Scott Gas Standards

SCOTTY General Use Standards

Scott Specialty Gases

We offer an expanded line of pure gases and gas mixtures, manufactured for Supelco by Scott Specialty Gases.

Supelco warrants that the Scott calibration gas products listed below meet the analytical specifications for the period of time stated on the cylinder and/or the Certificate of Analysis. Shelf life 1 year, unless otherwise noted.

SPECIFICATIONS

SCOTTY 4

Contents: 4 liters, Pressure: 120psig, Outlet Fitting: Aerosol-type push button with applicator tube, Weight: ~100g, Dimensions: 2.5 x 8 in., D.O.T. Specs: 2Q

SCOTTY 14

Contents: 14 liters, Pressure: 240psig, Outlet Fitting: CGA-160-1/8" NPT F, Weight: 1.5 lb., Dimensions: 3 x 11 in., D.O.T. Specs: 4B240

SCOTTY 48

Contents: 48 liters, Pressure: 300psig, Outlet Fitting: CGA-165, Weight: 1.75 lb., Dimensions: 4 x 16.25 in., D.O.T. Specs: 39 NRC

SCOTTY 48-EL

Contents: 75 liters, Pressure: 480psig, Outlet Fitting: CGA-170, Weight: 1.75 lb., Dimensions: 4 x 16.25 in., D.O.T. Specs: 39 NRC

SCOTTY 104

Contents: 104 liters, Pressure: 1800psig, Outlet Fitting: CGA-180, Weight: 2.2 lb., Dimensions: 3.25 x 12.25 in., D.O.T. Specs: 3AL1800

GAS COMPOSITION AND CONCENTRATION	CYLINDER	CAT. NO.	PRICE
PURE GASES			
Air, zero (THC < 1ppm)	SCOTTY 4 SCOTTY 14 SCOTTY 48	501212 501220 501239	
Argon 99.995%	SCOTTY 4 SCOTTY 14	501247 501255	
Carbon dioxide 99.8%*	SCOTTY 14 SCOTTY 48	23402 501298	
Ethylene	SCOTTY 14	25881-U	
Hydrogen 99.99%	SCOTTY 14	300100	
Methane 99.0%	SCOTTY 14	22562	
Nitrogen	SCOTTY 4 SCOTTY 14	25877-U 25879-U	
Oxygen 99.6%	SCOTTY 14	300500	
TWO-COMPONENT MIXTURES			
Benzene in air (1ppm)	SCOTTY 48	303402-U	
Benzene in air (100ppm)	SCOTTY 48	303404	
1,3-Butadiene in nitrogen (10ppm)	SCOTTY 14 SCOTTY 48	303405 303406	
Carbon dioxide in helium (100ppm)*	SCOTTY 14	308200	
Carbon dioxide in nitrogen (100ppm)	SCOTTY 14 SCOTTY 48	308300 501301	
Carbon dioxide in nitrogen (1000ppm)	SCOTTY 14 SCOTTY 48	501336 501344	
Chlorine in nitrogen (10ppm)**	SCOTTY 104	501352	
Ethylene in air (10ppm)*	SCOTTY 14	501379	
Ethylene in helium (100ppm)	SCOTTY 14	22572	
Hydrogen in helium(100ppm)	SCOTTY 14	301200	
Hydrogen in nitrogen (1%)	SCOTTY 14 SCOTTY 48	501417 501425	
Hydrogen in nitrogen (100ppm)	SCOTTY 14	301300	
Methane in helium (100ppm)	SCOTTY 4 SCOTTY 14 SCOTTY 48	501441 307200 501468	
Methane in nitrogen (100ppm)	SCOTTY 14	307300-U	
Methane in nitrogen (1%)	SCOTTY 4 SCOTTY 14	501476 23443	
Nitrogen in helium (100ppm)	SCOTTY 14	303200	
Nitrous oxide in nitrogen (1ppm)	SCOTTY 14 SCOTTY 48	501514 501522	
Nitrous oxide in nitrogen (10ppm)	SCOTTY 48	25883-U	
Oxygen in helium (10ppm)	SCOTTY 4	25878-U	

Scott Gas Standards
SCOTTY General Use Standards

GAS COMPOSITION AND CONCENTRATION	CYLINDER	CAT. NO.	PRICE
Oxygen in helium (100ppm)	SCOTTY 14	305200	
Oxygen in nitrogen (2%)	SCOTTY 14	501549	
	SCOTTY 48	501557	
Oxygen in nitrogen (6%)	SCOTTY 4	501565	
	SCOTTY 14	501573	
Oxygen in nitrogen (10%)	SCOTTY 14	25880-U	
1,1,1-Trichloroethane in nitrogen (10ppm)	SCOTTY 48	303408	
Trichloroethylene in nitrogen (10ppm)	SCOTTY 14	303400	
	SCOTTY 48	303401	
Vinyl chloride in nitrogen (1ppm	SCOTTY 14	22554	
	SCOTTY 48	501603	
Vinyl chloride in nitrogen (10ppm)	SCOTTY 14	22553	
Vinyl chloride in nitrogen (50ppm)	SCOTTY 14	22555-U	
Vinyl chloride in nitrogen (100ppm)	SCOTTY 14	22552	
Vinyl chloride in nitrogen (1000ppm)	SCOTTY 14	22556	
THREE-COMPONENT MIXTURES			
Carbon Dioxide and oxygen in nitrogen (1% / 20%)	SCOTTY 14	23441	
	SCOTTY 48	501638	
MULTI-COMPONENT MIXTURES			
Carbon monoxide, carbon dioxide, hydrogen & oxygen each at 0.5% in nitrogen	SCOTTY 14	23438	
	SCOTTY 48	501654	
Carbon monoxide, carbon dioxide, methane, ethane, ethylene & acetylene each at 1% in nitrogen	SCOTTY 4	501662	
	SCOTTY 14	23437	
	SCOTTY 48	23462	
Methane, carbon monoxide, carbon dioxide, hydrogen & oxygen each at 1% in nitrogen	SCOTTY 4	501670	
	SCOTTY 14	22561	
	SCOTTY 48	23463	
Carbon monoxide, carbon dioxide, nitrogen, & oxygen each at 5%, methane & hydrogen each at 4% in helium	SCOTTY 14	501697	
Carbon monoxide at 7%, carbon dioxide at 15% & oxygen at 5% in nitrogen	SCOTTY 14	23442	
Carbon monoxide & oxygen each at 7%, carbon dioxide at 15% and methane at 4.5% in nitrogen	SCOTTY 14	501743	
	SCOTTY 48	501751	
Branched paraffins, each at 15ppm: iso-butane, 2-methylbutane, 2,2-dimethylpropane, 2-methylpentane, 3-methylpentane, 2,2-dimethylbutane in nitrogen	SCOTTY 14	23445	
C1-C6 n-Paraffins, each at 15ppm: methane, ethane, propane, butane, pentane & hexane in nitrogen	SCOTTY 4	501778	
	SCOTTY 14	23444	
	SCOTTY 48	501786	
C1-C6 n-Paraffins, each at 100ppm: methane, ethane, propane, butane, pentane, hexane in nitrogen	SCOTTY 4	501840	
	SCOTTY 14	330300	
	SCOTTY 48	501859	
C1-C6 n-Paraffins, each at 100ppm: methane, ethane, propane, butane, pentane, hexane in helium	SCOTTY 4	501794	
	SCOTTY 14	330200	
	SCOTTY 48	501808	
C1-C6 n-Paraffins, each at 1000ppm: methane, ethane, propane, butane, pentane, hexane in helium	SCOTTY 4	501816	
	SCOTTY 14	501824	
	SCOTTY 48	501832	
C2-C4 Alkynes, each at 15ppm: acetylene, propyne, 1-butyne, 2-butyne in nitrogen	SCOTTY 4	22508	
C2-C6 Olefins, each at 100ppm: ethylene, propylene, 1-butene, 1-pentene, 1-hexene in nitrogen	SCOTTY 14	332300-U	
	SCOTTY 48	501875	
C2-C6 Olefins, each at 100ppm: ethylene, propylene, 1-butene, 1-pentene, 1-hexene in helium	SCOTTY 14	332200	
	SCOTTY 48	501867	
Methane, ethane, ethylene, acetylene, propane, propylene, propyne, n-butane each at 15ppm in nitrogen	SCOTTY 4	22566	
	SCOTTY 48	23470-U	
n-Butane, iso-butane, cis-2-butene, trans-2-butene, 1-butene, iso-butylene, 1,3-butadiene, ethyl acetylene each at 15ppm in nitrogen	SCOTTY 4	22567	
	SCOTTY 48	23471	
BTEX Mix**: benzene, ethylbenzene, toluene, m-xylene, o-xylene, p-xylene, each at 10ppm in nitrogen	SCOTTY 48	501883	
	SCOTTY 48-EL	25884-U	

