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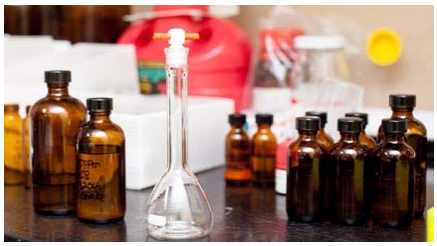
Products for Refinery, Petrochemical, and Fractionation Facilities

Reference standards are individually prepared and custom made to customer specifications. The standards are gravimetrically blended and N.I.S.T. traceable by weight with the reported values verified by one or more analytical techniques. The following is a partial listing of reference standards and products available.



Calibration Standards

Calibration Standards in Cylinders

Total Sulfur Standards
- Gas Phase (N_2, He, C1, C2, C2=, C3, C3= Matrices, ppb to % levels, weight / weight)
- Liquid Phase (LPG & Liquid Hydrocarbon Matrices, ppb to % levels, weight / weight)

Speciated Sulfur Standards
- Gas Phase (N_2, He, C1, C2, C2=, C3, C3= Matrices, ppb to % levels)
- Liquid Phase (LPG & Liquid Hydrocarbon Matrices, ppb to % levels)

Total Organic Nitrogen Standards
- Gas Phase (N_2, He, C1, C2, C2=, C3, C3= Matrices, ppb to % levels, weight / weight)
- Liquid Phase (LPG & Liquid Hydrocarbon Matrices, ppb to % levels, weight / weight)

Speciated Organic Nitrogen Standards
- Gas Phase (N_2, He, C1, C2, C2=, C3, C3= Matrices, ppb to % levels)
- Liquid Phase (LPG & Liquid Hydrocarbon Matrices, ppb to % levels)

Low Level Oxygenate Standard
- Contains 50 ppm each of the following by weight: Methanol, N-Propanol (1-Propanol), Isopropanol (2-Propanol), N-Butyl Alcohol (1-Butanol), Sec Butyl Alcohol (2-Butanol), 2-Butanone (Methyl Ethyl Ketone), MTBE, Ethanol, Acetone, Tertiary Butyl Alcohol (2-Methyl-2-Propanol), Isobutyl Alcohol (2-Methyl-1-Propanol), TAME, SBME, ETBE, & 200 ppm by weight of Dimethyl Ether in N-Butane.

Total Fluoride in N-Butane
- ≥ 1 ppm Total Fluoride from 2-Fluoropropane in N-Butane by weight

Acetaldehyde in LPG

Refinery Gas Standards
- Custom Refinery Gas Standards
- Refinery Gas Standards with Hydrogen Sulfide
- Refinery Gas Standards # 1, 2 & 5 in one liter refillable cylinders

Methane/Hydrogen Standards

Ethane Standards
- C2 Standards
- CO, CO_2, C2

Ethane/Propane (E/P) Standards

Ethylene Standards
- CO, CO_2, C2=
- High Purity C2=
- Hydrogen/Ethylene Standards
- Oxygen/Nitrogen/Ethylene

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Propane Standards
- Propane with Olefins
- High Purity Propane

Propane/Propylene Standards

Propylene Standards
- Low CO, CO_2, C3=
- Low O_2, H_2, N_2, C3=
- ppb & > H_2S, COS, C3=
- Methanol/C3=
- High purity C3=

Butane/Propane Standards

Butane Standards
- C4's with Olefins
- Mixed C4's
- High Purity IC4
- High Purity NC4

Butane/Gasoline Standards

1,3 Butadiene Standards
- Refined BD
- Crude BD

Liquefied Petroleum Gas Standards
- Custom Standards

Natural Gas Standards
- With Hydrogen Sulfide
- With high Carbon Dioxide
- With high Ethane
- For Hexanes Plus Backflush
- For Extended Analysis
- For High, Medium, and Low BTU Gas
- BTU Standards
- Specific Gravity Standards
- BTEX Standards
- NG Standards 1, 2 & 3 in One Liter Refillable Cylinder
- For all types of NG Analyzers

