

PetroChemical Standards

■ This selection of Biofuel reference standards. Includes FAMES & FAEEs from most popular biomasses, sulfurs, physical standards, wear metals, and free & total glycerin.

■ Reference standards to meet the most common UOP LLC (a Honeywell company) methods.

■ Reference standards for over 100 ASTM methods plus cross references to ISO, DIN, IP, JIS & AFNOR methods see page 273.

Petrochemical	269-344
ASTM Listing and Cross References	269-270
Quality Control	271-272
Physical Properties	274-275
Sulfur Standards	276-279
PIANO	280-281
Detailed Hydrocarbon Analysis and SIM DIS	282-283
ASTM Reference Standards (other)	283-312
Diisocyanates	307
UOP Standards	313
Miscellaneous - Skinner List, Fire Debris	314
BioFuels	315-317
TPH & Fuels & Hydrocarbons	318-321
Brownfield Regulation and ISO/DIS 9337	321
LUFT/LUST (UST) Methods - State Specific, GRH, DRH - TPH	322-336
Oil, Grease & TPH - EPA Methods 1664, 413.2/418.1 and 8440	336
Wear Metals (Organometallics)	337-344
Lubricating Oils	342-344



ASTM Table of Contents

ASTM Methods

ASTM #	Method Description	Page	ASTM #	Method Description	Page
	Cross Reference Tables (ASTM,IP,ISO,DIN,JIS,AFNOR)	273	D5191	Vapor Pressure Standards	289, 292
D56	Flash Point by TAG Closed Cup	274	D5307	Boiling Range Distribution of Crude Petroleum by GC	289
D86	Synthetic Distillation Standard	274	D5441	MtBE Analysis by GC	290
D92	Flash Point Standards (COC)	274	D5442	Petroleum Waxes by GC	291
D93	Flash Point Standards (PMCC)	274	D5443	PNA Analysis by Multidimensional GC	291
D445	Viscosity Calibration Standard	274	D5453	Sulfur by Ultra Violet Fluorescence	291, 312
D611	Aniline Point Standard	274	D5480	Engine Oil Volatility by GC	292
D1015	Freezing Point Standards	274	D5482	Vapor Pressure Standards	289, 292
D1319	Olefin Analysis by FIA	275	D5501	Ethanol Analysis by GC	292
D1744	Water in Liquid Petroleum Products	275, 309, 312	D5580	Aromatics by GC	293
D2386	Freezing Point Calibration Standards	275	D5599	Oxygenates by OFID	294-296
D2500	Cloud Point Calibration Standards	275	D5600	Trace Metals by ICP	296, 392
D2622	Sulfur by XRF	276-279	D5622	Oxygenates by Reductive Pyrolysis	297
D2789	PIANO, PONA, PNA by GC	280-281	D5623	Sulfur Compounds by Sulfur Selective Detection	297
	Hydrocarbon Analysis in Gasoline by GC/MS	282	D5708	Trace Metals by ICP	297, 401
D2887	Boiling Range by GC	282	D5762	Nitrogen by Chemiluminescence	297, 401
	Simulated Distillation (SIM DIS) by GC	283	D5769	Aromatics by GC/MS	299-306
D3120	Sulfur by Oxidative Microcoulometry	283	D5771	Cloud Point of Petro Products	275, 306
D3230	Salts in Crude Oil	283, 405	D5772	Cloud Point of Petro Products (Linear Cooling Rate)	275, 306
D3231	Phosphorus in Gasoline	283, 350	D5773	Cloud Point of Petro Products (Constant Cooling Rate)	275, 306
D3237	Lead in Gasoline by AA	283, 405	D5836	Diisocyanates	307
D3246	Sulfur in Petroleum Gas by Oxidative Microcoulometry	276-279, 283	D5863	Trace Metals by AA	274-275
D3340	Li & Na in Lubricating Greases by Flame Photometer	283, 355	D5901	Freezing Point Aviation Fuels (Auto Optical Method)	274-275
D3524	Diesel Fuel Analysis by GC	283	D5972	Freezing Point Aviation Fuels	274-275
D3605	Trace Metal in Gas Turbine Fuels by AA	283, 405	D5986	Oxygenates and Aromatics by GC/FTIR	307
D3610	Total Co Analysis by Potentiometric Titration	284	D6042	Plastic Packaging Testing	97-102
D3710	Boiling Range by GC	285	D6160	PCBs by GC	308
D3798	p-Xylene Analysis by GC	285	D6258	Solvent Red 164 Dye Concentration in Diesel Fuels	308
D3831	Manganese in Gasoline by AA	285, 405	D6293	Oxygenates (O-PONA) in Engine Fuels by GC	308
D4059	PCB Analysis by GC	285	D6296	Total Olefins in Spark Ignition Engine Fuels by GC	309
D4110	Ion Chrom	358-361	D6304	Water in Liquid Petro Products	275, 312
D4291	Ethylene Glycol by GC	286	D6334	Sulfur in Gasoline by Wavelength WD-XRF	276-279
D4294	Sulfur by ED-XRF	276-279	D6352	Boiling Range Distribution of Petroleum	309
D4377	Water in Liquid Petroleum Products	275, 286, 312	D6378	Vapor Pressure	284, 292, 310
D4420	Aromatics in Gasoline by GC	286	D6379	Aromatic Hydrocarbon by HPLC	310
D4628	Wear Metals in Lube Oil	286, 402	D6417	Engine Oil by GC	309, 310
D4629	Nitrogen by Chemiluminescence	286	D6428	Sulfur by ECD	310
D4815	Oxygenates in Gasoline by GC	287	D6443	Metals in Oil	403-404
D4927	Wear Metals and Additives by WD-XRF	287	D6445	Sulfur in Gasoline by ED-XRF	276-279
D4928	Water in Liquid Petroleum Products	275, 286, 312	D6481	Lube Oils by ED-XRF	402-403
D4929	Chlorine in Crude Oil by Microcoulometry	287	D6550	Olefin Content of Gasoline by SFC	310
D4951	Wear Metals and Additives by ICP	287, 403	D6584	(EN14105) Free and Total Glycerin	311
D5056	Trace Metals in Petroleum Coke by AA	354-356	D6591	(IP 391) Aromatic Hydrocarbon by HPLC	311
D5059	Lead in Gasoline by X-Ray Spectroscopy	288	D6751	Sulfur in Biodiesel	312
D5134	Petroleum Naphthas through n-Nonane by GC	288	D7065	Nonylphenol and Octylphenol	267
D5184	Al and Si by ICP-AES & AA	392	D7485	Nonylphenol and Octylphenol	267
D5185	Wear Metals and Additives by ICP	288, 397, 402-404	E1064	Water in Petroleum	275
D5186	Aromatics by SFC	288	E1387	Fire Debris Analysis	314
D5188	Vapor - Liquid Ratio Temperature	289	E1618	Fire Debris Analysis	314

Sulfur Standards Group

D2622	Sulfur by XRF
D3120	Sulfur by Oxidative Microcoulometry
D3246	Sulfur in Petro Gas by Oxidative Microcoulometry
D4294	Sulfur by ED-XRF
D5453	Sulfur by Ultra Violet Fluorescence
D5623	Sulfur Compounds by Sulfur Selective Detection
D6334	Sulfur in Gasoline by Wavelength WD-XRF
D6445	Sulfur in Gasoline by ED-XRF

Additional Methods

Motor Oil Standards	310
Chlorine in Lube Oil	287
Method 1664, Oil, Grease and TPH	336
Method 413.2, 418.1 and TPH Analysis	336
Method 8440 TPH Analysis	249
Method 1004 Alcohol Oxidation Products in Engine Exhaust	326

Wear Metals Group

D3605	Trace Metals in Gas Turbine Fuel by AA
D4628	Wear Metals in Lube Oil
D4927	Wear Metals and Additives by WDXRF
D4951	Wear Metals and Additives by ICP
D5185	Wear Metals and Additives by ICP
D5708	Trace Metals by ICP
D5863	Trace Metals by AA
D6443	Metals in Oil
D6481	Lube Oils by ED-XRF

Shipping Symbols

- ▲ Hazardous fee required.
- ▼ Hazardous fee not required
- * A ColdPAK is required
-  Can not be shipped by Air
-  Reformulated to ship by Air

AccuPetroCheck and AccuPetroTest Real World Gasoline QC Standards

In cooperation with ASTM D02 subcommittee 3 and 4, AccuStandard ampulled 21 Real World gasoline reference fuels. Consensus Values have been determined for these reference fuels by various ASTM Round Robins to provide Petrochemical Laboratories with a source of well characterized gasoline standards for use in QA/QC applications and as Single Blind test samples over an extended period of time. As new ASTM D02.03 and D02.04 Test methods are promulgated they require mandatory Quality Control testing of real world samples. AccuStandard's PetroTest & PetroCheck standards are being successfully used to achieve these new Quality Control requirements.

AccuPetroTest

Sulfur in Diesel Fuel QC Standard

SBPT-SDF-VAP 2 x 15 mL

Parameter	Approx. Range
Sulfur	20 - 11000 µg/g

See ASTM Methods D2622, D3120, D3246, D4294, D5453 for Sulfur Calibration Standards

Sulfur in White Mineral Oil QC Standard

SBPT-SWMO-VAP 2 x 15 mL

Parameter	Approx. Range
Sulfur	20 - 11000 µg/g

See ASTM Methods D2622, D3120, D3246, D4294, D5453 for Sulfur Calibration Standards

Sulfur Single Blind AccuPetroTest Alternative Matrices Standards

We have manufactured a number of Diesel and White Mineral Oil QC products containing a gravimetrically prepared amount of Sulfur. Use of these alternative matrix materials can provide further evaluation of the QA/QC process in the laboratory. Two samples will be sent for the test parameter and a separate sealed envelope containing the gravimetrically prepared sulfur values is also provided. The second sample is for repeatability testing or for use as a future QA/QC reference.

AccuPetroTest Gasoline

Low Sulfur QC Sample

SBPT-LSGAS-VAP 2 x 15 mL

Parameter	Method	Approx. Range
Sulfur	D5453	0 - 50 µg/g

Olefin QC Sample

SBPT-OLEFINSFC-VAP 2 x 15 mL

Parameter	Method	Approx. Range
Total Olefins	D6550	1 - 40 Vol.%

AccuPetroTest Gasoline

Comprehensive Single Blind Gasoline QC Sample

SBPT-COMP-VAP 2 x 15 mL

Parameter	Method	Approx. Range	Conc.
Total Aromatics	D1319	8 - 60	Vol.%
Total Olefins	D1319	1 - 40	Vol.%
Total Saturates	D1319	30 - 80	Vol.%
Sulfur	D2622	0.0001 - 0.0930	Wt.%
Sulfur	D4294	0.0016 - 0.0930	Wt.%
Sulfur	D5453	0.5 - 500	µg/g
Sulfur	D6344	1.0 - 1000	µg/g
Benzene	D5769	0.1 - 2.0	Vol.%
Toluene	D5769	1.0 - 15	Vol.%
Total Aromatics	D5769	8 - 60	Vol.%
Benzene	D5769	0.1 - 2.0	Vol.%
Total Olefins	D6550	1 - 40	Vol.%

Technical Note

This comprehensive single blind gasoline QC sample tests for more parameters from a single sample. The actual gasoline sample will have consensus values listed on the datasheet that fall within the range listed for each parameter.

Quality Control Standards continue on next page

AccuPetroTest Gasoline QC

Olefins QC Sample

Parameter	Method	Approx. Range
Total Aromatics	D1319	8-60 Vol.%
Total Olefins	D1319	1 - 40 Vol.%
Total Saturates	D1319	30-80 Vol. %

See ASTM Method D1319 for
Sulfur Calibration Standards

Aromatics QC Sample

Parameter	Method	Approx. Range
Total Aromatics	D5769	8 - 60 Vol.%

See ASTM Methods, D3606, D5580, D5769 for
Benzene Calibration Standards

Sulfur QC Sample

Parameter	Method	Approx. Range
Sulfur	D2622	0.0001 - 0.0930 Wt.%
Sulfur	D4294	0.0016 - 0.0930 Wt.%
Sulfur	D5453	4.0 - 500 µg/g
Sulfur	D6344	1.0 - 1000 µg/g

See ASTM Methods D2622, D3120, D3246,
D4294, D5453 for Sulfur Calibration Standards

Benzene/Toluene QC Sample

Parameter	Method	Approx. Range
Benzene	D5769	0.1 - 2.0 Vol.%
Toluene	D5769	1.0 - 15 Vol.%

See ASTM Methods, D3606, D5580, D5769 for
Benzene Calibration Standards

Technical Note

AccuPetroTest Single Blind Standards
Petrochemical laboratories looking to test the performance of the laboratory for a specific parameter can order the Single Blind **AccuPetroTest** sample for the parameter of interest. Two real world gasoline samples will be sent for the test parameter requested and a separate sealed envelope containing the determined Consensus Value is also provided. The second sample is for repeatability testing or as a future QA/QC reference.

Conducting a Petrochemical Round Robin for a new ASTM method?

Select AccuStandard to prepare the necessary samples for the Round Robin study

AccuStandard has packaged for ASTM committee D02 various select groups of gasoline fuels and hydrocarbon products for use in various Round Robin studies.

Large Sample Offering

AccuStandard was selected by ASTM committee D02 to fill, seal and package an initial set of 21 different types of Round Robin Gasolines. Each gasoline was selected due to its unique properties. These unique properties will be determined by various ASTM methods under evaluation through ASTM subcommittees. AccuStandard has expanded this offering with additional materials blended for other ASTM Round Robins.

Flexibility

Use the original 21 gasoline samples to conduct a Round Robin and we can label the samples appropriately to protect the integrity of the Round Robin. In addition, we can easily add additional samples to your specific Round Robin study to expand the scope of the method for different matrices, concentrations or instrument types.

Petro PT Samples

Oxygenate PT Sample

With MtBE contamination problems in drinking water, numerous states are requiring certification for Oxygenate monitoring. Join AccuStandard's next study for Oxygenate analysis. Our timely PT schedule easily allows your lab to be proactive in new regulatory requirements. The analytes in the standard and the PT sample have been drawn from the California list of known prevalent oxygenates in gasoline. These Oxygenate PT samples and standards allow your Lab to:

- Expand testing capabilities
- Generate new testing revenue
- Eliminate standard preparation
- Easily combine with other Volatile standards

SUFFIX KEY

AT = Pre-Test
AV = Values Included

WS-PT Oxygenates

OPE-OXY-001-AT	2 mL
OPE-OXY-001-AV	2 mL
Sample conc. after prep 5.0-50 µg/L	4 comps.

ETBE	MTBE
Diisopropylether	TAME

Technical Note

This PT sample can be used by gravimetric oil and grease methods. In addition, it can also be used for TPH analysis by gravimetric methods including the EPA method 1664. The sample contains real world material commonly found at petroleum containment sites.

WP-PT Oil, Grease & TPH

IPE-OILG-001-AT	5 mL
IPE-OILG-001-AV	5 mL
Sample conc. after prep	2 comps.

Analyte List	Sample range
Total Oil & Grease	5-100 mg/L
TPH	5-100 mg/L

Suggested Calibration Standards

Oxygenate Gasoline Additive Standards

OGAD-001	1 x 1 mL
OGAD-001-PAK	5 x 1 mL
At stated conc. in MeOH	5 comps

SAVE 20%

MtBE (2000 µg/mL)	TAME (2000 µg/mL)
ETBE (2000 µg/mL)	t-Butanol (10000 µg/mL)
Isopropyl ether (2000 µg/mL)	

OGAD-002	1 x 1 mL
At stated conc. in MeOH	5 comps

t-Butanol (10000 µg/mL)	TAME (2000 µg/mL)
ETBE (2000 µg/mL)	TAE (2000 µg/mL)
Isopropyl ether (2000 µg/mL)	

Suggested Calibration Standard

Oil and Grease

WC-OILG-10X-1	100 mL
1000 µg/mL Total Oil and Grease in n-Propanol	2 comps.
Contains 500 µg/mL vegetable oil and 500 µg/mL of petroleum oil.	