* Pressure restricted due to either vapor pressure restriction or flammable oxidizer restriction.

** Maximum usable shelf life 6 months from date of manufacture. Supelco guarantees 4 months of usable shelf life from date of pu rchase.

Scott Gas Standards

Natural Gas Standards, SCOTTY Accessories

Natural Gas Reference Standards

Prepared gravimetrically with weights traceable to the National Institute of Standards and Technology, then verified by analysis. In 14-liter SCOTTY 14 cylinders. Shelf life: 1 year.

COMPONENT (MOLE PERCENT)	GPA STANDARD	CALORIMETRIC STANDARD	HIGH ETHANE STANDARD	HELIUM-ENRICHED STANDARD
Helium	0.50	–	–	2.00
Nitrogen	5.00	2.50	9.00	1.60
Carbon dioxide	1.00	3.00	0.50	0.20
Methane	70.50	88.73	64.00	88.90
Ethane	9.00	3.50	12.50	3.00
Propane	6.00	1.00	7.00	1.70
Isobutane	3.00	0.40	3.00	1.00
n-Butane	3.00	0.40	3.00	1.00
Isopentane	1.00	0.15	0.50	0.30
n-Pentane	1.00	0.15	0.50	0.30
Neopentane	–	0.10	–	–
n-Hexane	–	0.05	–	–
n-Heptane	–	0.02	–	–

STANDARD	BTU	QTY.	CAT. NO.	PRICE
GPA	1298	785g	303100-U	
Calorimetric	1028	790g	303101	
High Ethane	1500	763g	303102	
Helium-Enriched	1083	774g	303103	

P000160

Syringe Adapter for SCOTTY 14 and 48 Cylinders

Withdraw calibration gas into a syringe, through a silicone rubber septum. A vent at the septum permits purging prior to filling the syringe. Constructed of chromium-plated brass. Maximum pressure 240psi (16.9kg/cm^2). 1/8" NPT male fitting.

DESCRIPTION	CAT. NO.	PRICE
Syringe Adapter	609010	
Additional Septa (pk. of 10)	608010	

P000158

Stand for SCOTTY 48 Cylinder

Stabilizes your cylinder on a benchtop or other surface.

DESCRIPTION	CAT. NO.	PRICE
Stand	500410	

P000159

Stand for SCOTTY 104 Cylinder

Ensures your SCOTTY 104 cylinder will be stable on a bench-top or other surface.

DESCRIPTION	CAT. NO.	PRICE
Stand	41909	

Model 24 and Model 26 SCOTTY Single-Stage, General Purpose Regulators for SCOTTY 14, 48 and 48-EL Cylinders

Designed for noncorrosive service. Gauge displays remaining cylinder pressure, regulator adjusts delivery pressure

- Brass body with acetal resin bonnet/Viton diaphragm
- Tamper resistant, locking control knob
- Inlet connection 1/4 inch AN flare (CGA-165 or CGA-160)
- Maximum inlet pressure 300psig
- Delivery pressure range 1-60psig, can be preset
- Miniature

DESCRIPTION	CAT. NO.	PRICE
Model 24 Single-Stage Regulator		
with CGA-160 (for SCOTTY 14)	507911	
with CGA-165 (for SCOTTY 48)	501395	
Model 26 Single-Stage Regulator		
with CGA-170 (for SCOTTY 48-EL)	25885-U	

Pressure Regulator
for SCOTTY 14 Cylinders

Reliable pressure regulation to 1psig (0.07kg/cm^2) indicated on a 0-60psi (4.2kg/cm^2) gauge. Easily connects to SCOTTY cylinders with the 1/8" NPT connector provided. You can also attach the syringe adapter (Cat. No. 609010) to the regulator for low pressure sample removal. Aluminum body with acetyl resin bonnet. Maximum inlet pressure: 400psi (28.1kg/cm^2)

DESCRIPTION	CAT. NO.	PRICE
Regulator	513010	

Petroleum Standards
PNA / PONA / PIANO

P-N-A, P-O-N-A, P-I-A-N-O Analyses

Use these mixes to determine retention times and indices and monitor response factors for components of complex mixtures of hydrocarbons. These standards are complex mixes of known quantities of hydrocarbons, accurately prepared by weight to four decimal places.Typical values are listed here; exact values will differ slightly from lot to lot.