Natural Gas Liquids
- NGL # 5 & 6
- E/P Standards
- Condensate Standards
- Custom Standards

HRVOC Standards

Oxygen in N_2, He, etc., ppm to % levels

Custom Standards available upon request

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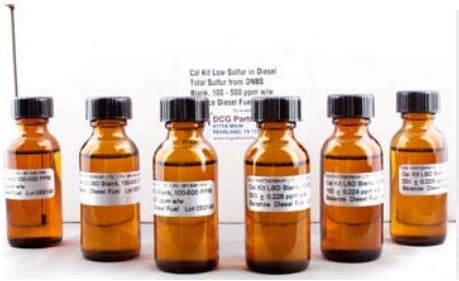
Calibration Standards in Ampoules and Bottles



EPA Ultra Low & Low Sulfur Diesel Standards and Samples for Laboratory Qualification

For compliance with the precision and accuracy criteria for approval of test methods for determining the sulfur content of motor vehicles and NRLM diesel fuel under EPA Motor Vehicle Diesel Fuel Sec. 80.580 to 80.585 of TITLE 40 – PROTECTION OF ENVIRONMENT CHAPTER 1 – ENVIRONMENTAL PROTECTION AGENCY PART 80 – REGULATION OF FUELS AND FUEL ADDITIVES.

- **Part Number: EPA Ultra Low Sulfur in Diesel Fuel Precision Sample 1**
  - (5 – 15 ppm S from Di-N-Butylsulfide in Diesel Fuel matrix)
- **Part Number: EPA Ultra Low Sulfur in Diesel Fuel Precision Sample 2**
  - (200 – 500 ppm S from Di-N-Butylsulfide in Diesel Fuel matrix)
- **Part Number: EPA Ultra Low Sulfur Diesel Accuracy Standard 1**
  - (1 – 10 ppm S from Di-N-Butylsulfide in Diesel Fuel matrix)
- **Part Number: EPA Ultra Low Sulfur Diesel Accuracy Standard 2**
  - (10 – 20 ppm S from Di-N-Butylsulfide in Diesel Fuel matrix)
- **Part Number: EPA Ultra Low Sulfur Diesel Accuracy Standard 3**
  - (100 – 200 ppm S from Di-N-Butylsulfide in Diesel Fuel matrix)
- **Part Number: EPA Ultra Low Sulfur Diesel Accuracy Standard 4**
  - (400 – 500 ppm S from Di-N-Butylsulfide in Diesel Fuel matrix)

Sulfur in Diesel Fuel Calibration Kits for ASTM D2622 & D5453

- **Part Number: Cal Kit ULSD 1 – 20**
  - Contains: Blank, 1.0, 2.5, 5.0, 10.0, 15.0, 20.0 ppm S from Di-N-Butylsulfide in Diesel Fuel matrix
- **Part Number: Cal Kit ULSD 20 – 100**
  - Contains: Blank, 20.0, 35.0, 50.0, 75.0, 100 ppm S from Di-N-Butylsulfide in Diesel Fuel matrix
- **Part Number: Cal Kit LSD 100 – 500**
  - Contains: Blank, 100, 200, 300, 400, 500 ppm S from Di-N-Butylsulfide in Diesel Fuel matrix

Low Sulfur In Gasoline Calibration Kits for ASTM D2622, D4294, D5453, D6334 & 6445

For compliance with the requirements of EPA 80.190 to 80.415 of TITLE 40 – PROTECTION OF ENVIRONMENT CHAPTER 1 – ENVIRONMENTAL PROTECTION AGENCY PART 80 – REGULATION OF FUELS AND FUEL ADDITIVES.