Shake well before use.

ASTM Committee D02 has jurisdiction over 580 published methods pertaining to petroleum products and lubricants. AccuStandard is a member of this technical committee, as well as ASTM Committee D16 on Aromatic Hydrocarbons. Working with fellow committee members has given us the opportunity to formulate products to meet the requirements of many of these methods.

In addition, AccuStandard can prepare, package and ship products for both ASTM PTP's (proficiency testing programs) and round robin studies. Please contact our Technical Service Department for more information.

Use this Cross-reference Table to Match other Methods for known Petrochemical analysis.

ANALYSIS	ASTM	IP	ISO	DIN	JIS	AFNOR
Tag Flash Point	D56			51411	K 2580	M07-003
Distillation	D86	123	3405	51751	K 2254	M07-002
COC Flash Point	D92	36	2592	51376	K 2265	T60-118
PMCC Flash Point	D93	34	2719	51758	K 2265	M07-019
Kinematic Viscosity	D445	71-1	3104	51562	K 2283	T60-100
Aniline Point	D611	2	2977	51775		M07-021
Hydrocarbon Types by FID	D1319	156	3837	51791	K 2536	M07-024
Water (Karl Fischer)	D1744		6296			T60-154
Freezing Point	D2386	16	3013	51421	K 2276	M07-048
Cloud Point	D2500	219	3015	51597	K 2269	T60-105
Sulfur by XRF	D2622			51400T6	K 2541	
Boiling Range By GC	D2887		3924			
Sulfur by Oxidative Microcoulometry	D3120		16591			
Lead by AAS	D3237	428				
Sulfur by Oxidative Microcoulometry	D3246	373				M07-052
Metals by AA	D3605	413	8691	51790T3		
Benzene by GC	D3606	425				
Sulfur by ED-XRF	D4294	336	8754			M07-053
Water (Karl Fischer)	D4377	356	10336			
Metals by AA	D4628	308		51391T1		
Nitrogen by Chemiluminescence Detection	D4629	379				M07-058
Metals by WD-XRF	D4927	407		51391T2		
Water (Karl Fischer)	D4928	386	10337			
Lead in Gas By X-Ray	D5059	228				
Vapor Pressure	D5191	394				M07-079
Oxygenates	D5599	408				
Cloud Point	D5771	444				
Cloud Point	D5772	445				
Cloud Point	D5773	446				
Freezing Point	D5901	434				
Auto-Freeze Point	D5972	435				
Hydrocarbons Automatic	D6379	436				
Hydrocarbons Automatic	D6591	391				
Metals			14597			

This is a partial list of Standards available for ASTM Methods.

Tables Generated from

- (a) R.A. Nadkarni, "Guide to ASTM Test Methods for the Analysis of Petroleum Products and Lubricants," Manual 44 (200), ASTM West Conshohocken, PA
- (b) Annual Book of ASTM Standards 2000, Volumes 05.01 to 05.05

MEMBER



ASTM



On site Viscosity testing



Vacuum Distillation apparatus for Testing Biodiesels Standards

ASTM D56, D92, D93 Flash Point Standards

The reference material is a stable, pure hydrocarbon with a method specific flash point determined by using the ASTM Method # referenced.

ASTM #	Nominal Flash Point	Cat. No.	Unit
PMCC D93	60 °C	ASTM-P-132-01	250 mL
PMCC D93	93 °C	ASTM-P-132-02	250 mL
COC D92	200 °C	ASTM-P-132-03	250 mL
COC D92	230 °C	ASTM-P-132-04	250 mL
PMCC D93	65 °C	ASTM-P-133-01	250 mL
PMCC D93	134 °C	ASTM-P-133-02	250 mL
COC D92	138 °C	ASTM-P-133-03	250 mL
TCC D56	67 °C	ASTM-P-133-04	250 mL

Note: nominal 250 mL fill

ASTM D86 Distillation Standards

The automatic distillation apparatus duplicates the distillation conditions of the manual method. The increased reliance on electronic control requires an independent standard to verify that the apparatus is performing correctly. This synthetic blend of hydrocarbons boil in the temperature range specified in ASTM D86 distillation Groups 1 and 2, and a fuel oil that meets the group 4 criteria.

The Group 1 and 2 standards cover the boiling range 129-368°F (54-187°C). The Group 4 standard covers the range from 410-670°F (210-355°C).

Group	Description	Cat. No.	Unit
1, 2	Synthetic Distillation Standard	ASTM-P-126-01 ▲	500 mL
		ASTM-P-126-SET ▲	2 x 500 mL
4	Distillation Standard	ASTM-P-127-01 ▲	250 mL
		ASTM-P-127-02 ▲	500 mL

Note: nominal 500 mL fill, or 250 mL fill

ASTM D445 Viscosity Calibration Standards

Viscosity @ 40°C	Cat. No.	Unit
4 Cst	ASTM-P-128-01	500 mL
7 Cst	ASTM-P-128-02	500 mL
19 Cst	ASTM-P-128-03	500 mL
61 Cst	ASTM-P-128-04	500 mL
180 Cst	ASTM-P-128-05	500 mL
520 Cst	ASTM-P-128-06	500 mL

Note: nominal 500 mL fill

ASTM D611 Aniline Point Standards

The accuracy of automated aniline point apparatus can be verified using a range of standards whose aniline points are determined using ASTM D611 (Method A) and ASTM D611 (Method E). Standards are packaged in 20 mL ampules in an inert atmosphere.

Aniline Point Verification Method 611(A)

Set include 5 Standards listed below

Nominal Aniline Point	Cat. No.	Unit
0°C	D-611-SET	5 x 20 mL
30°C	D-611-01	20 mL
55°C	D-611-02	20 mL
68°C	D-611-03	20 mL
94°C	D-611-04	20 mL
	D-611-05	20 mL

Aniline Point Verification Method 611(E)

Set include 3 Standards listed below

Nominal Aniline Point	Cat. No.	Unit
43 °C	D-611E-SET	3 x 20 mL
62 °C	D-611E-01	20 mL
77 °C	D-611E-02	20 mL
Pure Aniline	D-611E-03	20 mL
	ASTM-P-134-PAK	5 x 15 mL

Technical Note

For routine purposes pure Aniline is packaged in ampules under dry nitrogen. This minimizes the risk of oxidation.

ASTM D1015 Freezing Points of High Purity Hydrocarbons

Nominal Freezing Point	Cat. No.	Unit
- 50 °C	ASTM-P-129-01	250 mL
- 45 °C	ASTM-P-129-02	250 mL

Note: nominal 250 mL fill

▲ Hazardous fee required.

ASTM D1319 Calibration Standards by Fluorescent Indicator Adsorption FIA

Olefin FIA Calibration Curve

FIA-CAL-SET

	Std. 1	Std. 2	Std. 3	Std. 4	Std. 5	Std. 6	Std. 7
	Target Vol. %	Vol. %	Vol. %	Vol. %	Vol. %	Vol. %	Vol. %
Total Olefins	2.0	4.0	5.0	6.0	8.0	10.0	12.0
Total Paraffins	57.0	55.0	52.0	51.0	45.0	45.0	40.0
Total Aromatics	23.0	24.0	25.0	26.0	29.0	28.0	30.0
Total Oxygenate	18.0	17.0	18.0	17.0	18.0	17.0	18.0

Cat. No.	1 mL
Standard 1	FIA-CAL-01
Standard 2	FIA-CAL-02
Standard 3	FIA-CAL-03
Standard 4	FIA-CAL-04
Standard 5	FIA-CAL-05
Standard 6	FIA-CAL-06
Standard 7	FIA-CAL-07

FIA Olefin Standard

FIA-OLE

FIA-OLE-5ML

	Vol. %		Vol. %
1-Pentene	33.3	1-Heptene	33.3
2,3-Dimethyl-2-butene	33.3		

D1319
Meets
EPA Guidelines
for RFG
Analysis

Technical Note

These standards have been prepared for the determination of aromatics, olefins, oxygenates and saturates in petroleum fractions by Fluorescent Indicator Adsorption (FIA) IP designation 156/95.

The certificate for the FIA calibration curve lists both the volume percents for the hydrocarbon types and the individual volume percents for each analyte in the functional group.

The weight fraction for each hydrocarbon type and individual analyte is also listed on the certificate.

FIA Paraffin Standard

FIA-PAR

FIA-PAR-5ML

1 x 1 mL
1 x 5 mL
8 comps.

Vol. %		Vol. %
<i>n</i> -Pentane	8	2,3-Dimethylpentane
<i>n</i> -Hexane	9	Isooctane
Cyclohexane	15	<i>n</i> -Octane
<i>n</i> -Heptane	14	<i>n</i> -Decane

FIA Aromatic Standard

FIA-ARO

FIA-ARO-5ML

1 x 1 mL
1 x 5 mL
10 comps.

Vol. %		Vol. %
Benzene	4	<i>m</i> -Xylene
Toluene	32	1,2,4-Trimethylbenzene
Ethylbenzene	8	1,3,5-Trimethylbenzene
<i>p</i> -Xylene	8	1,2,4,5-Tetramethylbenzene
<i>o</i> -Xylene	8	Naphthalene

ASTM D1744, E1064, D4377 Water in Liquid Petroleum Products by Karl Fischer D4928, D6304

Standards are available for coulometric Karl Fischer titrations and are packaged in 2 mL, 5 mL, and 20 mL ampoules in sets of 5 and 10. The following concentrations are available:

Description	Cat. No.	Unit
Water content 40 µg/g	KF-0.4X-5ML-VAP	10 x 5 mL
Water content 60 µg/g	KF-0.6X-5ML-VAP	10 x 5 mL
Water content 100 µg/g	KF-1X-2ML-VAP	10 x 2 mL
	KF-1X-5ML-VAP	10 x 5 mL
	KF-1X-20ML-PAK	5 x 20 mL
Water content 1000 µg/g	KF-10X-2ML-VAP	10 x 2 mL
	KF-10X-5ML-VAP	10 x 5 mL
	KF-10X-20ML-PAK	5 x 20 mL
Water content 5000 µg/g	KF-50X-2ML-VAP	10 x 2 mL
	KF-50X-5ML-VAP	10 x 5 mL
	KF-50X-20ML-PAK	5 x 20 mL

Value Added PAK

Packaged in ready to use quantities.

Value Added Paks (Cat. No.'s ending in -VAP) provide multiple single units packaged together for both greater stability and cost savings.



Karl Fischer titrator

ASTM D2386 Freezing Points Calibration Standards

Nominal Freezing Point	Cat. No.	Unit
- 50 °C	ASTM-P-129-01 ▲	250 mL
- 45 °C	ASTM-P-129-02 ▲	250 mL

ASTM D2500 Cloud Point Calibration Standards

Cloud Point, Approx. Value	Cat. No.	Unit
+ 5 °C	ASTM-P-131-01 ▲	250 mL
- 2 °C	ASTM-P-131-02 ▲	250 mL
- 10 °C	ASTM-P-131-03 ▲	250 mL
- 15 °C	ASTM-P-131-04 ▲	250 mL
- 20 °C	ASTM-P-131-05 ▲	250 mL

▲ Hazardous fee required.

AccuStandard stands for accuracy in Cloud Points.



D2622, D3120, D3246, D4294, D5453, D6334, D6445 & Proposed ASTM Sulfur Methods

AccuStandard offers the Petroleum Industry the most complete line of calibration standards designed for today's test methods for sulfur analysis. These standards are designed specifically for the analysis of sulfur in a wide variety of matrices such as #2 diesel fuel, white mineral oil, kerosene, gasoline, crude oil and residual oil.

Traceability, Quality and Certification

All sulfur standards are manufactured from the highest quality raw materials, including well characterized starting materials and the lowest sulfur matrices available. Most standards are manufactured on a weight/weight basis using balances that are calibrated and verified daily against reference mass standards directly traceable to NIST. The concentration of these working level Sulfur standards have established traceability links to NIST SRM's where available.

Packaging

Since applicable concentration ranges will vary based on the instrumentation used and the nature of the sample the standards can be ordered as complete sets or individual bottles.

Sulfur Standards for ASTM D2622, D3120, D3246, D4294, D5453, D6334, D6445 & Proposed ASTM Sulfur Methods

Sulfur in Heavy Weight Mineral Oil (75 cSt)

Ready-to-Use

Concentration µg/g	Wt. %	100 mL Cat. No.	PAK 5 x 20 mL Cat. No.
Blank	0.000	SWMO-BL-100ML	SWMO-BL-20ML-PAK
100	0.010	SWMO-1X-100ML	SWMO-1X-20ML-PAK
200	0.020	SWMO-2X-100ML	SWMO-2X-20ML-PAK
300	0.030	SWMO-3X-100ML	SWMO-3X-20ML-PAK
400	0.040	SWMO-4X-100ML	SWMO-4X-20ML-PAK
500	0.050	SWMO-5X-100ML	SWMO-5X-20ML-PAK
750	0.075	SWMO-7.5X-100ML	SWMO-7.5X-20ML-PAK
1,000	0.10	SWMO-10X-100ML	SWMO-10X-20ML-PAK
1,500	0.15	SWMO-15X-100ML	SWMO-15X-20ML-PAK
3,000	0.30	SWMO-30X-100ML	SWMO-30X-20ML-PAK
5,000	0.50	SWMO-50X-100ML	SWMO-50X-20ML-PAK
7,000	0.70	SWMO-70X-100ML	SWMO-70X-20ML-PAK
10,000	1.00	SWMO-100X-100ML	SWMO-100X-20ML-PAK
15,000	1.50	SWMO-150X-100ML	SWMO-150X-20ML-PAK
20,000	2.00	SWMO-200X-100ML	SWMO-200X-20ML-PAK
30,000	3.00	SWMO-300X-100ML	SWMO-300X-20ML-PAK
40,000	4.00	SWMO-400X-100ML	SWMO-400X-20ML-PAK
50,000	5.00	SWMO-500X-100ML	SWMO-500X-20ML-PAK
60,000	6.00	SWMO-600X-100ML	SWMO-600X-20ML-PAK

Set of above **SWMO-CAL-100ML-SET** At stated concentration
19 x 100 mL 5 x 20 mL ea

Individual Sulfur Standards 100 mL Bottle

Sulfur in Light Weight Mineral Oil (20 cSt)

Ready-to-Use

Concentration µg/g	Wt. %	100 mL Cat. No.	PAK 5 x 20 mL Cat. No.
Blank	0.000	SWMO-LT-BL-100ML	SWMO-LT-BL-20ML-PAK
100	0.010	SWMO-LT-1X-100ML	SWMO-LT-1X-20ML-PAK
200	0.020	SWMO-LT-2X-100ML	SWMO-LT-2X-20ML-PAK
300	0.030	SWMO-LT-3X-100ML	SWMO-LT-3X-20ML-PAK
400	0.040	SWMO-LT-4X-100ML	SWMO-LT-4X-20ML-PAK
500	0.050	SWMO-LT-5X-100ML	SWMO-LT-5X-20ML-PAK
750	0.075	SWMO-LT-7.5X-100ML	SWMO-LT-7.5X-20ML-PAK
1,000	0.10	SWMO-LT-10X-100ML	SWMO-LT-10X-20ML-PAK
1,500	0.15	SWMO-LT-15X-100ML	SWMO-LT-15X-20ML-PAK
3,000	0.30	SWMO-LT-30X-100ML	SWMO-LT-30X-20ML-PAK
5,000	0.50	SWMO-LT-50X-100ML	SWMO-LT-50X-20ML-PAK
7,000	0.70	SWMO-LT-70X-100ML	SWMO-LT-70X-20ML-PAK
10,000	1.00	SWMO-LT-100X-100ML	SWMO-LT-100X-20ML-PAK
15,000	1.50	SWMO-LT-150X-100ML	SWMO-LT-150X-20ML-PAK
20,000	2.00	SWMO-LT-200X-100ML	SWMO-LT-200X-20ML-PAK
30,000	3.00	SWMO-LT-300X-100ML	SWMO-LT-300X-20ML-PAK
40,000	4.00	SWMO-LT-400X-100ML	SWMO-LT-400X-20ML-PAK
50,000	5.00	SWMO-LT-500X-100ML	SWMO-LT-500X-20ML-PAK
60,000	6.00	SWMO-LT-600X-100ML	SWMO-LT-600X-20ML-PAK