- Formulations are weight percent.
- Each mix includes a detailed data sheet listing components by weight percent, mole percent, and liquid volume percent, retention times and retention indices for each component, and other information.
- A chromatogram from a 100-meter Petrocol DH capillary column (including conditions) is provided.
- Products are supplied in crimp-top vials with hole caps and septa. The shelf life of the unopened, refrigerated mixes is 1 year

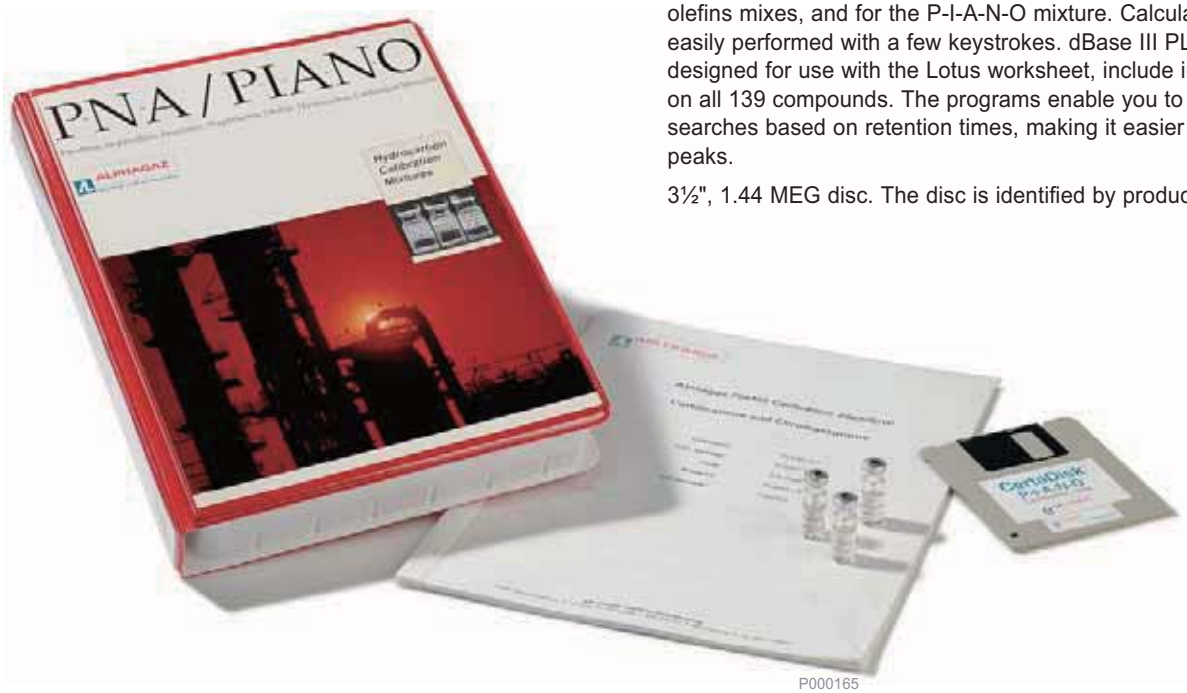
Quantitative Reference Standards

MIXES AND SOLUTIONS	COMPOSITION		QTY.	CAT. NO.	PRICE
n-Paraffins Mix■	11 n-paraffins (typical values shown)		0.1mL	44585-U	
	n-Pentane, 11.393%	n-Undecane, 7.645%			
	n-Hexane, 10.963%	n-Dodecane, 7.768 %			
	n-Heptane, 12.239%	n-Tridecane, 6.371%			
	n-Octane, 10.088%	n-Tetradecane, 5.903%			
	n-Nonane, 13.204%	n-Pentadecane, 7.723%			
	n-Decane, 6.703%				
Isoparaffins Mix■	37 isoparaffins (typical values shown)		0.1mL	44586-U	
	Isopentane, 2.553%	3-Methylheptane, 3.785%			
	2,3-Dimethylbutane, 1.438%	3-Ethylhexane, 2.927%			
	2-Methylpentane, 4.356%	2,5-Dimethylheptane, 3.081%			
	3-Methylpentane, 3.147%	3,5-Dimethylheptane (D), 0.378%			
	2,2-Dimethylpentane, 4.189%	3,3-Dimethylheptane, 3.258%			
	2,4-Dimethylpentane, 3.116%	3,5-Dimethylheptane (L), 0.378%			
	2,2,3-Trimethylbutane, 3.149%	2,3-Dimethylheptane, 1.540%			
	3,3-Dimethylpentane, 1.308%	3,4-Dimethylheptane (D), 1.722%			
	2-Methylhexane, 3.551%	3,4-Dimethylheptane (L), 2.022%			
	2,3-Dimethylpentane, 1.612%	2-Methyloctane, 5.093%			
	3-Methylhexane, 4.456%	3-Methyloctane, 2.731%			
	3-Ethylpentane, 1.600%	3,3-Diethylpentane, 3.335%			
	2,2-Dimethylhexane, 1.439%	2,2-Dimethyloctane, 3.126%			
	2,5-Dimethylhexane, 3.195%	3,3-Dimethyloctane, 1.718%			
	2,2,3-Trimethylpentane, 3.185%	2,3-Dimethyloctane, 1.646%			
	2,4-Dimethylhexane, 1.574%	2-Methylnonane, 3.343%			
	2,3-Dimethylhexane, 1.365%	3-Ethyloctane, 3.301%			
	2-Methylheptane, 4.641%	3-Methylnonane, 3.387%			
	4-Methylheptane, 3.377%				
Naphthenes Mix■	30 naphthenes (typical values shown)		0.1mL	44588	
	Cyclopentane, 5.805%	ccc-1,2,3-Trimethylcyclopentane, 1.622%			
	Methylcyclopentane, 8.728%	Isopropylcyclopentane, 1.853%			
	Cyclohexane, 5.758%	cis-1,2-Dimethylcyclohexane, 3.065%			
	1,1-Dimethylcyclopentane, 3.370%	n-Propylcyclopentane, 1.966%			
	cis-1,3-Dimethylcyclopentane, 1.962%	ccc-1,3,5-Trimethylcyclohexane, 2.983%			
	trans-1,3-Dimethylcyclopentane, 2.689%	1,1,4-Trimethylcyclohexane, 4.873%			
	trans-1,2-Dimethylcyclopentane, 3.087%	ctt-1,2,4-Trimethylcyclohexane, 1.501%			
	Methylcyclohexane, 8.992%	ctc-1,2,4-Trimethylcyclohexane, 3.510%			
	Ethylcyclopentane, 1.773%	1,1,2-Trimethylcyclohexane, 3.324%			
	ctc-1,2,4-Trimethylcyclopentane, 3.721%	Isobutylcyclopentane, 3.419%			
	ctc-1,2,3-Trimethylcyclopentane, 3.419%	Isopropylcyclohexane, 3.437%			
	cct-1,2,4-Trimethylcyclopentane, 1.438%	n-Butylcyclopentane, 3.420%			
	trans-1,4-Dimethylcyclohexane, 3.713%	Isobutylcyclohexane, 3.805%			
	1-Ethyl-1-methylcyclopentane, 1.634%	t-1-Methyl-2-propylcyclohexane, 3.576%			
	trans-1,2-Dimethylcyclohexane, 3.644%	t-1-Methyl-2-(4MP)cyclopentane, 1.636%			
Olefins Mix■	25 olefins (typical values shown)		0.1mL	44589	
	3-Methyl-1-butene, 1.478%	trans-3-Heptene, 2.173%			
	1-Pentene, 5.640%	cis-3-Heptene, 4.587%			
	2-Methyl-1-butene, 1.880%	trans-2-Heptene, 2.206%			
	2-Methyl-1,3-butadiene, 2.389%	cis-2-Heptene, 4.338%			
	trans-2-Pentene, 4.024%	1-Octene, 8.220%			
	cis-2-Pentene, 2.305%	trans-2-Octene, 2.206%			
	4-Methylpentene-1	cis-2-Octene, 4.766%			
	1-Hexene, 7.693%	1-Nonene, 9.192%			
	trans-2-Hexene, 1.744%	trans-3-Nonene, 2.256%			
	2-Methylpentene-2, 4.054%	cis-3-Nonene, 1.946%			
	cis-2-Hexene, 1.825%	trans-2-Nonene, 2.091%			
	1-Heptene, 8.716%	cis-2-Nonene, 1.881%			
	1-Decene, 7.665%				

