

# SPECTRA VOC STANDARDS

## Vapor Intrusion

**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).

With the increasing focus on vapor intrusion issues Linde is offering the PIANO (Parrafinic, Isoparrafinic, Aromatic, Napthenic, and Olefinic) calibration standard. The forensic requirements for vapor intrusion (VI) studies requires this multi-component standard to allow analysts to correctly identify and quantify the compounds of interest. The 80 component volatile/semi-volatile Vapor Intrusion standard is manufactured using exacting micro-grav techniques with all measurements directly traceable to NIST (National Institute of Standards and Technology).

The standard is available in concentrations of either 100 ppb or 1 ppm, and is supplied in our SpectraShield® size 2A cylinder (4000 liters @ 2000 psig).

For improved quality assurance procedures, Linde maintains two distinct lots of raw materials allowing you to order two (2) independent calibration standards from Linde.

### 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.

### Compound [CAS#]

#### Parrafinic

- Pentane [109-66-0]
- Hexane [110-54-3]
- Heptane [142-82-5]
- Octane [11-65-9]
- Nonane [111-84-2]
- Decane [124-18-5]
- Undecane [1120-21-4]
- Dodecane [112-40-3]

#### Isoparrafinic

- Isopentane [78-78-4]
- 2-Methylpentane [107-83-5]
- 3-Methylpentane [96-14-0]
- 2,3-Dimethylbutane [79-29-8]
- 2,3-Dimethylpentane [565-59-3]
- 2,2-Dimethylpentane [590-35-2]
- 2,4-Dimethylpentane [108-08-7]
- 2-Methylhexane [591-76-4]
- 3-Methylhexane [589-34-4]
- 2,3,3-Trimethylpentane [560-21-4]
- 2,3-Dimethylhexane [584-94-1]
- 3-Ethylhexane [619-99-8]
- 2,4-Dimethylhexane [589-43-5]
- 2,2,3-Trimethylpentane [564-02-3]
- 2,5 Dimethylhexane [592-13-2]
- 2,2,4-Trimethylpentane (isooctane) [540-84-1]
- 2,3,4-Trimethylpentane [565-75-3]
- 2-Methylheptane [592-27-8]
- 3-Methylheptane [589-81-1]

#### Aromatic

- Benzene [71-43-2]
- Toluene [108-88-3]
- Ethyl Benzene [100-41-4]
- m + p-Xylene [108-38-3][106-42-3]
- o-Xylene [95-47-6]
- Styrene [100-42-5]
- Isopropylbenzene [98-82-8]
- n-Propylbenzene [103-65-1]
- 1-Methy-3-ethylbenzene [620-14-4]
- 1-Methy-4-ethylbenzene [622-96-8]
- 1,3,5-Trimethylbenzene [108-67-8]
- 1-Methyl-2-ethylbenzene [611-14-3]
- 1,2,4-Trimethylbenzene [95-63-6]
- 1,2,4,5-Tetramethylbenzene [95-93-2]
- 1,2 Diethylbenzene [135-01-3]
- 1-Methyl-2-isopropylbenzene [527-84-4]
- 1-Methyl-3-n-propylbenzene [1074-43-7]
- 1-Methyl-4-n-propylbenzene [1074-55-1]
- 1-Methyl-2-n-propylbenzene [1074-17-5]
- 1,4-Dimethyl-2-ethylbenzene [1758-89-9]
- 1,3-Dimethyl-5-ethylbenzene [934-74-7]
- 1,2-Dimethyl-4-ethylbenzene [934-80-5]
- 1,2-Dimethyl-3-ethylbenzene [933-98-2]
- 1,3-Dimethyl-4-ethylbenzene [874-41-9]
- 1-Methyl-3-isopropylbenzene [535-77-3]
- 1,3 Dimethyl-2-ethylbenzene [2870-04-4]
- sec-Butylbenzene [135-98-8]
- 1-Methyl-4-isopropylbenzene [99-87-6]
- n-Butylbenzene [104-51-8]
- n-Pentylbenzene [538-68-1]
- Naphthalene [91-20-3]

**Compound [CAS#]****Napthenic**

- Cyclopentane [287-92-3]
- Methylcyclopentane [96-37-7]
- Cyclohexane [110-82-7]
- Methylcyclohexane [108-87-2]

**Olefinic**

- 1-Pentene [109-67-1]
- 2-Methyl-1-Butene [563-46-2]
- trans-2-Pentene [646-04-8]
- cis-2-Pentene [627-20-3]
- 1-Hexene [592-41-6]
- 1-Heptene [592-76-7]
- 1-Octene [111-66-0]
- 1-Nonene [124-11-8]
- 1-Decene [872-05-9]

**Thiophene & Fuel Additives**

- 1,2-Dichloroethane [107-06-2]
- 1,2-Dibromoethane [106-93-4]
- tert-amyl methyl ether [994-05-8]
- Diisopropyl ether [108-20-3]
- tert-butyl ethyl ether [637-92-3]
- tert-butyl methyl ether [1634-04-4]
- tertiary butanol [75-65-0]
- Ethanol [64-17-5]

**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 PIANO standard, Linde will perform the initial assay and certification analysis utilizing the regulator and cylinder as a matched set.

Linde's model 7621 regulator is ideal for use with the PIANO 80 component standard. Please see the equipment section for information on this and other gas handling equipment.

**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                |

**Standard Available Cylinders**

| Cylinder Size | Volume      | Pressure  | CGA |
|---------------|-------------|-----------|-----|
| 2A            | 4000 liters | 2000 psig | 350 |

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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