Set of above **SWMO-LT-CAL-100ML-SET** At stated concentration
19 x 100 mL 5 x 20 mL

Individual Sulfur Standards 100 mL Bottle

Sulfur in #2 Diesel Fuel

Ready-to-Use

Concentration µg/g	Wt. %	100 mL Cat. No.	PAK 5 x 20 mL Cat. No.
Blank	0.000	SDF-BL-100ML ▲	SDF-BL-20ML-PAK
100	0.010	SDF-1X-100ML ▲	SDF-1X-20ML-PAK
200	0.020	SDF-2X-100ML ▲	SDF-2X-20ML-PAK
300	0.030	SDF-3X-100ML ▲	SDF-3X-20ML-PAK
400	0.040	SDF-4X-100ML ▲	SDF-4X-20ML-PAK
500	0.050	SDF-5X-100ML ▲	SDF-5X-20ML-PAK
750	0.075	SDF-7.5X-100ML ▲	SDF-7.5X-20ML-PAK
1,000	0.10	SDF-10X-100ML ▲	SDF-10X-20ML-PAK
1,500	0.15	SDF-15X-100ML ▲	SDF-15X-20ML-PAK
3,000	0.30	SDF-30X-100ML ▲	SDF-30X-20ML-PAK
5,000	0.50	SDF-50X-100ML ▲	SDF-50X-20ML-PAK
7,000	0.70	SDF-70X-100ML ▲	SDF-70X-20ML-PAK
10,000	1.00	SDF-100X-100ML ▲	SDF-100X-20ML-PAK
15,000	1.50	SDF-150X-100ML ▲	SDF-150X-20ML-PAK
20,000	2.00	SDF-200X-100ML ▲	SDF-200X-20ML-PAK
30,000	3.00	SDF-300X-100ML ▲	SDF-300X-20ML-PAK
40,000	4.00	SDF-400X-100ML ▲	SDF-400X-20ML-PAK
50,000	5.00	SDF-500X-100ML ▲	SDF-500X-20ML-PAK
60,000	6.00	SDF-600X-100ML ▲	SDF-600X-20ML-PAK

Set of above **SDF-CAL-100ML-SET** **SDF-CAL-20ML-SET**
19 x 100 mL 19 x (5 x 20 mL)

Individual Sulfur Standards 100 mL Bottle At stated concentration
5 x 20 mL

Technical Note

A well-characterized di-*n*-butyl sulfide is used as the starting material in these products.

Custom Concentrations

AccuStandard can custom design a sulfur set for your specific needs. Contact our Technical Service Department for assistance or additional information.

As the matrix may contain some native sulfur, AccuStandard encourages purchasing sulfur blanks for calibration analysis

▲ Hazardous fee required.

Sulfur Standards for ASTM D2622, D3120, D3246, D4294, D5453, D6334, D6445 & Proposed ASTM Sulfur Methods

Sulfur in Light Distillate Kerosene

Concentration µg/g	Wt. %	100 mL Cat. No.	Ready-to-Use PAK 5 x 20 mL Cat. No.
Blank	0.000	SK-BL-100ML ▲	SK-BL-20ML-PAK
100	0.010	SK-1X-100ML ▲	SK-1X-20ML-PAK
300	0.030	SK-3X-100ML ▲	SK-3X-20ML-PAK
500	0.050	SK-5X-100ML ▲	SK-5X-20ML-PAK
750	0.075	SK-7.5X-100ML ▲	SK-7.5X-20ML-PAK
1,000	0.10	SK-10X-100ML ▲	SK-10X-20ML-PAK
2,000	0.20	SK-20X-100ML ▲	SK-20X-20ML-PAK
3,000	0.30	SK-30X-100ML ▲	SK-30X-20ML-PAK
4,000	0.40	SK-40X-100ML ▲	SK-40X-20ML-PAK
5,000	0.50	SK-50X-100ML ▲	SK-50X-20ML-PAK
10,000	1.00	SK-100X-100ML ▲	SK-100X-20ML-PAK
20,000	2.00	SK-200X-100ML ▲	SK-200X-20ML-PAK

Set of above SK-CAL-100ML-SET ▲
12 x 100 mL

Individual Sulfur Standards 100 mL Bottle

At stated conc.
5 x 20 mL

Sulfur in Heavy Distillate Kerosene

Concentration µg/g	Wt. %	100 mL Cat. No.
Blank	0.000	SK-HD-BL-100ML ▲
100	0.010	SK-HD-1X-100ML ▲
200	0.020	SK-HD-2X-100ML ▲
300	0.030	SK-HD-3X-100ML ▲
400	0.040	SK-HD-4X-100ML ▲
500	0.050	SK-HD-5X-100ML ▲
750	0.075	SK-HD-7.5X-100ML ▲
1,000	0.10	SK-HD-10X-100ML ▲
1,500	0.15	SK-HD-15X-100ML ▲
2,000	0.20	SK-HD-20X-100ML ▲
3,000	0.30	SK-HD-30X-100ML ▲
4,000	0.40	SK-HD-40X-100ML ▲
5,000	0.50	SK-HD-50X-100ML ▲
7,000	0.70	SK-HD-70X-100ML ▲
10,000	1.00	SK-HD-100X-100ML ▲
15,000	1.50	SK-HD-150X-100ML ▲
20,000	2.00	SK-HD-200X-100ML ▲
30,000	3.00	SK-HD-300X-100ML ▲
40,000	4.00	SK-HD-400X-100ML ▲
50,000	5.00	SK-HD-500X-100ML ▲
60,000	6.00	SK-HD-600X-100ML ▲

Set of above SK-HD-CAL-100ML-SET ▲
21 x 100 mL

Individual Sulfur Standards 100 mL Bottle

Standards of Interest

For the mandatory real world QC samples stipulated in the Method, see page 271.

Custom Concentrations

AccuStandard can custom design a sulfur set for your specific needs. Contact our Technical Service Department for assistance or additional information.

Technical Note

A well-characterized di-*n*-butyl sulfide is used as the starting material in these products.

▲ Hazardous fee required.



Antek 900 Series Sulfur Analyzer

As the matrix may contain some native sulfur, AccuStandard encourages purchasing sulfur blanks for calibration analysis



XOS Optical Systems, Sulfur Analyzer (Monochromatic Wavelength-Dispersive X-Ray Fluorescence Spectrometer)

ASTM D2622, D4294 Sulfur Calibration

Sulfur Calibration Standards in Isooctane for Gasoline & Reformulated Gasoline Analysis

In Isooctane

Sulfur Conc.	Sulfur Wt.%	Cat. No. (100 mL)
Blank	0.0	STP-BL-100ML ▲
10 µg/g	0.001	STP-1X-100ML ▲
20 µg/g	0.002	STP-2X-100ML ▲
30 µg/g	0.003	STP-3X-100ML ▲
50 µg/g	0.005	STP-5X-100ML ▲
100 µg/g	0.010	STP-10X-100ML ▲
200 µg/g	0.020	STP-20X-100ML ▲
300 µg/g	0.030	STP-30X-100ML ▲
400 µg/g	0.040	STP-40X-100ML ▲
600 µg/g	0.060	STP-60X-100ML ▲
1000 µg/g	0.10	STP-100X-100ML ▲
2000 µg/g	0.20	STP-200X-100ML ▲
3000 µg/g	0.30	STP-300X-100ML ▲

STP-CAL-100ML-SET ▲

13 x 100 mL

In Isooctane Set of 13 individual bottles

Technical Note

A well characterized di-*n*-butyl sulfide starting material is used with a low sulfur Isooctane matrix for RFG/gasoline sulfur standards.

ASTM D3120, D3246 Sulfur Calibration

Sulfur Calibration Set

D-3120-92-CAL-SET

8 x 1 mL

In Isooctane

Sulfur Conc.	Sulfur Wt. %	Cat. No (1 mL)
Blank	—	D-3120-92-BL
1 µg/g	0.0001	D-3120-92-1X
3 µg/g	0.0003	D-3120-92-3X
10 µg/g	0.0010	D-3120-92-10X
30 µg/g	0.0030	D-3120-92-30X
50 µg/g	0.0050	D-3120-92-50X
75 µg/g	0.0075	D-3120-92-75X
100 µg/g	0.010	D-3120-92-100X

Technical Note

Well characterized di-*n*-butyl sulfide is used in a low sulfur Isooctane matrix for this calibration set.

As the matrix may contain some native sulfur, AccuStandard encourages purchasing sulfur blanks for calibration analysis

ASTM D2622, D6334, D6445 Sulfur Calibration

Sulfur Calibration Standards used on XRF Energy Dispersive or Wavelength Instruments

Low Level

In Isooctane:Toluene (3:1)

Sulfur Conc.	Sulfur Wt.%	Cat. No. (100 mL)
Blank	0.0	D-2622-LL-BL-100ML ▲
5 µg/g	0.0005	D-2622-LL-5X-100ML ▲
10 µg/g	0.0010	D-2622-LL-10X-100ML ▲
30 µg/g	0.0030	D-2622-LL-30X-100ML ▲
50 µg/g	0.0050	D-2622-LL-50X-100ML ▲
75 µg/g	0.0075	D-2622-LL-75X-100ML ▲
100 µg/g	0.010	D-2622-LL-100X-100ML ▲
300 µg/g	0.030	D-2622-LL-300X-100ML ▲
500 µg/g	0.050	D-2622-LL-500X-100ML ▲
1000 µg/g	0.100	D-2622-LL-1000X-100ML ▲

D-2622-LL-CAL-100ML-SET ▲

10 x 100 mL

In Isooctane:Toluene (3:1)

Set of 10 individual bottles

Mid Level Additions

200 µg/g	0.020	D-2622-LL-200X-100ML ▲
400 µg/g	0.040	D-2622-LL-400X-100ML ▲
600 µg/g	0.060	D-2622-LL-600X-100ML ▲
700 µg/g	0.070	D-2622-LL-700X-100ML ▲
800 µg/g	0.080	D-2622-LL-800X-100ML ▲
900 µg/g	0.090	D-2622-LL-900X-100ML ▲
1100 µg/g	0.110	D-2622-LL-1100X-100ML ▲
1200 µg/g	0.120	D-2622-LL-1200X-100ML ▲

Technical Note

Well characterized Thiophene & 2-Methyl thiophene are used as starting material in these products.

▲ Hazardous fee required.

ASTM Methods - Sulfur in Oil

Sulfur in Crude Oil Standards

µg/g	Wt. %	Cat. No. (100 mL)
1,000	0.10	SCO-10X-100ML ▲
2,500	0.25	SCO-25X-100ML ▲
5,000	0.50	SCO-50X-100ML ▲
10,000	1.00	SCO-100X-100ML ▲
20,000	2.00	SCO-200X-100ML ▲
30,000	3.00	SCO-300X-100ML ▲
40,000	4.00	SCO-400X-100ML ▲
50,000	5.00	SCO-500X-100ML ▲

SCO-CAL-100ML-SET ▲ 8 x 100 mL
In Crude oil Set of 8 individual bottles

Individual Sulfur
100 mL Bottle

Sulfur in Residual Oil Standards

µg/g	Wt. %	Cat. No. (100 mL)
3,500	0.35	SRO-35X-100ML
7,000	0.70	SRO-70X-100ML
10,000	1.00	SRO-100X-100ML
15,000	1.50	SRO-150X-100ML
20,000	2.00	SRO-200X-100ML
30,000	3.00	SRO-300X-100ML
40,000	4.00	SRO-400X-100ML

SRO-CAL-100ML-SET x 100 mL
In Residual oil Set of 7 individual bottles

Standards of Interest

We can provide **Ready-to-Inject** working level calibration standards to meet unique laboratory applications. Call or fax us your standard requirements.

ASTM Methods Sulfur in Aromatic Hydrocarbons

Total Sulfur in Aromatic Compounds by Hydrogenolysis & Rateometric Colorimetry

ASTM-P-0010-PAK 5 x 1 mL
1000 µg/mL in Toluene
Sulfur (as Thiophene)

Trace Quantities of Sulfur in Liquid Aromatic Hydrocarbons by Oxidative Microcoulometry

ASTM-P-0020-PAK 5 x 1 mL
1000 µg/mL in Xylenes
Sulfur (as Dibenzothiophene)

ASTM-SSTDA/B-SET 10 x 2 mL
Set contains the following 10 standards in isooctane

Description	Cat. No. (2 mL)
Sulfur Blank	ASTM-SSTDA-BL
Sulfur @ 0.5 µg/g in Isooctane	ASTM-SSTDA-01
Sulfur @ 1.0 µg/g in Isooctane	ASTM-SSTDA-02
Sulfur @ 2.5 µg/g in Isooctane	ASTM-SSTDA-03
Sulfur @ 5.0 µg/g in Isooctane	ASTM-SSTDA-04
Sulfur Blank	ASTM-SSTDDB-BL
Sulfur @ 5.0 µg/g in Isooctane	ASTM-SSTDDB-04
Sulfur @ 10.0 µg/g in Isooctane	ASTM-SSTDDB-05
Sulfur @ 25.0 µg/g in Isooctane	ASTM-SSTDDB-06
Sulfur @ 50.0 µg/g in Isooctane	ASTM-SSTDDB-07



AccuStandard is an active member in ASTM and strives to keep abreast of ASTM method revisions. If our listed formulation does not meet the most recent method revision, please contact Technical Support for an updated product.

As the matrix may contain some native sulfur, AccuStandard encourages purchasing sulfur blanks for calibration analysis



AccuStandard's Environmental Efforts

1. As part of a recent facility expansion, and in cooperation with the local utilities, AccuStandard invested almost \$100,000 on energy conservation and controls. The estimated impact on the environment is similar to that of planting 19 acres of trees.
2. Many customers avoid the environmental impact and cost of disposing of unused standards. One of the only standards manufacturers to offer this, AccuStandard's "On-Going Stability Program" allows us to extend the expiration date on a standard if our testing over time on a specific lot warrants it.
3. Many every day steps such as using recycled paper for the tens of thousands of catalogs every year, educating customers on the value of using standards as pre-made solutions rather than buying large quantities of reagents.

▲ Hazardous fee required.

The **PIANO** line of quantitative and qualitative petrochemical standards for analysis of naphthas, gasolines, reformates and other complex hydrocarbons mixtures. **PIANO** analysis involves the determination of the percentage of the following five fractions Paraffins, Isoparaffins, Aromatics, Naphthenes, and Olefins. **PONA** analysis involves analyzing the naphtha sample for Paraffins, Olefins, Naphthenes, and Aromatics. If the Isoparaffins and Olefins are not present, the analysis is just for **PNA**.

The **PIANO** line of standards is used to determine quantitative and qualitative retention times and indices as well as to monitor response factors within the hydrocarbon blend. These complex mixes are prepared from materials of the highest available purity, accurate to four decimal places, and include a detailed data sheet on the formulation composition. The typical range for the analytes in each formulation has been provided for each catalog item. The exact composition on a weight % basis for each analyte has been provided on the certificate, and a disk deliverable spreadsheet is available on request.