■ For information on a kit containing these products, see the following page (Cat. No. 44594-U).

Petroleum Standards
PNA / PONA / PIANO

MIXES AND SOLUTIONS	COMPOSITION	QTY.	CAT. NO.	PRICE
Aromatics Mix	37 aromatics (typical values shown) Benzene, 3.139% Toluene, 4.563% Ethylbenzene, 1.570% m-Xylene, 2.939% p-Xylene, 2.982 % o-Xylene, 3.208% Isopropylbenzene, 3.127% n-Propylbenzene, 1.705% 1-Methyl-3-ethylbenzene, 2.903% 1-Methyl-4-ethylbenzene, 3.166% 1,3,5-Trimethylbenzene, 3.427% 1-Methyl-2-ethylbenzene, 4.460% 1,2,4-Trimethylbenzene, 4.315% tert-Butylbenzene, 2.667% Isobutylbenzene, 0.845% sec-Butylbenzene, 1.469% 1-Methyl-3-isopropylbenzene, 1.403% 1-Methyl-4-isopropylbenzene, 2.789% 1-Methyl-2-isopropylbenzene, 2.631% 1-Methyl-3-n-propylbenzene, 3.214% 1-Methyl-4-n-propylbenzene, 1.444% n-Butylbenzene, 2.894% 1,3-Dimethyl-5-ethylbenzene, 1.306% 1,2-Diethylbenzene, 3.063% 1-Methyl-2-n-propylbenzene, 1.449% 1,4-Dimethyl-2-ethylbenzene, 2.985% 1,2-Dimethyl-4-ethylbenzene, 2.706% 1,3-Dimethyl-2-ethylbenzene, 2.702% 1,2-Dimethyl-3-ethylbenzene, 2.956% 1,2,4,5-Tetramethylbenzene, 1.966% 2-Methylbutylbenzene, 1.432% n-Pentylbenzene, 1.466% t-1-Butyl,3,5-dimethylbenzene, 2.920% t-1-Butyl-4-ethylbenzene, 2.900% 1,3,5-Triethylbenzene, 1.850% 1,2,4-Triethylbenzene, 3.104% n-Hexylbenzene, 4.641%	0.1mL	44587	
P-I-A-N-O Mix	139 n-paraffins, isoparaffins, aromatics, naphthenes, and olefins A quantitative mix of the components in the five mixes described above and on the previous page. Data sheets for each class of compounds list weight percent, mole percent, and other information for each component. Approximate weight percentages: n-Paraffins, 18.9% Isoparaffins, 18.8% Aromatics, 23.3% Naphthenes, 20.5% Olefins, 18.5%	0.1mL	44593-U	
P-I-A-N-O Kit	One of each of the following mixes n-Paraffins Mix (44585-U) Isoparaffins Mix (44586-U) Naphthenes Mix (44588) Olefins Mix (44589) Aromatics Mix (44587) P-I-A-N-O Mix (44593-U)		44594-U	



P000165

RELATED INFORMATION

Included with P-I-A-N-O Mix and P-I-A-N-O Kit, Data Disc Makes it Easier to Organize P-I-A-N-O Data

The P-I-A-N-O CertaDisc Certification Worksheet and Database can greatly simplify the task of organizing certification data. A worksheet (Lotus 1-2-3 format) contains complete certification data for the n-paraffins, isoparaffins, aromatics, naphthenes, and olefins mixes, and for the P-I-A-N-O mixture. Calculations are easily performed with a few keystrokes. dBase III PLUS programs, designed for use with the Lotus worksheet, include information on all 139 compounds. The programs enable you to perform searches based on retention times, making it easier to identify peaks.

3½", 1.44 MEG disc. The disc is identified by product lot number.

Petroleum Standards
ASTM D2887, ASTM D3710

ASTM D2887

MIXES AND SOLUTIONS	QTY.	CAT. NO.	PRICE
ASTM D2887 Reference Gas Oil Sample, Lot 2 ▪	1 x 1mL	506419	
	6 x 1mL	48873	

▪ This sample is a petroleum fraction having a boiling range from 250°F to 850°F, evaluated in round-robin studies by the ASTM. Use this sample and the supplied ASTM boiling range consensus values to evaluate system performance.

ASTM D3710

Boiling Range Distribution of Gasoline (500°F maximum) These qualitative and quantitative hydrocarbon blends are prepared according to ASTM recommendations. Calibration mixes are either volume/volume or weight/weight formulations as indicated. Nominal concentration of actual values will differ from lot to lot. Qualitative calibration references are prepared to approximate weight/weight (±10%) specifications and, because of the presence of gases, are not intended for quantitative use. Quantitative calibration references are accompanied by a data sheet.