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- **Part Number: Cal Kit SG 10 – 50**
  - Contains: Blank, 10.0, 20.0, 30.0, 40.0, 50.0 ppm S from Di-N-Butylsulfide in Gasoline matrix
- **Part Number: Check Standard SG 25**
  - Contains: 25.0 ppm S from Di-N-Butylsulfide in Gasoline matrix check standard
- **Part Number: Cal Kit SG 50 – 125**
  - Contains: Blank, 50.0, 65.0, 80.0, 95.0, 110, 125 ppm S from Di-N-Butylsulfide in Gasoline matrix
- **Part Number: Check Standard SG 75**
  - Contains: 75.0 ppm S from Di-N-Butylsulfide in Gasoline matrix check standard
- **Part Number: Cal Kit SG 110 – 500**
  - Contains: Blank, 110, 200, 300, 400, 500 ppm S from Di-N-Butylsulfide in Gasoline matrix
- **Part Number: Check Standard SG 175**
  - Contains: 175 ppm S from Di-N-Butylsulfide in Gasoline matrix check standard

Ampoule Standards for Sulfurs

ASTM Methods

- D2622 Sulfur in Petroleum Products by Wavelength Dispersive X-Ray Fluorescence Spectrometry
- D3120 Trace Quantities of Sulfur in Light Petroleum Hydrocarbons by Oxidative Microcoulometry
- D3246 Sulfur in Petroleum Gas by Oxidative Microcoulometry
- D4045 Sulfur in Petroleum Products by Hydrogenalysis and Rateometric Colorimetric
- D4294 Sulfur in Petroleum and Petroleum Products by Energy Dispersive X-Ray Fluorescence Spectrometry
- D4735 Trace Thiophene in Refined Benzene between 0.5 – 5.0 ppm by FPD
- D5453 Total Sulfur in Light Hydrocarbons, Motor Fuels & Oil by Untraviolet Fluorescence
- D5623 Sulfur Compounds in Light Petroleum by GC & Sulfur Selective Detection (also available in cylinders)
- D6212 Total Sulfur in Aromatic Compounds by Hydrogenalysis and Rateometric Colorimetry
- D6313 Total Sulfur in Aromatic Compounds by Hydrogenalysis and Sulfur Specific Difference Photometry
- D6334 Sulfur in Gasoline by Wavelength Dispersive X-Ray Fluorescence
- D6428 Total Sulfur in Liquid Aromatic Hydrocarbons and their Derivatives by Oxidation Combustion & Electrochemical Detection
- D6445 Sulfur in Gasoline by Energy-Dispersive Fluorescence Spectrometry

Ampoule Standards for Nitrogens

ASTM Methods

- D4629 Trace Nitrogen in Liquid Petroleum Hydrocarbons by Syringe/Inlet Oxidation Combustion and Chemiluminescence Detection
- D5762 Nitrogen in Petroleum and Petroleum Products by Boat-Inlet Chemiluminescence
- D6069 Trace Nitrogen in Aromatic Hydrocarbons by Oxidation Combustion & Reduced Pressure Chemiluminescence Detection
- D6366 Total Trace Nitrogen and its derivatives in Liquid Aromatic Hydrocarbons by Oxidative Combustion & Electrochemical Detection

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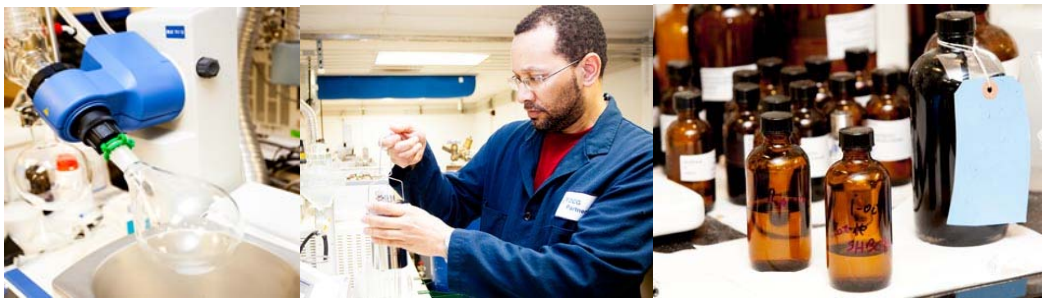
Ampoule Standards for Oxygenates