Updated PIANO Full Analytical Data Package (FAP) includes:

- Detailed analytical conditions
- Certification of all components
- Chromatograms all products

Products are prepared and certified gravimetrically.

1. All weights are traceable through National Institute of Standards & Technology.
2. Certified Analyte Concentration = Purity x Prepared Concentration.
3. The uncertainty value is $\pm 2\%$ and is determined in accordance with the CITAC guide to Quantifying Uncertainty in Analytical Measurement and is reported as an Expanded Uncertainty ($U(C_{cd})$). Assuming a normal distribution, a coverage factor of $K=2$ (95% confidence level) is used in the calculation.

Partnering with Air Liquide to provide these materials enables AccuStandard to provide a detailed certification package to meet your needs.

Naphthenes FAP Documentation Sample

ASTM PIANO

PIANO, PONA, PNA Analysis

PIANO *n*-Paraffins Mix

ASTM-P-0031-FAP

100 µL

11 paraffins listed below at varying Wt. % typically in the range from 7.0 to 11.0 Wt. %. The actual certificate will have the exact Wt. % for each analyte.

	Typ. Wt. %
<i>n</i> -Pentane	9.4375
<i>n</i> -Hexane	9.5661
<i>n</i> -Heptane	9.8048
<i>n</i> -Octane	9.5518
<i>n</i> -Nonane	9.0482
<i>n</i> -Decane	9.2517
<i>n</i> -Undecane	9.3172
<i>n</i> -Dodecane	9.1855
<i>n</i> -Tridecane	8.9332
<i>n</i> -Tetradecane	8.7989
<i>n</i> -Pentadecane	7.1057

PIANO Isoparaffins Mix

ASTM-P-0032-FAP

100 µL

35 Isoparaffins listed below at varying Wt. % typically in the range from 0.5 to 6.0 Wt. %. The actual certificate will have the exact Wt. % for each analyte.

	Typ. Wt. %		Typ. Wt. %		Typ. Wt. %
Isopentane	2.1928	2,2-Dimethylhexane	1.3061	2,3-Dimethylheptane	1.4870
2,3-Dimethylbutane	0.4466	2,5-Dimethyl hexane	3.6975	3,4-Dimethylheptane	3.7450
2-Methylpentane	3.2815	2,2,3-Trimethylpentane	1.7371	2-Methyloctane	3.7576
3-Methylpentane	5.3865	2,4-Dimethylhexane	1.6252	3-Methyloctane	5.6020
2,2-Dimethylpentane	1.7747	2,3-Dimethylhexane	1.6212	3,3-Diethylpentane	1.5755
2,4-Dimethylpentane	3.6993	2-Methylheptane	4.4073	2,2-Dimethyloctane	3.4135
2,2,3-Trimethylbutane	3.9291	4-Methylheptane	3.2015	3,3-Dimethyloctane	3.2582
3,3-Dimethylpentane	1.1848	3-Methylheptane	5.5186	2,3-Dimethyloctane	3.8842
2-Methylhexane	2.2384	3-Ethylhexane	0.6999	3-Ethylheptane	3.7482
2,3-Dimethylpentane	1.7883	3,3-Dimethylheptane	1.7011	2-Methylnonane	3.7144
3-Methylhexane	1.6708	2,5-Dimethylheptane	5.6731	3-Methylnonane	5.7687
3-Ethylpentane	0.5080	3,5-Dimethylheptane	0.7565		

PIANO Aromatics Mix

ASTM-P-0033-FAP

100 µL

38 Aromatics listed below at varying Wt. % typically in the range from 0.2 to 7.0 Wt. %. The actual certificate will have the exact Wt. % for each analyte.

	Typ. Wt. %
Benzene	3.45
Toluene	4.5738
Ethylbenzene	6.7670
<i>m</i> -Xylene	2.2259
<i>p</i> -Xylene	4.4815
<i>o</i> -Xylene	2.2519
Isopropylbenzene	2.2248
<i>n</i> -Propylbenzene	4.4979
1-Methyl-3-ethylbenzene	2.2243
1-Methyl-4-ethylbenzene	2.2206
1,3,5-Trimethylbenzene	1.1076
1-Methyl-2-ethylbenzene	2.2611
1,2,4-Trimethylbenzene	2.2535
<i>tert</i> -Butylbenzene	4.5310
Isobutylbenzene	4.4216
<i>sec</i> -Butylbenzene	2.2368
1-Methyl-3-isopropylbenzene	1.1066
1-Methyl-4-isopropylbenzene	1.0668
1-Methyl-2-isopropylbenzene	1.1241
1-Methyl-3- <i>n</i> -propylbenzene	2.1135
1-Methyl-4- <i>n</i> -propylbenzene	2.2336
<i>n</i> -Butylbenzene	2.2087
1,2-Diethylbenzene	1.0947
1-Methyl-2- <i>n</i> -propylbenzene	2.2641
1,4-Dimethyl-2-ethylbenzene	2.2803
1,3-Dimethyl-5-ethylbenzene	2.2858
1,2-Dimethyl-4-ethylbenzene	2.2558
1,3-Dimethyl-2-ethylbenzene	1.1416
1,2-Dimethyl-3-ethylbenzene	2.1864
1,2,4,5-Tetramethylbenzene	0.2360
2-Methylbutylbenzene	1.1453
1- <i>tert</i> -Butyl-2-methylbenzene	0.7641
<i>n</i> -Pentylbenzene	4.4828
1- <i>tert</i> -Butyl,3,5-dimethylbenzene	2.1641
1- <i>tert</i> -Butyl-4-ethylbenzene	2.2322
1,3,5-Triethylbenzene	4.5671
1,2,4-Triethylbenzene	1.1087
<i>n</i> -Hexylbenzene	4.5029

PIANO Naphthenes Mix

ASTM-P-0034-FAP

100 µL

30 Naphthenes listed below at varying Wt. % typically in the range from 0.5 to 8.0 Wt. %. The actual certificate will have the exact Wt. % for each analyte.

	Typ. Wt. %
Cyclopentane	4.9143
Methylcyclopentane	3.2829
Cyclohexane	5.3268
1,1-Dimethylcyclopentane	3.4612
<i>cis</i> -1,3-Dimethylcyclopentane	0.5963
<i>trans</i> -1,2-Dimethylcyclopentane	1.4715
<i>trans</i> -1,3-Dimethylcyclopentane	2.7531
Methylcyclohexane	5.6091
Ethylcyclopentane	3.5534
<i>ctc</i> -1,2,3-Trimethylcyclopentane	1.5859
<i>cct</i> -1,2,4-Trimethylcyclopentane	3.7208
<i>ctc</i> -1,2,4-Trimethylcyclopentane	1.6467
<i>trans</i> -1,4-Dimethylcyclohexane	3.6499
1-Ethyl-1-methylcyclopentane	1.0554
<i>trans</i> -1,2-Dimethylcyclohexane	1.6537
<i>ccc</i> -1,2,3-Trimethylcyclopentane	0.7971
Isopropylcyclopentane	3.5042
<i>cis</i> -1,2-Dimethylcyclohexane	3.7159
<i>n</i> -Propylcyclopentane	3.6438
<i>ccc</i> -1,3,5-Trimethylcyclohexane	3.5263
1,1,4-Trimethylcyclohexane	3.6791
<i>ctt</i> -1,2,4-Trimethylcyclohexane	3.6107
<i>ctc</i> -1,2,4-Trimethylcyclohexane	3.5069
1,1,2-Trimethylcyclohexane	3.3354
Isobutylcyclopentane	3.7123
Isopropylcyclohexane	5.7233
<i>n</i> -Butylcyclopentane	3.6944
Isobutylcyclohexane	5.6729
<i>t</i> -1-Methyl-2-propylcyclohexane	3.8434
<i>t</i> -1-Methyl-2-(4MP)cyclopentane	3.7534

PIANO Olefins Mix

ASTM-P-0035-FAP

100 µL

25 Olefins listed below at varying Wt. % typically in the range from 1.2 to 9.0 Wt. %. The actual certificate will have the exact Wt. % for each analyte.

	Typ. Wt. %
3-Methyl-1-butene	1.9396
1-Pentene	4.1355
2-Methyl-1-butene	1.4440
2-Methyl-1,3-butadiene	2.3889
<i>trans</i> -2-Pentene	1.8034
<i>cis</i> -2-Pentene	1.9792
4-Methylpentene-1	3.4372
1-Hexene	7.0484
<i>trans</i> -2-Hexene	1.7302
2-Methylpentene-2	3.3901
<i>cis</i> -2-Hexene	3.8765
1-Heptene	7.6134
<i>trans</i> -3-Heptene	3.3469
<i>cis</i> -3-Heptene	5.8657
<i>trans</i> -2-Heptene	3.7217
<i>cis</i> -2-Heptene	5.7679
1-Octene	7.6901
<i>trans</i> -2-Octene	1.9432
<i>cis</i> -2-Octene	3.9502
1-Nonene	7.6425
<i>trans</i> -3-Nonene	1.9972
<i>cis</i> -3-Nonene	4.0042
<i>trans</i> -2-Nonene	1.9848
<i>cis</i> -2-Nonene	2.7952
1-Decene	8.2053

Technical Note

We may add and/or subtract PIANO Analytes and vary the weight % for each Analyte. The certificate will reflect the exact Analyte composition.

PIANO Mixture

ASTM-P-0030-FAP

100 µL

139 comps.

The PIANO formulation contains the *n*-Paraffins, Isoparaffins, Aromatics, Naphthenes, and Olefins:

ASTM-P-0031-FAP, ASTM-P-0032-FAP, ASTM-P-0033-FAP, ASTM-P-0034-FAP, ASTM-P-0035-FAP.

Approximate weight %'s for the total: *n*-Paraffins 18.5%, Isoparaffins 17.9%, Aromatics 23.6%, Naphthenes 20.9%, Olefins 19.0%. The certificate lists the weight % for all analytes in the formulation.

PIANO Mix Set

ASTM-PIANO-FAP-SET

6 x 100 µL

Set includes the following ASTM-P-0030, ASTM-P-0031, ASTM-P-0032, ASTM-P-0033, ASTM-P-0034, ASTM-P-0035



ASTM

Detailed Hydrocarbon Analysis

ASTM D2789 Hydrocarbon Types in Low Olefinic Gas by MS

Hydrocarbon Mixture

D-2789-CTM

D-2789-CTM-PAK

SAVE

1 x 1 mL
5 x 1 mL
9 comps.

Technical Note

Both the actual volume percent ratio and the final weight fractions for each analyte will be listed on the certificate.

	Vol. %		Vol. %
2-Methylpentane	7.2	<i>cis</i> -1,2-Dimethylcyclohexane	15.5
2,4-Dimethylpentane	9.4	Benzene	7.7
<i>n</i> -Octane	16.6	Toluene	10
Methylcyclopentane	7.1	<i>p</i> -Xylene	16.5
Methylcyclohexane	10		

ASTM D2887 Boiling Range Distribution of Petroleum Fractions by GC

Calibration Mixture

DRH-002N

DRH-002N-10X

100 mg
1 gm
17 comps.

	Wt. %		Wt. %
<i>n</i> -Hexane	6	<i>n</i> -Octadecane	5
<i>n</i> -Heptane	6	<i>n</i> -Eicosane	2
<i>n</i> -Octane	8	<i>n</i> -Tetracosane	2
<i>n</i> -Nonane	8	<i>n</i> -Octacosane	1
<i>n</i> -Decane	12	<i>n</i> -Dotriacontane	1
<i>n</i> -Undecane	12	<i>n</i> -Hexatriacontane	1
<i>n</i> -Dodecane	12	<i>n</i> -Tetracontane	1
<i>n</i> -Tetradecane	12	<i>n</i> -Tetratetracontane	1
<i>n</i> -Hexadecane	10		

Hydrocarbon Window Defining Standard

DRH-008S-R2

DRH-008S-R2-PAK SAVE

500 µg/mL each in Chloroform

1 x 1 mL
5 x 1 mL
35 comps.

Octane	Nonadecane	Triacontane
Nonane	Phytane	<i>n</i> -Hentriacontane
Decane	Eicosane	Dotriacontane
Undecane	Heneicosane	Tritriacontane
Dodecane	Docosane	Tetratriacontane
Tridecane	Tricosane	Pentatriacontane
Tetradecane	Tetracosane	Hexatriacontane
Pentadecane	Pentacosane	Heptatriacontane
Hexadecane	Hexacosane	Octatriacontane
Heptadecane	Heptacosane	Nonatriacontane
Octadecane	Octacosane	Tetracontane
Pristane	Nonacosane	

Fuel Oil Degradation/Retention Time Mix for Quantification of C₁₇/Pristane & C₁₈/Phytane ratios

DRH-005S-10X

2.0 mg/mL each in CH₂Cl₂:CS₂ (1:1)

DRH-005S-R1-10X

DRH-005S-R1-10X-PAKSAVE

2.0 mg/mL each in Chloroform

1 x 1 mL
4 comps.
1 x 1 mL
5 x 1 mL
4 comps.

Heptadecane
Octadecane
Phytane (2,6,10,14-Tetramethylhexadecane)
Pristane (2,6,10,14-Tetramethylpentadecane)

Technical Note

AccuStandard offers a hydrocarbon window defining standard with the C₈ to C₄₀ odd and even alkanes. As an added benefit, pristane and phytane are included in the formulation. Use of this one standard measuring the C₁₇/pristane and C₁₈/phytane ratio can be used to estimate degradation of fuel oil.

Also available is a fuel oil degradation mixture containing just the four required analytes to determine the C₁₇/pristane and C₁₈/phytane ratio (DRH-005S-10X).

Column Test Mixture

D-2887

1% v/v in *n*-Octane

1 x 1 mL
2 comps.

n-Hexadecane *n*-Octadecane

Reference Gas Oil Sample Lot #2

D-2887-REFOIL

1 x 1 mL

Calibration Solutions

DRH-002S-R1

DRH-002S-R1-PAK

At stated conc. in Chloroform

SAVE

1 x 1 mL
5 x 1 mL
17 comps.

	µg/mL		µg/mL
<i>n</i> -Hexane	600	<i>n</i> -Octadecane	500
<i>n</i> -Heptane	600	<i>n</i> -Eicosane	200
<i>n</i> -Octane	800	<i>n</i> -Tetracosane	200
<i>n</i> -Nonane	800	<i>n</i> -Octacosane	100
<i>n</i> -Decane	1200	<i>n</i> -Dotriacontane	100
<i>n</i> -Undecane	1200	<i>n</i> -Hexatriacontane	100
<i>n</i> -Dodecane	1200	<i>n</i> -Tetracontane	100
<i>n</i> -Tetradecane	1200	<i>n</i> -Tetratetracontane	100
<i>n</i> -Hexadecane	1000		

DRH-002S-R2

DRH-002S-R2-PAK

0.1 % Wt./Wt. each in Chloroform

SAVE

1 x 1 gm
5 x 1 gm
20 comps.