MIXES AND SOLUTIONS	COMPOSITION	QTY.	CAT. NO.	PRICE
ASTM D3710 Qualitative Calibration Mix	Each of the following components in the approximate proportions (w/w) indicated	1 x 1mL	506427	
		6 x 1mL	48884	
	n-Propane, 1.5% 2-Methylpropane, 1.5% n-Butane, 4 5% 2-Methylbutane, 9.7% n-Pentane, 7.6% 2-Methylpentane, 5.4% n-Hexane, 5.4% 2,4-Dimethylpentane, 5.4% n-Heptane, 9.7% Toluene, 10.8% n-Octane, 5.4% p-Xylene, 13.0% n-Propylbenzene, 4.3% n-Decane, 3.2% n-Butylbenzene, 3.2% n-Dodecane, 3.2% n-Tridecane, 2.2% n-Tetradecane, 2.2% n-Pentadecane, 2.2%			
ASTM D3710 Quantitative Calibration Mix	Each of the following components in the proportions (w/w) indicated	1 x 1mL	506435	
		6 x 1mL	48879	
	2-Methylbutane, 10.5% n-Pentane, 8.1% 2-Methylpentane, 5.8% n-Hexane, 5.8% 2,4-Dimethylpentane, 5.8% n-Heptane, 10.5% Toluene, 11.6% n-Octane, 5.8% p-Xylene, 14.0% n-Propylbenzene, 4.7% n-Decane, 3.5% n-Butylbenzene, 3.5% n-Dodecane, 3.5% n-Tridecane, 2.3% n-Tetradecane, 2.3% n-Pentadecane, 2.3%			
ASTM D2887/D5307 Column Resolution Test Mix	Each of the following components at 1% (w/v) in n-octane	6 x 1mL	48889	
	n-Hexadecane n-Octadecane			
ASTM D2887 Quantitative Calibration Solution	Prepared in carbon disulfide at 0.5 weight percent each component (except for nC16 and nC18, which are at 1 weight percent)	1 x 1mL	500631	
		6 x 1mL	500658	
	Use for assessing column resolution as well as for quantitative analyses. n-Pentane n-Hexane n-Heptane n-Octane n-Nonane n-Decane n-Undecane n-Dodecane n-Tetradecane n-Pentadecane n-Hexadecane n-Heptadecane n-Octadecane n-Eicosane n-Tetracosane n-Octacosane n-Dotriacontane n-Hexatriacontane n-Tetracontane n-Tetratetracontane			

Petroleum Standards
ASTM D4815

ASTM D4815

Determination of Oxygenates (Ethers and Alcohols) in Gasoline by GC

Along with valve timing and peak identification mixes, one set of quantitative calibration mixes are available with the method-specified internal standard. All components used in preparing these standards have been analyzed for purity, water content, and presence of other method components to 0.01%. Blends have been prepared using precise gravimetric techniques exceeding the requirements of ASTM Method D4815. Corrections are made for common impurities. All calibration blends are provided with a chromatogram and data verifying the purity and identity of the raw materials.

MIXES AND SOLUTIONS	COMPOSITION	QTY.	CAT. NO.	PRICE
D4815 Quantitative Calibration Mix 1 (With Internal Standard)	Each component at the nominal weight percent indicated Ethanol, 2.85 tert-Butanol, 0.095 Methyl tert-butyl ether, 19.00 tert-Pentanol, 1.19 isooctane:xylene (65:35), 71.87 DME (internal standard), 5.00	1mL	47205	
D4815 Quantitative Calibration Mix 2 (With Internal Standard)	Each component at the nominal weight percent indicated Ethanol, 0.095 tert-Butanol, 2.85 Methyl tert-butyl ether, 14.25 tert-Pentanol, 4.75 isooctane:xylene (65:35), 73.06 DME (internal standard), 5.00	1mL	47206	
D4815 Quantitative Calibration Mix 3 (With Internal Standard)	Each component at the nominal weight percent indicated Ethanol, 5.70 tert-Butanol, 5.70 Methyl tert-butyl ether, 9.50 tert-Pentanol, 2.38 isooctane:xylene (65:35), 71.73 DME (internal standard), 5.00	1mL	47207	
D4815 Quantitative Calibration Mix 4 (With Internal Standard)	Each component at the nominal weight percent indicated Ethanol, 8.55 tert-Butanol, 7.60 Methyl tert-butyl ether, 4.75 tert-Pentanol, 3.56 isooctane:xylene (65:35), 70.54 DME (internal standard), 5.00	1mL	47208	
D4815 Quantitative Calibration Mix 5 (With Internal Standard)	Each component at the nominal weight percent indicated Ethanol, 11.40 tert-Butanol, 11.40 Methyl tert-butyl ether, 0.095 tert-Pentanol, 0.095 isooctane:xylene (65:35), 72.01 DME (internal standard), 5.00	1mL	47209	
ASTM D4815 Valve Timing Mix	Each component at the nominal weight percent indicated Use for determining the proper backflush valve timing. Methylcyclopentane, 10.0 Diisopropyl ether, 10.0 Ethyl tert-butyl ether, 10.0 Methyl tert-butyl ether, 10.0 n-Hexane, 60.0	1mL	47212	
ASTM D4815 Qualitative Peak ID Mix	Each component at the nominal weight percent indicated Use for determining relative retention times of selected oxygenates. Methylcyclopentane, 4.0 Methanol, 7.3 Ethanol, 7.3 Isopropanol, 7.3 tert-Butanol, 7.3 n-Propanol, 7.3 Methyl tert-butyl ether, 4.0 sec-Butanol, 7.3 Diisopropyl ether, 4.0 Isobutanol, 7.3 Ethyl tert-butyl ether, 4.0 tert-Pentanol, 7.3 1,2-Dimethoxyethane (internal standard), 6.0 n-Butanol, 7.3 Benzene, 5.0 tert-Amyl methyl ether, 7.3	1mL	47213	
ASTM D4815 Quantitative Calibration Kit	Each of the following products Quantitative Calibration Mix 1 (47205) Quantitative Calibration Mix 2 (47206) Quantitative Calibration Mix 3 (47207) Quantitative Calibration Mix 4 (47208) Quantitative Calibration Mix 5 (47209) Valve Timing Mix (47212) Qualitative Peak ID Mix (47213)		47211	