ASTM Methods

- D4815 Determination of MTBE, ETBE, TAME, DIPE, tertiary-Amyl Alcohol and C1 to C4 Alcohols in Gasoline by GC
- D5599 Determination of Oxygenates in Gasoline by Gas Chromatography and Oxygen Selective Flame Ionization Detector
- Low Level Oxygenate Standard

Custom Standards available upon request

Sample Analysis



Total Sulfur Analysis

- In diesel and gasoline according to ASTM D5453
- In LPG and gases according to ASTM D6667

Detailed Sulfur Analysis

- In gasoline, diesel and other liquid hydrocarbon matrices
- In LPG and gases

Organic Nitrogen Analysis in LPG

Methanol Analysis in Natural Gas

Oxygenate Analysis in LPG

Detailed Hydrocarbon Analysis

- In gasoline, reformulated gasoline and other liquid hydrocarbon matrices
- Solvent purity
- In LPG and gases

GC-MS Analysis

- Solvent impurities identification
- Almost any hydrocarbon matrix
- Special samples

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Regulators & Switchover Manifold Systems



Brass Regulators

- Single stage & Double stage with brass barstock body and 316L stainless steel diaphragm
- Single stage & Double stage with chrome-plated brass forged body with 316L stainless steel diaphragm
- In-line regulator with brass barstock body and 316L stainless steel diaphragm
- Lecture bottle regulators
- Regulators for one liter steel cylinders

Stainless Steel Regulators

- Single stage & Double stage with 1316L stainless steel barstock body and 316L stainless steel diaphragm
- In-line regulator with stainless steel barstock body and 316L stainless steel diaphragm
- Lecture bottle regulators
- Regulators for one liter aluminum cylinders
- Vaporizing regulator, single stage stainless steel

Automatic Switchover Manifold Systems Brass and 316L Stainless Steel Components

- Automatic Switchover System with pressure switches and brass components with or without remote alarm
- Automatic Switchover System with pressure switches and 316L stainless steel components with or without remote alarm
- Automatic Switchover System with pressure transducers with brass and 316L stainless steel components with or without remote alarm
- Protocol Switchover Station
- Automatic Switchover System, liquid primary with high pressure reserve and brass components
- Automatic Switchover System, liquid primary with high pressure reserve and 316L stainless steel components
- Automatic Switchover System with brass components with or without tee purge valves
- Automatic Switchover System with 316L stainless steel components with or without tee purge
  valves

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- Braided stainless steel pigtails
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- 1/8” stainless steel seamless tubing @ 8 watts per foot (other sizes available)
- Kits, thermostats, accessories, and instruction manuals necessary for heat trace tubing installation

Cylinders



Aluminum, High Pressure with tapered threads

- 1 AL (1 Liter Aluminum) with aluminum CGA 180 valve, 3.2" X 12", 4 lbs.
- AL 30: 7.25" X 21", 20 lbs.
- Al 80: 7.25" X 40", 40 lbs.
- Al 150: 8" X 53", 60 lbs.

Steel, High Pressure with tapered threads

- Size 200: 9" X 56", 120 lbs.

Steel, Low Pressure with tapered threads

- 1 L (1 Liter low pressure cylinder) with brass CGA 170 valve, 3" X 12", 2 lbs.
- LP 2.5: 8" X 18", 20 lbs.
- LP 5: 12" X 18", 20 lbs.
- LP 143: 12" X 46", 50 lbs.
- LP 239: 15" X 48", 75 lbs.

Constant Pressure Cylinders

- 300 cc Constant Pressure Cylinder
- 500 cc Constant Pressure Cylinder
- 1000 cc Constant Pressure Cylinder
- Carry Case for Constant Pressure Cylinders

CGA Fittings for Valves

Safety Accessories

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- Cylinder Brackets
- Cylinder Stands

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