<i>n</i> -Tetratetracontane	<i>n</i> -Octadecane	<i>n</i> -Octane
<i>n</i> -Tetracontane	<i>n</i> -Hexadecane	<i>n</i> -Heptane
<i>n</i> -Hexatriacontane	<i>n</i> -Tetradecane	<i>n</i> -Hexane
<i>n</i> -Dotriacontane	<i>n</i> -Dodecane	<i>n</i> -Pentane
<i>n</i> -Octacosane	<i>n</i> -Undecane	<i>n</i> -Pentadecane
<i>n</i> -Tetracosane	<i>n</i> -Decane	<i>n</i> -Heptadecane
<i>n</i> -Eicosane	<i>n</i> -Nonane	

Reformulated to ship by Air

ASTM

Simulated Distillation (SIM DIS)



Simulated Distillation (SIM DIS) and Proposed Motor Oil Volatility Method

AccuStandard has developed an extensive line of SIM DIS standards for normal and high temperature analytical requirements when generating boiling point versus retention time calibration curves. Since normal paraffins above Alkane C60 are not readily available, Polywax 500, 655, 850 and 1000 standards have been incorporated to perform SIM DIS analysis of heavy petroleum fractions with boiling points up to 1350°F.

SIM DIS Simulated Distillation Standards

Stock SIM DIS Paraffin Solution

ASTM-P-0050

1 x 5 mL
14 comps.

	Wt. %		Wt. %
<i>n</i> -Pentane	6.66	<i>n</i> -Dodecane	13.33
<i>n</i> -Hexane	6.66	<i>n</i> -Tetradecane	6.66
<i>n</i> -Heptane	6.66	<i>n</i> -Pentadecane	6.66
<i>n</i> -Octane	6.66	<i>n</i> -Hexadecane	6.66
<i>n</i> -Nonane	6.66	<i>n</i> -Heptadecane	6.66
<i>n</i> -Decane	6.66	<i>n</i> -Octadecane	6.66
<i>n</i> -Undecane	6.66	<i>n</i> -Eicosane	6.66

Working Level SIM DIS Paraffin Solution with Polywax 500

ASTM-P-0052

ASTM-P-0052-PAK **SAVE**

At stated conc. in Carbon disulfide

1 x 1 mL
5 x 1 mL
15 comps.

	Wt. %		Wt. %
<i>n</i> -Pentane	0.0333	<i>n</i> -Tetradecane	0.0333
<i>n</i> -Hexane	0.0333	<i>n</i> -Pentadecane	0.0333
<i>n</i> -Heptane	0.0333	<i>n</i> -Hexadecane	0.0333
<i>n</i> -Octane	0.0333	<i>n</i> -Heptadecane	0.0333
<i>n</i> -Nonane	0.0333	<i>n</i> -Octadecane	0.0333
<i>n</i> -Decane	0.0333	<i>n</i> -Eicosane	0.0333
<i>n</i> -Undecane	0.0333	Polywax 500	0.5
<i>n</i> -Dodecane	0.0666		



Carbon disulfide can not ship by air. When possible alternate solvents can be used. Please contact our Technical Service Department for other options.

Polywax 850®

ASTM-P-0137N-2G

2 grams

Polywax 850

Polywax 1000®

ASTM-P-0138N-2G

2 grams

Polywax 1000

Polywax 500®

ASTM-P-0051N-2G

2 grams

Polywax 500

Polywax 655®

ASTM-P-0053N-2G

2 grams

Polywax 655

Standards of Interest

See ASTM Methods D3710, D5307, D5442, D6352 for additional calibration standards for hydrocarbon analysis.

ASTM D3120 & D3246 Trace Quantities of Sulfur in Light Liquid Petroleum Hydrocarbons by Oxidative Microcoulometry

Sulfur Calibration Set

D-3120-92-CAL-SET

In Isooctane

set of 8 x 1 mL

Sulfur Conc.	Sulfur Wt. %	Cat. No.	Sulfur Conc.	Sulfur Wt. %	Cat. No.
Blank	—	D-3120-92-BL	30 µg/g	0.0030	D-3120-92-30X
1 µg/g	0.0001	D-3120-92-1X	50 µg/g	0.0050	D-3120-92-50X
3 µg/g	0.0003	D-3120-92-3X	75 µg/g	0.0075	D-3120-92-75X
10 µg/g	0.0010	D-3120-92-10X	100 µg/g	0.010	D-3120-92-100X

Technical Note

Well characterized di-*n*-butyl sulfide is used in a low sulfur Isooctane matrix for this calibration set.

As the matrix may contain some native sulfur, AccuStandard encourages purchasing sulfur blanks for calibration analysis

ASTM D3230 Determination of Salts in Crude Oil

see page 405

ASTM D3231 Determination of Phosphorus in Gasoline

see page 350

ASTM D3237 Lead in Gasoline by AA Spectroscopy

see page 405

ASTM D3246 Sulfur in Petroleum Gas by Oxidative Microcoulometry

see pages 276-279

ASTM D3340 Li & Na in Lubricating Greases by Flame Photometer

see page 355

ASTM D3524 Diesel Fuel Diluent in Used Diesel Engine Oils by GC

Calibration Curve

D-3524-CAL-5ML-SET

D-3524-CAL-10ML-SET

Analyte	Std. 1	Std. 2	Std. 3	Std. 4	Std. 5	Std. 6
Target Wt. %	Target Wt. %	Target Wt. %	Target Wt. %	Target Wt. %	Target Wt. %	Target Wt. %
# 2 Diesel	10	7.5	5.0	2.5	1.0	0
30 W Motor oil	90	92.5	95	97.5	99	100

Internal Standard

D-3524-IS-10ML

D-3524-IS-10ML-PAK **SAVE**

At stated conc. in *n*-Heptane

1 x 10 mL
5 x 10 mL
2 comps.

Wt./Wt. %
<i>n</i> -Decane
<i>n</i> -Octadecane

Mid Level Daily QC Solution

D-3524-QC-10ML

At stated conc.

1 x 10 mL
2 comps.

Wt. / Wt. %
2 Diesel
30 W Motor oil

Column Resolution Mix

D-3524-CR

D-3524-CR-PAK **SAVE**

At stated conc. in *n*-Heptane

1 x 1 mL
5 x 1 mL
2 comps.

Wt. / Wt. %
<i>n</i> -Hexadecane
<i>n</i> -Octadecane

ASTM D3605 Trace Metals in Gas Turbine Fuels by AA & Flame Emission & Spectroscopy

see page 405

ASTM D3606 Benzene & Toluene in Finished Motor & Aviation Gasoline by GC

Aromatics Quantitative Calibration Standards

Without Internal Standards

D-3606-25ML-SET

7 x 25 mL

Analyte	Std. 1	Std. 2	Std. 3	Std. 4	Std. 5	Std. 6	Std. 7
Calibr. range	Target Vol. %	Vol. %	Vol. %	Vol. %	Vol. %	Vol. %	Vol. %
Benzene	0.06 - 5.0	5.00	2.50	1.25	0.67	0.33	0.12
Toluene	0.5 - 20	20.00	15.00	10.00	5.00	2.50	1.00
Isooctane		75.00	82.50	88.75	94.33	97.17	98.88



With Internal Standard: MEK

D-3606/IS-SET

7 x 1 mL

D-3606/IS-2ML-SET

7 x 2 mL

D-3606/IS-2ML-SET-PAK

5 x (7 x 2) mL

Analyte	Std. 1	Std. 2	Std. 3	Std. 4	Std. 5	Std. 6	Std. 7
Calibr. range	Target Vol. %	Vol. %	Vol. %	Vol. %	Vol. %	Vol. %	Vol. %
Benzene	0.06 - 5.0	4.8	2.4	1.2	0.6432	0.3168	0.1152
Toluene	0.5 - 20	19.2	14.4	9.6	4.8000	2.4000	0.9600
Isooctane		72.0	79.2	85.2	90.5568	93.2832	94.9248
Methyl ethyl ketone (Internal Std.)	4.0	4.0	4.0	4.0	4.0	4.0	4.0

Aromatics Quantitative Calibration Standard

With Internal Standard: sec Butanol

D-3606/IS2-SET

7 x 1 mL

D-3606/IS2-SET-PAK

5 x (7 x 1) mL

Analyte	Std. 1	Std. 2	Std. 3	Std. 4	Std. 5	Std. 6	Std. 7
Calibr. range	Target Vol. %	Vol. %	Vol. %	Vol. %	Vol. %	Vol. %	Vol. %
Benzene	0.06 - 5.0	4.8	2.4	1.2	0.6432	0.3168	0.1152
Toluene	0.5 - 20	19.2	14.4	9.6	4.8000	2.4000	0.9600
Isooctane		72.0	79.2	85.2	90.5568	93.2832	94.9248
sec Butanol (Internal Std.)	4.0	4.0	4.0	4.0	4.0	4.0	4.0

Aromatics Quantitative Calibration Curve

D-3606/IS2-R1-SET

set of 7 x 1 mL

Analyte	Std. 1	Std. 2	Std. 3	Std. 4	Std. 5	Std. 6	Std. 7
Calibr. range	Target Vol. %	Vol. %	Vol. %	Vol. %	Vol. %	Vol. %	Vol. %
Benzene	0.06 - 5.0	5	4.2	3.4	2.6	1.7	0.9
Toluene	0.5 - 20	20	17	14	11	8	5
Isooctane		75	78.8	82.6	86.4	90.3	94.1
sec Butanol (Internal Std.)	4	4	4	4	4	4	4

Technical Note

Due to the possible use of other oxygenates (i.e. ethanol) in gasoline, a calibration curve using sec-butanol as an internal standard has been formulated. The use of this internal standard minimizes coelution caused by the oxygenate(s) and pre column - standard column configuration in the GC system.

Daily Gasoline Refinery Quality Control Standards

With Internal Standard: sec Butanol

D-3606-QC-IS2-25ML

1 x 25 mL

D-3606-QC-IS2-25ML-PAK

5 x 25 mL

Each at stated quantities

4 comps.

Compound	Target Vol. %
Benzene	0.6432
Toluene	4.8000
Isooctane	90.5568
sec-Butanol (Internal Std.)	4.0v
	100

With Internal Standard: MEK

D-3606-QC/IS-10ML

1 x 10 mL

D-3606-QC/IS-10ML-PAK

5 x 10 mL

Each at stated quantities

4 comps.

Compound	Target Vol. %
Benzene	0.6432
Toluene	4.8000
Isooctane	90.5568
Methyl ethyl ketone (Internal Std.)	4.0
	100

Without Internal Standard

D-3606-QC-25ML

1 x 25 mL

D-3606-QC-25ML-PAK

5 x 25 mL

Each at stated quantities

3 comps.

Compound	Target Vol. %
Benzene	0.67
Toluene	5.00
Isooctane	94.33
	100

ASTM D3710 Boiling Range Distribution of Gasoline & Gasoline Fractions by GC

This **SIM DIS** (Simulated Distillation or GCD) Method is used to determine the boiling range distribution of gasoline and gasoline components. ASTM Method D3710 is used for petroleum products and fractions with a final boiling point of 500°F (260°C) or lower. By having an insight into the composition of the gasoline blend, essential data for the calculation of vapor pressure and a prediction of the D86 distillation curve can be made.

Qualitative Calibration Standard

D-3710-QUAL
D-3710-QUAL-PAK **SAVE** 1 x 1 mL
5 x 1 mL
19 comps.

Approx. Wt./ Wt. %	Approx. Wt./ Wt. %
<i>n</i> -Butane 4.5	<i>n</i> -Octane 5.4
<i>n</i> -Butylbenzene 3.2	<i>n</i> -Pentadecane 2.2
<i>n</i> -Decane 3.2	<i>n</i> -Pentane 7.6
2,4-Dimethylpentane 5.4	<i>n</i> -Propane 1.5
<i>n</i> -Dodecane 3.2	<i>n</i> -Propylbenzene 4.3
<i>n</i> -Heptane 9.7	<i>n</i> -Tetradecane 2.2
<i>n</i> -Hexane 5.4	Toluene 10.8
2-Methylbutane 9.7	<i>n</i> -Tridecane 2.2
2-Methylpentane 5.4	<i>p</i> -Xylene 13
2-Methylpropane 1.5	

Quantitative Calibration Standard

D-3710
D-3710-PAK **SAVE** 1 x 1 mL
5 x 1 mL
16 comps.

Vol./Vol. %	Vol./Vol. %
<i>n</i> -Butylbenzene 3.5	<i>n</i> -Octane 5.8
<i>n</i> -Decane 3.5	<i>n</i> -Pentadecane 2.3
2,4-Dimethylpentane 5.8	<i>n</i> -Pentane 8.1
<i>n</i> -Dodecane 3.5	<i>n</i> -Propylbenzene 4.7
<i>n</i> -Heptane 10.5	<i>n</i> -Tetradecane 2.3
<i>n</i> -Hexane 5.8	Toluene 11.6
2-Methylbutane 10.5	<i>n</i> -Tridecane 2.3
2-Methylpentane 5.8	<i>p</i> -Xylene 14.0

ASTM D2887 Boiling Range Distribution of Petroleum Fractions by GC**Calibration Solution**

DRH-002S-R1
DRH-002S-R1-PAK

At stated conc. in Chloroform

SAVE

1 x 1 mL
5 x 1 mL
17 comps.

 Reformulated to ship by Air

µg/mL	µg/mL	µg/mL	µg/mL
<i>n</i> -Hexane 600	<i>n</i> -Undecane 1200	<i>n</i> -Octadecane 500	<i>n</i> -Dotriacontane 100
<i>n</i> -Heptane 600	<i>n</i> -Dodecane 1200	<i>n</i> -Eicosane 200	<i>n</i> -Hexatriacontane 100
<i>n</i> -Octane 800	<i>n</i> -Tetradecane 1200	<i>n</i> -Tetracosane 200	<i>n</i> -Tetracontane 100
<i>n</i> -Nonane 800	<i>n</i> -Hexadecane 1000	<i>n</i> -Octacosane 100	<i>n</i> -Tetratetracontane 100
<i>n</i> -Decane 1200			

ASTM D3798 Analysis of *p*-Xylene by GC***p*-Xylene Impurity Standards****With Internal Standard**

D-3798-IS
D-3798-IS-PAK **SAVE** 1 x 1 mL
5 x 1 mL
11 comps.

At stated conc. by weight

Wt./Wt. %	Wt./Wt. %
<i>n</i> -Pentane 0.15	<i>o</i> -Xylene 0.15
<i>n</i> -Octane 0.15	Cumene 0.15
Benzene 0.15	Propylbenzene 0.15
Toluene 0.15	
Ethylbenzene 0.15	Total Analytes 100
<i>p</i> -Xylene 98.65	plus <i>n</i> -Undecane* (ISTD) 0.500
<i>m</i> -Xylene 0.15	grams

Without Internal Standard

D-3798-10ML
D-3798-10ML-PAK **SAVE** 1 x 10 mL
5 x 10 mL
10 comps.

At stated conc. by weight

Wt./Wt. %	Wt./Wt. %
<i>n</i> -Pentane 0.15	<i>p</i> -Xylene 98.65
<i>n</i> -Octane 0.15	<i>m</i> -Xylene 0.15
Benzene 0.15	<i>o</i> -Xylene 0.15
Toluene 0.15	Cumene 0.15
Ethylbenzene 0.15	Propylbenzene 0.15

Technical Note

Other internal standards can be used in conjunction with the bulk packaged D-3798 (1 x 10 mL) to meet your specific application. If you prefer to eliminate making standards, contact our Technical Service Department with your unique formulation for a custom quotation. A custom quotation request form is located in the back of this catalog.