Petroleum Standards
ASTM D5134, Reference Materials

ASTM D5134

Detailed Analysis of Petroleum Naphthas Through n-Nonane

MIXES AND SOLUTIONS	COMPOSITION	QTY.	CAT. NO.	PRICE
ASTM D5134 Qualitative Column Evaluation Mix	Nominal 0.5-1.0% by weight in 2-methylpentane Use this mix of hydrocarbons for assessing column performance. Toluene, 0.5% — 2,3,3-Trimethylpentane, 1% — 4-Methylheptane, 1% n-Heptane, 1% — 2-Methylheptane, 1% — n-Octane, 1%	1mL	502103	
ASTM D5134 Splitter Linearity Check Mix	Neat at 10% by weight, each component Use this quantitative mix of hydrocarbons to determine proper system performance and detector response factors. n-Hexane — Benzene — 2,4-Dimethylhexane n-Heptane — Toluene — 2-Methylheptane n-Octane — 2-Methylhexane — 2,4-Dimethylheptane n-Nonane	500mg	506753	
2,3,3-Trimethylpentane	Neat	500mg	502081	

ASTM D5134 Qualitative Reference Materials

These refinery reference materials are the actual materials used in the ASTM D5134 round-robin method validation stage. They ar referred to in the method, and are used for establishing component retention times for identification purposes. Each sample is accompa nied by a comprehensive data booklet containing an expanded detailed chromatogram from a Petrocol DH 50.2 column, with identifi ed peaks.

MIXES AND SOLUTIONS	COMPOSITION	QTY.	CAT. NO.	PRICE
ASTM D5134 Qualitative Reference Alkylate Standard	Approximately 30 identified components. Neat fraction. Actual refinery alkylation product	6 x 1mL	48267-U	
ASTM D5134 Qualitative Reference Reformate Standard	Approximately 70 identified components. Neat fraction. Actual refinery reformate product	6 x 1mL	48266	
ASTM D5134 Qualitative Reference Naphtha Standard	Approximately 100 identified components. Neat fraction. Actual refinery naphtha product	6 x 1mL	48265-U	
ASTM D5134 Qualitative Reference Refinery Standards Kit	2 x 1mL each of the three qualitative reference standards (alkylate, naphtha, and reformate)		48268	

Highly Characterized Reference Materials

The following standards, taken from refinery process streams and exhaustively analyzed by GC/FID and GC/MS, are recommended for evaluating process performance, identifying sources of contamination, PIANO analysis, method development, and training. Each co mes with a comprehensive data packet containing quantitative and qualitative data and chromatograms using a 100-meter Petrocol DH column.

DESCRIPTION	QTY.	CAT. NO.	PRICE
Petroleum Refinery Reformate	1mL	47489	
Petroleum Refinery Pyrolysis Gasoline (Py Gas)	1mL	47490-U	
Petroleum Refinery Heavy Straight Run Naphtha	1mL	47488	

Petroleum Standards

ASTM D5307, Molecular Weight Standards, ASTM D5441

ASTM D5307

Boiling Range Distribution of Crude Petroleum

MIXES AND SOLUTIONS	COMPOSITION	QTY.	CAT. NO.	PRICE
ASTM D5307 Crude Oil Quantitative Standard	Equal weights of the hydrocarbons listed Use to determine detector response factors (slight warming of this mixture may be necessary to dissolve all components completely). n-Decane, n-Undecane, n-Dodecane, n-Tridecane, n-Tetradecane, n-Pentadecane, n-Hexadecane, n-Heptadecane, n-Octadecane, n-Eicosane, n-Tetracosane, n-Octacosane, n-Dotriacontane, n-Hexatriacontane, n-Tetracontane, n-Tetratetracontane	2mL	48179	
ASTM D5307 Crude Oil Qualitative Standard	Each of the hydrocarbons listed in the approximate proportions (w/w) indicated Combine with Cat. No. 48179 to prepare a calibration mixture covering C3 to C44 for calibrating retention times for boiling point correlation. n-Propane, 10%, n-Butane, 15%, n-Pentane, 15%, n-Hexane, 15%, n-Heptane, 15%, n-Octane, 15%, n-Nonane, 15%	1mL	48182	
ASTM D5307 Crude Oil Internal Standard	Equal weights of the hydrocarbons listed Add to the crude oil sample as the internal standard. n-Tetradecane, n-Pentadecane, n-Hexadecane, n-Heptadecane	25mL	48479	

High Molecular Weight Hydrocarbon Standards

For high temperature SIMDIS or GC analyses. Polywax materials are polyethylene waxes having average molecular weights of 500 and 655 Dalton, respectively. Ethylene oligomers range in carbon number from approximately C20 to C100+ and are useful for establishing retention times.

DESCRIPTION	CONC.	QTY.	CAT. NO.	PRICE
Pentacontane (nC50)	Neat	50mg	48595	
Hexacontane (nC60)	Neat	50mg	48893	
Polywax 500	Neat	5000mg	48475	
Polywax 500	10,000µg/mL in p-xylene	6 x 1mL	48480-U	
Polywax 655	Neat	5000mg	48477	
Polywax 655	10mg/mL in p-xylene	6 x 1mL	48482	

ASTM D5441

Purity of Methyl tert-butyl ether (MTBE) by GC

MIXES AND SOLUTIONS	COMPOSITION	QTY.	CAT. NO.	PRICE
MTBE Quantitative Solutions and Neat Materials	For analyses of oxygenates in gasoline.			
tert-Amyl methyl ether	2000µg/mL in methanol	1mL	506737	
Methyl tert-butyl ether (MTBE)	Neat	1000mg	48027	
Methyl tert-butyl ether (MTBE)	2000µg/mL in methanol	1mL	48483	
MTBE Contaminant Standards ASTM D5441 MTBE Contaminants (High) Mix A	Each component at 1% w/w in MTBE Use to identify and determine response factors for the common impurities in MTBE. tert-Amyl methyl ether, tert-Butanol, tert-Butyl ethyl ether, Methanol, 2-Methylbutane, 2-Methyl-2-butene, Pentane, cis-2-Pentene, trans-2-Pentene, Triisobutylene (mixed isomers), 2,4,4-Trimethyl-1-pentene	1mL	47942	
ASTM D5441 MTBE Contaminants (Low) Mix B	Each component at 0.1% w/w in MTBE Use to identify and determine response factors for the common impurities in MTBE. tert-Amyl methyl ether, tert-Butanol, tert-Butyl ethyl ether, Methanol, 2-Methylbutane, 2-Methyl-2-butene, Pentane, cis-2-Pentene, trans-2-Pentene, Triisobutylene (mixed isomers), 2,4,4-Trimethyl-1-pentene	1mL	47943	

Petroleum Standards
ASTM D5442, Paraffin Mixes

ASTM D5442

Analysis of Petroleum Waxes by GC Qualitative and quantitative mixes of n-paraffins used for determining column resolution, retention times, and response factors.

