm +/- 5%
	>1 ppm to 10 ppm +/- 2%
Stability	12 months

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To enhance your QA/QC procedures, Linde stocks at least two (2) individual batches of each VOC raw material allowing you to order two (2) independent TO-15/TO-17 Calibration Standards.

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**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-15/TO-17 standard, Linde will perform the initial assay and certification analysis utilizing the regulator and cylinder as a matched set.

The Linde model 7621 regulator is ideal for use with the TO-15/TO-17 Calibration Standards.

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**Standard Available Cylinders**

Cylinder Size	Volume	Pressure	CGA
2A	4000 liters	2000 psig	350
6A	104 liters	1800 psig	180

All SPECTRA VOC Calibration Standards are guaranteed for a minimum of 12 months.

Please contact Linde for information on other concentrations, tolerances, and cylinder sizes.

**Linde Electronics and Specialty Gases**

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