ASTM D3831 Manganese in Gasoline by AA Spectroscopy

see page 405

ASTM D4059 Polychlorinated Biphenyls in Insulating Liquids by GC**Solutions in PCB-Free Transformer Oil (Individuals, 2 Concentrations)**

Aroclor # CAS No.	Conc. ppm w/w	Individual Cat. No. 1 mL	PAK SAVE Cat. No. 5 x 1 mL	Aroclor # CAS No.	Conc. ppm w/w	Individual Cat. No. 1 mL	PAK SAVE Cat. No. 5 x 1 mL
Aroclor 1016	50	C-216-ST-1	C-216-ST-1-PAK	Aroclor 1262	50	C-262-ST-1	C-262-ST-1-PAK
12674-11-2	500	C-216-ST-2	C-216-ST-2-PAK		500	C-262-ST-2	C-262-ST-2-PAK
Aroclor 1221	50	C-221-ST-1	C-221-ST-1-PAK	Aroclor 1268	50	C-268-ST-1	C-268-ST-1-PAK
11104-28-2	500	C-221-ST-2	C-221-ST-2-PAK	11100-14-4	500	C-268-ST-2	C-268-ST-2-PAK
Aroclor 1232	50	C-232-ST-1	C-232-ST-1-PAK				
11141-16-5	500	C-232-ST-2	C-232-ST-2-PAK				
Aroclor 1242	50	C-242-ST-1	C-242-ST-1-PAK				
53469-21-9	500	C-242-ST-2	C-242-ST-2-PAK				
Aroclor 1248	50	C-248-ST-1	C-248-ST-1-PAK				
12672-29-6	500	C-248-ST-2	C-248-ST-2-PAK				
Aroclor 1254	50	C-254-ST-1	C-254-ST-1-PAK				
11097-69-1	500	C-254-ST-2	C-254-ST-2-PAK				
Aroclor 1260	50	C-260-ST-1	C-260-ST-1-PAK				
11096-82-5	500	C-260-ST-2	C-260-ST-2-PAK				

Neats (Individuals)

Aroclor #	Cat. No.	Unit
Aroclor 1016	C-216N	100 mg
Aroclor 1221	C-221N-50MG	50 mg
Aroclor 1242	C-242N-50MG	50 mg
Aroclor 1248	C-248N-50MG	50 mg
Aroclor 1254	C-254N-50MG	50 mg
Aroclor 1260	C-260N-50MG	50 mg
Aroclor 1262	C-262N-50MG	50 mg

**Aroclor-free
Transformer Oil**

T-W130 1 x 1 mL

ASTM D4291 Trace Ethylene Glycol in Used Engine Oil

D-4291-93
D-4291-93-PAK
2000 µg/mL in water
Ethylene glycol

SAVE

5 x 1 mL
5 x 1 mL

ASTM D4294 Sulfur in Petroleum Products by ED-XRF Spectroscopy

see pages 276-279

ASTM D4377 Water in Crude oils by Potentiometric Karl Fischer Titration

see pages 275, 312

ASTM D4420 Aromatics in Finished Gasoline by GC

see page 402

Aromatics in Gasoline by GC/TC

D-4420-CAL-SET

Analyte	Std. 1	Std. 2	Std. 3	Std. 4	Std. 5	set of 7 x 1 mL	
	Target	Target	Target	Target	Target	Std. 6	Std. 7
	Vol. %	Vol. %	Vol. %	Vol. %	Vol. %	Vol. %	Vol. %
Benzene	0.05	0.10	0.25	0.75	1.25	2.50	5.00
Toluene	0.5	1.00	2.50	5.00	10.00	15.00	25.00
Total Xylenes (C ₈ aromatics)	5	10.00	15.00	20.00	25.00	1.00	3.00
n-Butylbenzene (C ₉ + aromatics)	30.00	25.00	20.00	10.00	5.00	15.00	2.50
Isooctane	64.45	63.90	62.25	64.25	58.75	66.50	64.50

D-4420-94	1 x 1 mL
D-4420-94-PAK	5 x 1 mL
	5 comps.
	Vol. %
Benzene	3.00
Toluene	10.00
Total Xylenes (C ₈ aromatics)	15.00
n-Butylbenzene (C ₉ + aromatics)	15.00
Isooctane	57.00

ASTM D4628 Barium, Calcium, Magnesium & Zinc in Unused Lubricating Oil

see page 402

ASTM D4629 Trace Nitrogen in Liquid Petroleum Hydrocarbons by Syringe/Inlet Oxidative Combustion and Chemiluminescence Detection. IP 379/88

D4629 is used to determine trace total nitrogen naturally found in liquid hydrocarbons boiling from 50 to 400°C with viscosities 0.2 - 10 cSt. This method monitors feed stocks for nitrogen to prevent the poisoning of some process catalysts when trace nitrogenous materials are present.

Nitrogen Calibration Set - Low Boiling Solvents

D-4629-LB-CAL-R1-SET

Nitrogen introduced using Pyridine

8 x 1 mL

Set includes the following Cat. No.s

Each in Isooctane	Cat. No.	1 mL	Each in Isooctane	Cat. No.	1 mL
Blank	D-4629-91-LB-BL		Nitrogen @ 25 µg/mL	D-4629-91-LB-25X	
Nitrogen @ 0.3 µg/mL	D-4629-91-LB-0.3X		Nitrogen @ 50 µg/mL	D-4629-91-LB-50X	
Nitrogen @ 1 µg/mL	D-4629-91-LB-1X		Nitrogen @ 75 µg/mL	D-4629-91-LB-75X	
Nitrogen @ 10 µg/mL	D-4629-91-LB-10X		Nitrogen @ 100 µg/mL	D-4629-91-LB-100X	

Stock Nitrogen Solution Low Boiling Solvents

D-4629-91-LB-CON	1 x 1 mL
D-4629-91-LB-CON-PAK	5 x 1 mL
1000 µg/mL in Isooctane	

Nitrogen introduced using Pyridine

Nitrogen Calibration Set - High Boiling Solvents

D-4629-HB-CAL-R1-SET

Nitrogen introduced using Carbazole

set of 8 x 1 mL

Set includes the following Cat. No.s

Each in Toluene	Cat. No.	1 mL	Each in Toluene	Cat. No.	1 mL
Blank	D-4629-91-HB-BL		Nitrogen @ 25 µg/mL	D-4629-91-HB-25X	
Nitrogen @ 0.3 µg/mL	D-4629-91-HB-0.3X		Nitrogen @ 50 µg/mL	D-4629-91-HB-50X	
Nitrogen @ 1 µg/mL	D-4629-91-HB-1X		Nitrogen @ 75 µg/mL	D-4629-91-HB-75X	
Nitrogen @ 10 µg/mL	D-4629-91-HB-10X		Nitrogen @ 100 µg/mL	D-4629-91-HB-100X	

Stock Nitrogen Solution High Boiling Solvents

D-4629-91-HB-CON	1 x 1 mL
D-4629-91-HB-CON-PAK	5 x 1 mL
1000 µg/mL in Toluene:Acetone (9:1)	

Nitrogen introduced using Carbazole

Nitrogen Calibration Set - Low Level

ASTM-P-0070-SET

Nitrogen introduced using Aniline

6 x 1 mL

Set includes the following Cat. No.s

Each in Isooctane	Cat. No.	Unit	Each in Isooctane	Cat. No.	Unit
Isooctane Blank	ASTM-P-0070-BL	1 mL	Nitrogen @ 2.0 µg/g	ASTM-P-0070-4X	1 mL
Nitrogen @ 0.5 µg/g	ASTM-P-0070-1X	1 mL	Nitrogen @ 5.0 µg/g	ASTM-P-0070-10X	1 mL
Nitrogen @ 1.0 µg/g	ASTM-P-0070-2X	1 mL	Nitrogen @ 10.0 µg/g	ASTM-P-0070-20X	1 mL

Low Level Nitrogen & Sulfur Calibration Set

ASTM-P-0071-SET

The Nitrogen is introduced using Aniline and the Sulfur is introduced using di-n-butyl sulfide

4 x 1 mL

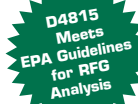
Set includes the following Cat. No.s

Concentration in Benzene	Cat. No.	Unit
Benzene Blank	ASTM-P-0071-BL	1 mL
Nitrogen @ 0.25 µg/g & Sulfur @ 0.25 µg/g	ASTM-P-0071-01	1 mL
Nitrogen @ 0.50 µg/g & Sulfur @ 0.50 µg/g	ASTM-P-0071-02	1 mL
Nitrogen @ 1.00 µg/g & Sulfur @ 1.00 µg/g	ASTM-P-0071-03	1 mL

ASTM D4815 MtBE, EtBE, TAME, DIPE, Tertiary-amyl & C1 to C4 Alcohols in Gasoline by GC
**Oxygenate Quantitative Calibration Mixtures
Without Internal Standard**

D-4815-10ML-SET

set of 5 x 10 mL of 5 component mix



Analyte	Target Concentrations				
	Std. 1 Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %
Ethanol	3.00	0.10	6.00	9.00	12.00
<i>t</i> -Butanol	0.10	3.00	6.00	8.00	12.00
Methyl <i>t</i> -butyl ether (<i>MtBE</i>)	20.0	15.00	10.00	5.00	0.10
<i>t</i> -Pentanol	1.25	5.00	2.50	3.75	0.10
Isooctane/xylene (65:35)	75.65	76.90	75.50	74.25	75.80

With Internal Standard

D-4815/IS-SET of 6 component mix

D-4815/IS-SET-PAK

set of 5 x 1 mL
set of 5 x (5 x 1 mL)

Analyte	Calibration Range	Target Concentrations				
		Std. 1 Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %
Ethanol	0.1 - 11.40	2.85	0.095	5.70	8.55	11.40
<i>t</i> -Butanol	0.1 - 11.40	0.095	2.85	5.70	7.60	11.40
Methyl <i>t</i> -butyl ether (<i>MtBE</i>)	0.1 - 19.0	19.00	14.25	9.50	4.75	0.095
<i>t</i> -Pentanol	0.1 - 4.79	1.19	4.75	2.38	3.56	0.095
1,2-Dimethoxyethane (<i>DME</i>) (Internal Std.)		5.00	5.00	5.00	5.00	5.00
Isooctane/xylene (65:35)		71.87	73.06	71.73	70.54	72.01
Total Oxygenates & Internal Standard		28.14	26.95	28.28	29.46	28.00

Oxygenate Internal Standard

M-GRO-IS-5ML

1 x 5 mL

M-GRO-IS-5ML-PAK **SAVE**

5 x 5 mL

1,2-Dimethoxyethane (neat)

**Oxygenate Free Refinery Gasoline
Blank**

RFA-BLNK-10ML

1 x 10 mL

RFA-BLNK-10ML-PAK **SAVE**

5 x 10 mL

RFA Gasoline (neat)

**Quantitative Peak ID and
Retention Time Mixture**

D-4815-RT

1 x 1 mL

D-4815-RT-PAK

SAVE

5 x 1 mL

16 comp. core mix

	Wt. %
Methylcyclopentane	4.00
Methanol	7.30
Ethanol	7.30
Isopropanol	7.30
<i>tert</i> -Butanol	7.30
<i>n</i> -Propanol	7.30
Methyl <i>tert</i> -butyl ether (<i>MtBE</i>)	4.00
<i>sec</i> -Butanol	7.30
Diisopropyl ether (<i>DIPE</i>)	4.00
Isobutanol	7.30
Ethyl <i>tert</i> -butyl ether (<i>EtBE</i>)	4.00
<i>tert</i> -Pentanol	7.30
1,2-Dimethoxyethane (ISTD)	6.00
<i>n</i> -Butanol	7.30
Benzene	5.00
<i>tert</i> -Amyl methyl ether	7.30
	100

Valve Timing Mixture

D-4815-VT

1 x 1 mL

D-4815-VT-PAK

SAVE

5 x 1 mL

5 comps.

	Wt. %
Methylcyclopentane	10.00
Diisopropyl ether (<i>DIPE</i>)	10.00
Ethyl <i>tert</i> -butyl ether (<i>EtBE</i>)	10.00
Methyl <i>tert</i> -butyl ether (<i>MtBE</i>)	10.00
<i>n</i> -Hexane	60.00

**ASTM D4927 Elemental Analysis of Lubricant and Additive Components - Barium, Calcium, Phosphorus, Sulfur, and Zinc by
WD-XRF Spectroscopy**

see page 402

ASTM D4928 Water in Crude oils by Potentiometric Karl Fischer Titration

see page 275

ASTM D4929 Organic Chloride Content in Crude Oil - Test Method B Combustion and Microcoulometry
Working Level Chlorine Standard

D-4929-94

1 x 5 mL

D-4929-94-PAK

SAVE

5 x 5 mL

10 µg/mL in Isooctane

Chlorine

Stock Chlorine Standard

D-4929-94-100X

1 x 5 mL

D-4929-94-100X-PAK **SAVE**

5 x 5 mL

1000 µg/mL in Isooctane

Chlorine

Chlorine in Lube Oils

ASTM-P-0092-100ML-SET

set of 7 x 100 mL

Each in 75 cSt mineral oil

Cat. No.	Chlorine Wt. %	Chlorine µg/g	Unit
ASTM-P-0092-BL-100ML	Blank	Blank	100 mL
ASTM-P-0092-0.1X-100ML	0.001	10	100 mL
ASTM-P-0092-1X-100ML	0.01	100	100 mL
ASTM-P-0092-5X-100ML	0.05	500	100 mL
ASTM-P-0092-10X-100ML	0.1	1,000	100 mL
ASTM-P-0092-100X-100ML	1	10,000	100 mL
ASTM-P-0092-500X-100ML	5	50,000	100 mL

ASTM D4951 Additive Elements in Lubricating Oils by Inductively Coupled Plasma Atomic Emission Spectrometry

see page 403

ASTM D5056 Trace Metals in Petroleum Coke by AA

see pages 354-356

ASTM D5059 Lead in Gasoline by X-Ray Spectroscopy IP Designation 228/79

Part A - Lead in Gasoline Standards

D-5059-A-CAL-100ML-SET ▲

7 x 100 mL

7 solutions in Isooctane

Lead Concentration g Pb/US gal	g Pb/ UK gal	mg Pb/mL	Cat. No.	100 mL
0.0000	0.000	0.000	D-5059-A-01-100ML ▲	
0.1000	0.120	0.026	D-5059-A-02-100ML ▲	
1.0000	1.200	0.264	D-5059-A-03-100ML ▲	
2.0000	2.400	0.528	D-5059-A-04-100ML ▲	
3.0000	3.600	0.793	D-5059-A-05-100ML ▲	
4.0000	4.800	1.057	D-5059-A-06-100ML ▲	
5.0000	6.000	1.321	D-5059-A-07-100ML ▲	

Internal Standard

D-5059-IS-100ML

1 x 100 mL

D-5059-IS-10ML-PAK

5 x 10 mL ampules

0.793 mg/mL in Mineral Oil

Bismuth



Technical Note

AccuStandard has formulated D5059 standards to measure the lead content in gasoline for both high and low concentrations using bismuth as an internal standard. The 100 mL quantities are designed for laboratories analyzing many samples while the 10 mL ampules are for laboratories that have limited requests for the test method. Should you require bulk quantities of the internal standard packaged in single-use ampules, contact our Technical Service Department for a quotation.

Technical Note

Certificates for D5059 standards have the lead content listed in 3 concentration units.

Part C - Lead in Gasoline Standards

D-5059-C-CAL-100ML-SET ▲

set of 7 x 100 mL

The set contains the following 7 solutions in Isooctane

Lead Concentration g Pb/US gal	g Pb/ UK gal	µg Pb/mL	Cat. No.	100 mL
0.0000	0.000	0.000	D-5059-C-01-100ML ▲	
0.0010	0.001	0.264	D-5059-C-02-100ML ▲	
0.0050	0.006	1.321	D-5059-C-03-100ML ▲	
0.0100	0.012	2.642	D-5059-C-04-100ML ▲	
0.0500	0.060	13.209	D-5059-C-05-100ML ▲	
0.1000	0.120	26.417	D-5059-C-06-100ML ▲	
0.3000	0.360	79.252	D-5059-C-07-100ML ▲	

ASTM D5134 Petroleum Naphthas through n-Nonane by Capillary GC

Qualitative Reference Petroleum Set

D-5134-92-SET

3 x 1 mL

Qualitative Reference Standards	Cat. No.	1 mL
Alkylate Standard neat fraction approx. 30 comps. identified	D-5134-92-ALK	
Naphtha Standard neat fraction approx. 70 comps. identified	D-5134-92-NAP	
Reformate Standard neat fraction approx. 100 comps. identified	D-5134-92-REF	

Column Evaluation Mix

D-5134-92-CEM

1 x 1 mL

7 comps.