MIXES AND SOLUTIONS	COMPOSITION	QTY.	CAT. NO.	PRICE
Retention Time Standards ASTM D5442 C16-C44				
Retention Time Mix	Neat qualitative n-paraffins, each at 8.3 weight percent Use to establish retention times from C16 to C44 C16, C18, C20, C22, C24, C26, C28, C30, C32, C36, C40, C44	500mg	502251	
ASTM D5442 C12-C60				
Retention Time Mix	Neat qualitative n-paraffins, each at 6.25 weight percent Use to establish retention times from C12 to C60 C12, C14, C16, C18, C20, C22, C24, C26, C28, C30, C32, C36, C40, C44, C50, C60	500mg	500623	
Quantitative Linearity Standards ASTM D5442 C16-C44				
Linearity Standard	n-Paraffins, each at 0.01 weight percent Accurately prepared mix. Use to determine response factors from C16 to C44. C16, C18, C20, C22, C24, C26, C28, C30, C32, C36, C40, C44	1mL 6 x 1mL	502278 502286	
ASTM D5442 C12-C60				
Linearity Standard	n-Paraffins, each at 0.01 weight percent Accurately prepared mix. Use to determine response factors from C12 to C60. C12, C14, C16, C18, C20, C22, C24, C26, C28, C30, C32, C36, C40, C44, C50, C60	1mL 6 x 1mL	502243 502235	

Aliphatic Hydrocarbons Kit

Kit contains the following neat compounds and mixtures. Each compound individually packaged in ampules or vials.

CHEMICAL NAME	CONCENTRATION	QTY.	CAT. NO.	PRICE
Aliphatic Hydrocarbons Kit	34 individual ampules and vials n-Pentane, 1.0g; n-Hexane, 1.0g; n-Heptane, 1.0g; n-Octane, 1.0g; n-Nonane, 1.0g; n-Decane, 1.0g; n-Dodecane, 1.0g; n-Tetradecane, 1.0g; n-Hexadecane, 1.0g; 1-Octene, 0.5g; 1-Decene, 0.5g; 1-Dodecene, 0.5g; 1-Tetradecene, 0.5g; 1-Hexadecene, 0.5g; 1-Octadecene, 0.5g; Isooctane, 1.0g; Squalane, 1.0g; Squalene, 1.0g; n-Octadecane, 1.0g; n-Eicosane, 1.0g; n-Eicosene, 0.5g; n-Docosane, 0.1g; n-Tricosane, 0.1g; n-Triacontane, 0.1g; n-Dotriacontane, 0.1g; n-Tetratricontane, 0.1g; n-Hexatriacontane, 0.1g; n-Tetratetracontane, 0.1g; n-Heneicosane, 0.1g; n-Tetracosane, 1.0g; n-Pentacosane, 0.1g; n-Hexacosane, 0.1g; n-Octacosane, 1.0g; n-Tetracontane, 0.1g	1	44575-U	

Petroleum Standards
Paraffin Mixes, ASTM D5580

Qualitative n-Paraffin Mixes

For determining retention indices and retention times.

CHEMICAL NAME	CONCENTRATION	QTY.	CAT. NO.	PRICE
n-Paraffin Mix C5, C6, C7, C8	Neat, varied concentrations	500mg	47100	
n-Paraffin Mix C7, C8, C9, C10	Neat, varied concentrations	500mg	47101	
n-Paraffin Mix C10, C12, C14, C16	Neat, varied concentrations	500mg	47102	
n-Paraffin Mix C18, C20, C22, C24	2% (wt./wt.) each n-paraffin in n-octane	5mL	47108	
n-Paraffin Mix C22, C24, C28, C32	2% (wt./wt.) each n-paraffin in n-octane	5mL	47106	
n-Paraffin Mix C24, C28, C32, C36	2% (wt./wt.) each n-paraffin in n-octane	5mL	47107	

ASTM D5580

Aromatics in Gasoline -The following standards include calibration blends both with and without internal standard. The internal standard-free blends are packaged in quantities of approximately 9mL to facilitate reference standard preparation. All calibrants are provided with a chromatogram and data verifying the purity and identity of the raw material. All raw materials used are fully characterized, as described for ASTM D4815.

MIXES AND SOLUTIONS	COMPOSITION	QTY.	CAT. NO.	PRICE
D5580 Quantitative Calibration Mix 4 (Without Internal Standard)	Each component at the nominal weight percent indicated Benzene, 2.00 Ethylbenzene, 5.00 1,2,4-Trimethylbenzene, 5.00 Toluene, 2.50 o-Xylene, 5.00 Isooctane, 80.50	9mL	47738-U	
D5580 Quantitative Calibration Mix 1 (With Internal Standard)	Each component at the nominal weight percent indicated Benzene, 0.09 o-Xylene, 0.90 Isooctane, 74.16 Toluene, 13.50 1,2,4-Trimethylbenzene, 0.90 2-Hexanone (int. std.), 10.00 Ethylbenzene, 0.45	1mL	47740-U	
D5580 Quantitative Calibration Mix 2 (With Internal Standard)	Each component at the nominal weight percent indicated Benzene, 0.45 o-Xylene, 2.25 Isooctane, 68.40 Toluene, 9.00 1,2,4-Trimethylbenzene, 9.00 2-Hexanone (int. std.), 10.00 Ethylbenzene, 0.90	1mL	47741-U	
D5580 Quantitative Calibration Mix 3 (With Internal Standard)	Each component at the nominal weight percent indicated Benzene, 0.90 o-Xylene, 9.00 Isooctane, 72.90 Toluene, 4.50 1,2,4-Trimethylbenzene, 0.45 2-Hexanone (int. std.), 10.00 Ethylbenzene, 2.25	1mL	47742-U	
D5580 Quantitative Calibration Mix 4 (With Internal Standard)	Each component at the nominal weight percent indicated Benzene, 1.80 o-Xylene, 4.50 Isooctane, 72.45 Toluene, 2.25 1,2,4-Trimethylbenzene, 4.50 2-Hexanone (int. std.), 10.00 Ethylbenzene, 4.50	1mL	47743-U	
D5580 Quantitative Calibration Mix 5 (With Internal Standard)	Each component at the nominal weight percent indicated Benzene, 4.50 o-Xylene, 0.45 Isooctane, 72.90 Toluene, 0.90 1,2,4-Trimethylbenzene, 2.25 2-Hexanone (int. std.), 10.00 Ethylbenzene, 9.00	1mL	47744-U	
D5580 Valve Timing Calibration Mix	Each component at the nominal weight percent indicated Benzene, 4.5 Ethylbenzene, 9.0 2-Hexanone (internal standard), 10.0 Toluene, 4.5 o-Xylene, 9.0 Isooctane, 63.0	1mL	47731-U	
D5580 Selectivity Check Standard	Each component at the nominal weight percent indicated n-Dodecane, 1.5 Isooctane, 98.5	1mL	47732-U	
D5580 Quantitative Calibration Kit	Each component at the nominal weight percent indicated Quantitative Calibration Mix 1 (47740-U) Quantitative Calibration Mix 2 (47741-U) Quantitative Calibration Mix 3 (47742-U) Quantitative Calibration Mix 4 (47743-U) Quantitative Calibration Mix 5 (47744-U) Valve Timing Calibration Mix (47731-U) Selectivity Check Standard (47732-U)	1mL of ea.	47734-U	
Internal Standard 2-Hexanone	Neat	5mL	47733-U	