Linearity Check Mix

D-5134-92-LCM-PAK

10% w/w each component

5 x 50 mg

10 comps.

Wt. / Wt. %	Wt. / Wt. %	Wt. / Wt. %	Wt. / Wt. %
Toluene 0.5	4-Methylheptane 1.0	Benzene	2-Methylheptane
n-Heptane 1.0	n-Octane 1.0	2,4-Dimethylheptane	2-Methylhexane
2,3,3-Trimethylpentane 1.0	2-Methylpentane 94.5	2,4-Dimethylhexane	n-Nonane
2-Methylheptane 1.0		n-Heptane	n-Octane
		n-Hexane	Toluene

ASTM D5184 Al and Si in Fuel Oils by Ashing, Fusion, ICP-AES & AA Spectrometry

see page 392

ASTM D5185 Additive Elements, Wear Metals & Contaminants in Used Lubricating Oils by ICP-AES

see pages 397, 402-404

ASTM D5186 Aromatic Content & Polynuclear Aromatic Content of Diesel Fuels & Aviation Turbine Fuels by SFC

Performance Solution

D-5186-96-PM

1 x 1 mL

D-5186-96-PM-PAK **SAVE**

5 x 1 mL

At stated approx. Wt. %

4 comps.

Wt./Wt. %	Wt./Wt. %	Wt./Wt. %	Wt./Wt. %
n-Hexadecane 75	Tetralin 3.0		
Naphthalene 2.0	Toluene 20		

Detector Linearity

Check Solution Set

D-5186-96-DLC-SET

2 x 1 mL

Set includes the below two Cat. No.'s

#2 Diesel Fuel in n-Hexadecane

25% w/w	D-5186-96-DLC-25X
50% w/w	D-5186-96-DLC-50X

Docosane

D-5186-91-PM-0.4X

1 x 1 mL

20% w/w in Toluene

▲ Hazardous fee required.

ASTM D5188 Vapor - Liquid Ratio Temperature Standards

Performance Check Samples for daily monitoring of instrument performance

Volume/Liquid Temp	Cat. No.	Set
36.1°C (96.9°F)	ASTM-P-125-01-VAP	5 x 20 mL
68.0°C (155.7°F)	ASTM-P-125-02-VAP	5 x 20 mL

ASTM D5191 & D5482 Vapor Pressure Standards

Vapor Pressure Quality Control Samples

Vapor Pressure	Cat. No.	Set
68.3kPa (9.91 psi)	ASTM-P-124-01-VAP	10 x 10 mL
68.0kPa (9.86 psi)	ASTM-P-124-02-VAP	10 x 10 mL
51.1kPa (7.41 psi)	ASTM-P-124-03-VAP	10 x 10 mL
46.7kPa (6.77 psi)	ASTM-P-124-04-VAP	10 x 10 mL
22.5kPa (3.26 psi)	ASTM-P-124-05-VAP	10 x 10 mL
7.1kPa (1.03 psi)	ASTM-P-124-06-VAP	10 x 10 mL

Technical Note

Consists of pure solvents with known vapor pressures.

Value Added PAK

Packaged in ready to use quantities.

ASTM D5307 Boiling Range Distribution of Crude Petroleum by GC

Quantitative Paraffins Standard

D-5307-QUANT	1 x 2 mL
D-5307-QUANT-PAK SAVE	5 x 2 mL
Equal Wt. %	16 comps.

<i>n</i> -Decane	<i>n</i> -Octadecane
<i>n</i> -Undecane	<i>n</i> -Eicosane
<i>n</i> -Dodecane	<i>n</i> -Tetracosane
<i>n</i> -Tridecane	<i>n</i> -Octacosane
<i>n</i> -Tetradecane	<i>n</i> -Dotriacontane
<i>n</i> -Pentadecane	<i>n</i> -Hexatriacontane
<i>n</i> -Hexadecane	<i>n</i> -Tetracontane
<i>n</i> -Heptadecane	<i>n</i> -Tetratetracontane

Qualitative Paraffins Standard

D-5307-QUAL	1 x 1 mL
D-5307-QUAL-PAK SAVE	5 x 1 mL
At stated approx. Wt. %	7 comps.

	Wt./Wt. %		Wt./Wt. %
Propane	10	<i>n</i> -Heptane	15
Butane	15	<i>n</i> -Octane	15
<i>n</i> -Pentane	15	<i>n</i> -Nonane	15
<i>n</i> -Hexane	15		

Internal Standard

D-5307-IS-10ML	1 x 10 mL
D-5307-IS-10ML-PAK SAVE	5 x 10 mL
	4 comps.

	Wt./Wt. %		Wt./Wt. %
<i>n</i> -Tetradecane	25	<i>n</i> -Hexadecane	25
<i>n</i> -Pentadecane	25	<i>n</i> -Heptadecane	25

Column Resolution Mix

D-5307-CR	1 x 1 mL
D-5307-CR-PAK SAVE	5 x 1 mL
At stated approx. Wt. %	3 comps.

	Wt./Wt. %		Wt./Wt. %
<i>n</i> -Hexadecane	1.0	<i>n</i> -Octane	98.0
<i>n</i> -Octadecane	1.0		



ASTM D5441 Analysis of Methyl tert-butyl ether (MtBE) by GC

ASTM Committee D02 on Petroleum Products and Lubricants has issued the Standard Method D5441 for the determination of the purity of methyl tert-butyl ether (MtBE) by Gas Chromatography. This method provides a procedure to measure impurities in MtBE such as C₄ to C₁₂ olefins, methyl, isopropyl and tert-butyl alcohols, methyl sec-butyl and methyl tert-amyl ethers, acetone, and methyl ethyl ketones. The presence of these impurities in MtBE can have a direct effect upon the value of the MtBE as a gasoline additive. The following reference standards have been formulated to meet the method specifications. Different packaging sizes are available to meet various sample testing capacities.

MtBE Contaminant Standard

Low Concentration

D-5441		1 x 1 mL
D-5441-PAK	SAVE	5 x 1 mL
D-5441-5ML		1 x 5 mL
D-5441-5ML-PAK	SAVE	5 x 5 mL
0.1% Wt./Wt. each in MtBE		12 comps.

tert-Amyl methyl ether
tert-Butanol
tert-Butyl ethyl ether
4,4-Dimethyl-2-neopentyl-1-pentene
Methanol
2-Methylbutane
2-Methyl-2-butene
2,2',4,6,6'-Pentamethyl-3-heptene
Pentane
cis-2-Pentene
trans-2-Pentene
2,4,4-Trimethyl-1-pentene

MtBE Contaminant Standard

High Concentration

D-5441-10X		1 x 1 mL
D-5441-10X-PAK	SAVE	5 x 1 mL
D-5441-10X-5ML		1 x 5 mL
D-5441-10X-5ML-PAK	SAVE	5 x 5 mL
1% Wt./Wt. each in MtBE		12 comps.

tert-Amyl methyl ether
tert-Butanol
tert-Butyl ethyl ether
4,4-Dimethyl-2-neopentyl-1-pentene
Methanol
2-Methylbutane
2-Methyl-2-butene
2,2',4,6,6'-Pentamethyl-3-heptene
Pentane
cis-2-Pentene
trans-2-Pentene
2,4,4-Trimethyl-1-pentene

Qualitative Standard

D-5441-QUAL	1 x 1 mL
0.1% Wt./Wt. each in <i>n</i> -Dodecane	33 comps.

Methanol	MtBE
Isobutylene	2,3-Dimethyl-1-butene
n-Butane	4-Methyl-cis-2-pentene
trans-2-butene	2-Methylpentane
cis-2-butene	Methylethyl ketone
3-Methyl-1-butene	3-Methylpentane
Acetone	sec-Butyl methyl ether
Isopentane	ETBE
2-Propanol	TAME
1-Pentene	3,5-Dimethyl-1-hexene
2-Methyl-1-butene	2,4,4-Trimethyl-1-pentene
n-Pentane	2,4,4-Trimethyl-2-pentene
trans-2-Pentene	3,4,4-Trimethyl-trans-2-pentene
t-Butanol	2,3,4-Trimethyl-2-pentene
cis-2-Pentene	4,4-Dimethyl-2-neopentyl-1-pentene
2-Methyl-2-butene	2,2',4,6,6'-Pentamethyl-3-heptene
Cyclopentene	

Quantitative Standard

D-5441-QUANT-R1	1 x 1 mL
0.1% Wt./Wt. each in <i>n</i> -Dodecane	29 comps.

Methanol (0.04 Wt/Wt)	2-Methylpentane
3-Methyl-1-butene	Methyl ethyl ketone
Acetone	3-Methylpentane
Isopentane	sec-Butyl methyl ether
2-Propanol	Ethyl tert-butyl ether
1-Pentene	TAME
2-Methyl-1-butene	3,5-Dimethyl-1-hexene
n-Pentane	2,4,4-Trimethyl-1-pentene
trans-2-Pentene	2,4,4-Trimethyl-2-pentene
t-Butanol	3,4,4-Trimethyl-trans-2-pentene
cis-2-Pentene	2,3,4-Trimethyl-2-pentene
2-Methyl-2-butene	4,4-Dimethyl-2-neopentyl-1-pentene
Cyclopentene	2,2',4,6,6'-Pentamethyl-3-heptene
MtBE	
2,3-Dimethyl-1-butene	
4-Methyl-cis-2-pentene	

MtBE Resolution Test Mix

D-5441-RES		1 x 1 mL
D-5441-RES-PAK	SAVE	5 x 1 mL
D-5441-RES-5ML		1 x 5 mL
D-5441-RES-5ML-PAK	SAVE	5 x 5 mL
1% Wt./Wt. each in MtBE		3 comps.

trans-2-Pentene cis-Pentene
tert-Butanol



AccuStandard is an active member in ASTM and strives to keep abreast of ASTM method revisions. If our listed formulation does not meet the most recent method revision, please contact Technical Support, for an updated product.

ASTM D5442 Analysis of Petroleum Waxes by GC

Quantitative Wax Standard

D-5442 1 x 1 mL
D-5442-PAK 5 x 1 mL
At stated Wt. % in Cyclohexane 16 comps.

SAVE

Wt./Wt. %	Wt./Wt.
<i>n</i> -Dodecane 0.02	<i>n</i> -Octacosane 0.12
<i>n</i> -Tetradecane 0.03	<i>n</i> -Triacontane 0.10
<i>n</i> -Hexadecane 0.04	<i>n</i> -Dotriacontane 0.08
<i>n</i> -Octadecane 0.05	<i>n</i> -Hexatriacontane 0.06
<i>n</i> -Eicosane 0.06	<i>n</i> -Tetracontane 0.05
<i>n</i> -Docosane 0.08	<i>n</i> -Tetratetracontane 0.04
<i>n</i> -Tetracosane 0.10	<i>n</i> -Pentacontane 0.03
<i>n</i> -Hexacosane 0.12	<i>n</i> -Hexacontane 0.02

Column Resolution Standard

D-5442-CR-PAK 5 x 1 mL
At stated Wt. % in Cyclohexane 2 comps.

Wt./Wt. %
<i>n</i> -Eicosane 0.05
<i>n</i> -Tetracontane 0.05

Hydrocarbon Standard Brownfield Regulation

D-5442-R1 1 x 1 mL
100 µg/mL each in Cyclohexane 18 comps.

<i>n</i> -Decane	<i>n</i> -Octacosane
<i>n</i> -Dodecane	<i>n</i> -Triacontane
<i>n</i> -Tetradecane	<i>n</i> -Dotriacontane
<i>n</i> -Hexadecane	<i>n</i> -Tetratriacontane
<i>n</i> -Octadecane	<i>n</i> -Hexatriacontane
<i>n</i> -Eicosane	<i>n</i> -Octatriacontane
<i>n</i> -Docosane	<i>n</i> -Tetracontane
<i>n</i> -Tetracosane	<i>n</i> -Tetratetracontane
<i>n</i> -Hexacosane	<i>n</i> -Pentacontane

Retention Time Standard Mix 1

D-5442-RT1 500 mg
Equal parts by weight 12 comps.

<i>n</i> -Hexadecane (c16)	<i>n</i> -Octacosane (c28)
<i>n</i> -Octadecane (c18)	<i>n</i> -Triacontane (c30)
<i>n</i> -Eicosane (c20)	<i>n</i> -Dotriacontane (c32)
<i>n</i> -Docosane (c22)	<i>n</i> -Hexatriacontane (c36)
<i>n</i> -Tetracosane (c24)	<i>n</i> -Tetracontane (c40)
<i>n</i> -Hexacosane (c26)	<i>n</i> -Tetratetracontane (c44)

Retention Time Standard Mix 2

D-5442-RT2 500 mg
Equal parts by weight 16 comps.

<i>n</i> -Dodecane (c12)	<i>n</i> -Octacosane (c28)
<i>n</i> -Tetradecane (c14)	<i>n</i> -Triacontane (c30)
<i>n</i> -Hexadecane (c16)	<i>n</i> -Dotriacontane (c32)
<i>n</i> -Octadecane (c18)	<i>n</i> -Hexatriacontane (c36)
<i>n</i> -Eicosane (c20)	<i>n</i> -Tetracontane (c40)
<i>n</i> -Docosane (c22)	<i>n</i> -Tetratetracontane (c44)
<i>n</i> -Tetracosane (c24)	<i>n</i> -Pentacontane (c50)
<i>n</i> -Hexacosane (c26)	<i>n</i> -Hexacontane (c60)

Standards of Interest

See ASTM Methods D3710, D5307, and D6352 for additional calibration standards for hydrocarbon analysis.

ASTM D5443 Paraffin, Naphthene and Aromatic Hydrocarbon Type Analysis in Petroleum Distillates through 200°C by Multi-dimensional GC

Hydrocarbon Test Mixture

D-5443-93-HTM 1 x 1 mL
At stated Wt. % 28 comps.

Wt./Wt. %	Wt./Wt. %	Wt./Wt. %
Cyclopentane 1.00	1cis,2-Dimethylcyclohexane 5.00	<i>trans</i> -Decahydronaphthelene 4.25
<i>n</i> -Pentane 1.00	Isooctane 5.00	<i>n</i> -Tetradecane 4.50
Cyclohexane 2.00	<i>n</i> -Octane 5.00	Ethylbenzene 4.50
2,3-Dimethylbutane 2.00	1cis,2 cis,4-Trimethylcyclohexane 4.25	<i>o</i> -Xylene 4.25
<i>n</i> -Hexane 2.00	<i>n</i> -Nonane 4.50	<i>n</i> -Propylbenzene 5.00
<i>n</i> -Hexene 1.50	<i>n</i> -Decane 4.25	1,2,4-Trimethylbenzene 4.50
Methylcyclohexane 4.25	<i>n</i> -Undecane 3.50	1,2,3-Trimethylbenzene 5.00
4-Methyl-1-hexene 1.50	<i>n</i> -Dodecane 3.25	1,2,4,5-Tetramethylbenzene 5.00
<i>n</i> -Heptane 3.50	Benzene 2.25	Pentamethylbenzene 5.00
	Toluene 2.25	

ASTM D5453 Total Sulfur in Light Hydrocarbons, Motor Fuels and Oils by Ultraviolet Fluorescence

Low Level Sulfur Set

D-5453-LL-SET 5 x 2 mL
 Contains the following 5 standards in Isooctane

Description	Unit
Sulfur Blank	2 mL
Sulfur @ 0.5 ng/µL	2 mL
Sulfur @ 2.5 ng/µL	2 mL
Sulfur @ 5.0 ng/µL	2 mL
Sulfur @ 10.0 ng/µL	2 mL

Mid Level Sulfur Set

D-5453-ML-SET 6 x 2 mL
 Contains the following 5 standards in Isooctane

Description	Unit
Sulfur Blank	2 mL
Sulfur @ 5.0 ng/µL	2 mL
Sulfur @ 25 ng/µL	2 mL
Sulfur @ 50 ng/µL	2 mL
Sulfur @ 100 ng/µL	2 mL
Sulfur @ 200 ng/µL	2 mL

High Level Sulfur Set

D-5453-HL-SET 5 x 2 mL
 Contains the following 5 standards in Isooctane

Description	Unit
Sulfur Blank	2 mL
Sulfur @ 100 ng/µL	2 mL
Sulfur @ 250 ng/µL	2 mL
Sulfur @ 500 ng/µL	2 mL
Sulfur @ 1000 ng/µL	2 mL

Standards of Interest

ASTM Method D5453 Sulfur as Di-*n*-butyl sulfide in Biodiesel see ASTM D6751.