Petroleum Standards
ASTM D5769

ASTM D5769

Aromatics in Gasoline by GC/MS

MIXES AND SOLUTIONS	COMPOSITION	QTY.	CAT. NO.	PRICE
ASTM D5769/EPA Aromatics Internal Standard Mix	Each of the following components at the weight percent indicated Benzene-d_6, 40.0 Ethylbenzene-d_{10}, 40.0 Naphthalene-d_8, 20.0	1 x 5.0mL	47327	

WSPA RM-1 Gasoline Reference Material

This multipurpose reference material was developed by Scott Specialty Gases Inc. under the sponsorship of the Western States Petroleum Association (WSPA), based on specifications for California Phase II reformulated gasoline (RFG). Consensus values were established by 14 labs, including the California Air Resources Board (CARB) and are assured by WSPA. The specifications are shown below.

MIXES AND SOLUTIONS	QTY.	CAT. NO.	PRICE
WSPA RM-1 Gasoline Reference Material	6 x 20mL	502227	

ASTM METHOD	CONSTITUENTS	CONCENTRATION	UNITS
D4815	Oxygenate (Methyl tert-butyl ether)	2.07%	WO[1]
D5580	Total aromatics	27.7%	w/w
D5580	Benzene	0.982%	w/w
D1319	Olefins	5.42%	LV[2]
D2622/D5453	Sulfur	30.9ppm	w/w
D5191	Reid vapor pressure	6.59	psi

[1] Weight percent oxygen.
[2] Liquid volume.

Food and Beverage Standards
USP Solvents, Phenolic Antioxidants

USP Solvent Standards

Described in US Pharmacopoeia methods for determining residual organic solvents in pharmaceutical preparations.

DESCRIPTION		QTY.	CAT. NO.	PRICE
International USP 467 Mix	8 analytes at concentrations indicated in methanol Acetonitrile (500µg/mL), 1,2-Dichloroethane (1000µg/mL), Methylene chloride (5000µg/mL) Benzene (1000µg/mL), 1,4-Dioxane (1000µg/mL), Pyridine (1000µg/mL) Chloroform (500µg/mL), Trichloroethene (1000µg/mL)	1mL	47632-U	
USP Organic Volatile Impurities Mix	5 analytes at concentrations indicated in dimethyl sulfoxide Benzene (1000µg/mL), 1,4-Dioxane (1000µg/mL), Trichloroethene (1000µg/mL) Chloroform (500µg/mL), Methylene chl oride (1000µg/mL)	4 x 1mL	47401	
USP Modified Organic Volatile Impurities Mix	5 analytes at concentrations indicated in methanol Benzene (1000µg/mL), 1,4-Dioxane (1000µg/mL), Trichloroethene (1000µg/mL) Chloroform (500µg/mL), Methylene chl oride (5000µg/mL)	1mL	47398	
USP 467 OVI Mix (High Concentration), 23rd Ed.	5 analytes at indicated concentrations in DMSO Benzene, 1000µg/mL, 1,4-Dioxane, 1000µg/mL, Trichloroethylene, 1000µg/mL Chloroform, 500µg/mL, Methylene chloride, 5000µg/mL	1mL 4 x 1mL	47538-U 47539-U	
USP 467 OVI Mix (Low Concentration), 23rd Ed.	5 analytes at indicated concentrations in DMSO Benzene, 100µg/mL, 1,4-Dioxane, 100µg/mL, Trichloroethylene, 100µg/mL Chloroform, 50µg/mL, Methylene chloride, 500µg/mL	1mL 4 x 1mL	47540-U 47541-U	
USP 467 OVI Mix (High Concentration), 24th Ed.	5 analytes at indicated concentrations in DMSO Benzene, 100µg/mL, 1,4-Dioxane, 3800µg/mL, Trichloroethylene, 800µg/mL Chloroform, 600µg/mL, Methylene chloride, 6000µg/mL	1mL	47545-U	
USP 467 OVI Mix (Low Concentration), 24th Ed.	5 analytes at indicated concentrations in DMSO Benzene, 20µg/mL, 1,4-Dioxane, 3800µg/mL, Trichloroethylene, 800µg/mL Chloroform, 600µg/mL, Methylene chloride, 6000µg/mL	1mL	47546-U	

Phenolic Antioxidants Kit

Antioxidants are added to food and other products to prevent rancidity caused by the oxidation of unsaturated fats. Separate 9 of the antioxidants listed in the Association of Official Analytical Chemists (AOAC) Official Method 983.15 Phenolic Antioxidants in Oils, Fats, and Butter Oil. Individual antioxidants are available through our custom standards group. Each antioxidant is packaged neat, under nitrogen.

DESCRIPTION	CAS NO.	QTY.	CAT. NO.	PRICE
PHENOLIC ANTIOXIDANTS				
3,5-Di-tert-butyl-4-hydroxytoluene (BHT)	128-37-0	500mg	47168	
Phenolic Antioxidants Kits			47192	

Analyte	CAS No.	Quantity
Propyl gallate (PG)	121-79-9	500mg
2,4,5-Trihydroxybutrophenone (THBP)	1421-63-2	500mg
tert-Butylhydroquinone (TBHQ)	1948-33-0	500mg
Nordihydroguaiaretic acid (NDGA)	500-38-9	100mg
2- & 3-tert-Butyl-4- hydroxyanisole (BHA)	25013-16-5	500mg
2,6-Di-tert-butyl-4-hydroxymethyl-phenol (Ionox 100)	88-26-6	100mg
3,5-Di-tert-butyl-4-hydroxytoluene (BHT)	128-37-0	500mg
Lauryl gallate (Dodecyl gallate)	1166-52-5	500mg
Octyl gallate	1034-01-1	500mg
Ethoxyquin	91-53-2	500mg