Real World Sulfur in Various Gasoline & Fuels QC Samples

SBPT-LSGAS-VAP 2 x 15 mL

Parameter	Method	Approx. Range
Sulfur	D-5453-00	0 - 50 µg/g

As the matrix may contain some native sulfur, AccuStandard encourages purchasing sulfur blanks for calibration analysis

ASTM D5480 Engine Oil Volatility by GC

Stock Column Resolution Standard

D-5480-CR-PAK 5 x 1 mL
 10 µg/mL each in Carbon disulfide 5 comps.
D-5480-CR-100X-PAK 5 x 1 mL
 1000 µg/mL each in Carbon disulfide 5 comps.

n-Decane *n*-Octadecane
n-Dodecane *n*-Tetracosane
n-Hexadecane



Carbon disulfide can not ship by air. When possible alternate solvents can be used. Please contact our Technical Service Department for other options.

Tetracosane (Solution A)

D-5480-C40-5ML 1 x 5 mL
D-5480-C40-5ML-PAK 5 x 5 mL **SAVE**
 500 µg/mL in Carbon disulfide
D-5480-C40-R1-5ML 1 x 5 mL
D-5480-C40-R1-5ML-PAK 5 x 5 mL **SAVE**
 500 µg/mL in Chloroform

n-Tetracosane

Internal Standard Solution

D-5480-IS-5ML 1 x 5 mL
D-5480-IS-5ML-PAK 5 x 5 mL **SAVE**
 Each comp. at equal weights 3 comps.

n-Decane *n*-Dodecane
n-Undecane

ASTM D5482 & D5191 Vapor Pressure Standards

Vapor Pressure Quality Control Samples

Vapor Pressure	Cat. No	Set of 10
68.3kPa (9.91 psi)	ASTM-P-124-01	10 x 10 mL
68.0kPa (9.86 psi)	ASTM-P-124-02	10 x 10 mL
51.1kPa (7.41 psi)	ASTM-P-124-03	10 x 10 mL
46.7kPa (6.77 psi)	ASTM-P-124-04	10 x 10 mL
22.5kPa (3.26 psi)	ASTM-P-124-05	10 x 10 mL
7.1kPa (1.03 psi)	ASTM-P-124-06	10 x 10 mL

ASTM D5501 Ethanol Content of Denatured Fuel Ethanol by GC

Denatured Fuel Ethanol Calibration Set

D-5501-94-SET

7 x 1 mL

Comp.1	Wt./ Wt. %	Comp.2	Wt./ Wt. %	Comp.3	Wt./ Wt. %	Unit
Ethanol	92	Methanol	0.6	Heptane	7.4	1 mL
Ethanol	93	Methanol	0.5	Heptane	6.5	1 mL
Ethanol	94	Methanol	0.4	Heptane	5.6	1 mL
Ethanol	95	Methanol	0.3	Heptane	4.7	1 mL
Ethanol	96	Methanol	0.2	Heptane	3.8	1 mL
Ethanol	97	Methanol	0.1	Heptane	2.9	1 mL
Ethanol	98	Methanol	0.05	Heptane	1.95	1 mL

Technical Note

Additional Oxygenate calibration, check standards, and independent reference standards can be found in ASTM method D4815 or D5622. The required QA/QC procedures in EPA methods stipulate a calibration check standard be used once per analytical batch or per 10 sample set. AccuStandard has bulk packaged check standards to meet this increased usage.



ASTM D5580 Benzene, Toluene, Ethylbenzene, m/p-Xylene, o-Xylene, C9 & Heavier Aromatics & Total Aromatics in Finished Gasoline by GC

Aromatics Quantitative Calibration Mixes

Without Internal Standard

D-5580-95-CAL-10ML-SET

5 x 10 mL (of 6 component mix)

Analyte	Calibration range	Std. 1 Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %
Benzene	0.10 - 5.00	0.10	0.50	1.00	2.00	5.00
Toluene	1.00 - 15.00	15.00	10.00	5.00	2.50	1.00
Ethylbenzene	0.50 - 10.00	0.50	1.00	2.50	5.00	10.00
o-Xylene	0.50 - 10.00	1.00	2.50	10.00	5.00	0.50
1,2,4-Trimethylbenzene	0.50 - 10.00	1.00	10.00	0.50	5.00	2.50
Isooctane		82.40	76.00	81.00	80.50	81.00

With Internal Standard

D-5580-95-CAL-IS-SET

5 x 1 mL (of 7 component mix)

Analyte	Calibration range	Std. 1 Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %
Benzene	0.09 - 4.50	0.09	0.45	0.90	1.80	4.50
Toluene	0.90 - 13.50	13.50	9.00	4.50	2.25	0.90
Ethylbenzene	0.45 - 9.00	0.45	0.90	2.25	4.50	9.00
o-Xylene	0.45 - 9.00	0.90	2.25	9.00	4.50	0.45
1,2,4-Trimethylbenzene	0.45 - 9.00	0.90	9.00	0.45	4.50	2.25
2-Hexanone (Internal Standard)		10.00	10.00	10.00	10.00	10.00
Isooctane		74.16	68.40	72.90	72.45	72.90

Standard 2 D-5580-95-CAL-IS-2 1 mL

Valve Timing Calibration Mixes

With Internal Standard

M-GRA-VT/IS-AS

1 x 1 mL

M-GRA-VT/IS-AS-PAK **SAVE**

5 x 1 mL

Each at stated conc.

6 comps.

Wt./Wt. %

Benzene	4.5
Toluene	4.5
Ethylbenzene	9.0
o-Xylene	9.0
2-Hexanone (Internal Std.)	10.0
Isooctane	63.0

Without Internal Standard

M-GRA-VT-AS-10ML

1 x 10 mL

M-GRA-VT-AS-10ML-PAK**SAVE**

5 x 10 mL

Each at stated conc.

5 comps.

Wt./Wt. %

Benzene	5.0
Toluene	5.0
Ethylbenzene	10.0
o-Xylene	10.0
Isooctane	70.0

Internal Standard

M-GRA-IS-AS-5ML

1 x 5 mL

M-GRA-IS-AS-5ML-PAK **SAVE**

5 x 5 mL

2-Hexanone (Neat)

Selectivity Check Standard

M-GRA-SCS-AS

1 x 1 mL

M-GRA-SCS-AS-PAK **SAVE**

5 x 1 mL

Each at stated conc.

2 comps.

Wt./Wt. %

n-Dodecane	1.5
Isooctane	98.5

Daily Quality Control Standard

Without Internal Standard

D-5580-QC-R1-10ML

1 x 10 mL

D-5580-QC-R1-10ML-PAK**SAVE**

5 x 10 mL

14 comps.

Wt./Wt. %		Wt./Wt. %	
<i>n</i> -Hexane	12	Toluene	9
<i>n</i> -Heptane	20	Ethylbenzene	2
<i>n</i> -Octane	15	<i>p</i> -Xylene	3
<i>n</i> -Decane	10	<i>o</i> -Xylene	2
<i>n</i> -Dodecane	1	1,2,4-Trimethylbenzene	3
Isooctane	20	1,2,4,5-Tetramethylbenzene	1
Benzene	1	Naphthalene	1

Daily Quality Control Standard

Without Internal Standard

D-5580-QC-10ML

1 x 10 mL

D-5580-QC-10ML-PAK **SAVE**

5 x 10 mL

14 comps.

Wt./Wt. %		Wt./Wt. %	
<i>n</i> -Hexane	12	Toluene	9
<i>n</i> -Heptane	20	Ethylbenzene	2
<i>n</i> -Octane	15	<i>p</i> -Xylene	3
<i>n</i> -Decane	10	<i>o</i> -Xylene	2
<i>n</i> -Tridecane	1	1,2,4-Trimethylbenzene	3
Isooctane	20	1,2,4,5-Tetramethylbenzene	1
Benzene	1	Naphthalene	1

Technical Note

The configuration of the instrument valve time switching and the pre-column incorporated determines which QA/QC standard provides optimum performance when analyzing gasoline samples by Method D5580. Use of the D5580 standards in conjunction with the real world gasoline standards can provide added assurance that the analytical results generated are reproducible and the analytical system is performing to method specifications.

ASTM D5599 Oxygenates in Gas by GC & O-FID

Oxygenates Calibration Curves

With Internal Standard

M-GRO-CAL/IS-SET

M-GRO-CAL/IS-SET-PAK

of 15 Comp. Mix

SAVE

8 x 1 mL
5 x (8 x 1) mL

Calibration range	Std. 1 Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %	Std. 6 Wt. %	Std. 7 Wt. %	Std. 8 Wt. %
Methanol 0.1 - 5.0	---	0.1	2.5	---	5	0.5	1	---
Ethanol 1.0 - 12.0	12	---	3	---	8	5	1	---
Isopropanol 0.1 - 2.0	2	1	---	0.1	0.3	---	0.5	---
t-Butanol 0.1 - 2.0	0.5	0.1	1	---	2	0.3	---	---
Propanol 0.2 - 2.0	2	---	0.7	0.2	1	---	0.4	---
MtBE 1.0 - 17.0	5	17	---	---	1	2.5	10	---
sec-Butanol 0.1 - 2.5	1	---	0.5	0.1	---	2.5	0.7	---
Diisopropyl ether 0.1 - 2.0	---	0.5	0.3	0.1	2	1	---	---
iso-Butanol 0.1 - 2.0	2	0.5	---	1	0.1	0.3	---	---
EtBE 1.0 - 18.0	---	3.5	18	7.5	---	1	12	---
t-Pentanol 0.1 - 2.0	0.3	1	---	0.5	0.1	2	---	---
Butanol 0.1 - 2.0	1	---	0.3	---	0.5	0.1	2	---
TAME 1.0 - 18.0	---	3.5	1	18	7.5	12	---	---
1,2-Dimethoxyethane (ISTD)	4	4	4	4	4	4	4	---
RFA Gasoline	70.2	68.8	68.7	68.5	68.5	68.8	68.4	100
Total oxygenates and ISTD	29.8	31.2	31.3	31.5	31.5	31.2	31.6	0

Technical Note

This certified oxygenate calibration curve can be used in combination with other aromatic standards for combined oxygenate/aromatic analysis, to change the amount of internal standard added, or to incorporate alternative internal standard analytes.

With Internal Standard

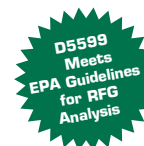
M-GRO-CAL/IS-R1-SET

8 x 1 mL

M-GRO-CAL/IS	Analyte	01-R1 Wt. %	02-R1 Wt. %	03-R1 Wt. %	04-R1 Wt. %	05-R1 Wt. %	06-R1 Wt. %	07-R1 Wt. %	08-R1 Wt. %
	Calibration range								
	Methanol 0.1 - 5.0	--	0.1	2.5	--	5	0.5	1	--
	Ethanol 1.0 - 12.0	12	--	3	--	8	5	1	--
	Isopropanol 0.1 - 2.0	2	1	--	0.1	0.3	--	0.5	--
	t-Butanol 0.1 - 2.0	0.5	0.1	1	--	2	0.3	--	--
	Propanol 0.2 - 2.0	2	--	0.7	0.2	1	--	0.4	--
	MtBE 1.0 - 17.0	5	17	--	--	1	2.5	10	--
	sec-Butanol 0.1 - 2.5	1	--	0.5	0.1	--	2.5	0.7	--
	Diisopropyl ether 0.1 - 2.0	--	0.5	0.3	0.1	2	1	--	--
	Isobutanol 0.1 - 2.0	2	0.5	--	1	0.1	0.3	--	--
	EtBE 1.0 - 18.0	--	3.5	18	7.5	--	1	12	--
	tert-Pentanol 0.1 - 2.0	0.3	1	--	0.5	0.1	2	--	--
	Butanol 0.1 - 2.0	1	--	0.3	--	0.5	0.1	2	--
	TAME 1.0 - 18.0	--	3.5	1	18	7.5	12	--	--
	1,2-Dimethoxyethane (ISTD)	4	4	4	4	4	4	4	--
	RFA Gasoline	74.2	72.8	72.7	72.5	72.5	72.8	72.4	100
	Total oxygenates and ISTD	28.6	30.0	30.1	30.3	30.3	30.0	30.4	0

Technical Note

The revised Set formulates the product components and gasoline to 100 mL volume and then adds the Internal Standard for a total volume of 104 mL.



Without Internal Standard

M-GRO-CAL-SET

8 x 10 mL
of 14 Comp. Mix

Calibration range	Std. 1 Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %	Std. 6 Wt. %	Std. 7 Wt. %	Std. 8 Wt. %
Methanol 0.1 - 5.0	---	0.1	2.5	---	5	0.5	1	---
Ethanol 1.0 - 12.0	12	---	3	---	8	5	1	---
Isopropanol 0.1 - 2.0	2	1	---	0.1	0.3	---	0.5	---
t-Butanol 0.1 - 2.0	0.5	0.1	1	---	2	0.3	---	---
Propanol 0.2 - 2.0	2	---	0.7	0.2	1	---	0.4	---
MtBE 1.0 - 17.0	5	17	---	---	1	2.5	10	---
sec-Butanol 0.1 - 2.5	1	---	0.5	0.1	---	2.5	0.7	---
Diisopropyl ether 0.1 - 2.0	---	0.5	0.3	0.1	2	1	---	---
iso-Butanol 0.1 - 2.0	2	0.5	---	1	0.1	0.3	---	---
EtBE 1.0 - 18.0	---	3.5	18	7.5	---	1	12	---
t-Pentanol 0.1 - 2.0	0.3	1	---	0.5	0.1	2	---	---
Butanol 0.1 - 2.0	1	---	0.3	---	0.5	0.1	2	---
TAME 1.0 - 18.0	---	3.5	1	18	7.5	12	---	---
RFA Gasoline	74.2	72.8	72.7	72.5	72.5	72.8	72.4	100
Total oxygenates	25.8	27.2	27.3	27.5	27.5	27.2	27.6	0

ASTM D5599 (Continued) Oxygenates in Gas by GC & O-FID

Daily QC Standard

Without Internal Standard

M-GRO-QC-10ML 1 x 10 mL
 M-GRO-QC-10ML-PAK **SAVE** 5 x 10 mL
 14 comps.

Oxygenate	Target Wt. %	Compound Oxygenate	Target Wt. %
Methanol	1	<i>Di</i> -isopropyl ether	3
Ethanol	1	iso-Butanol	1
Isopropanol	1	EtBE	3
<i>t</i> -Butanol	1	<i>t</i> -Pentanol	1
Propanol	1	Butanol	1
MtBE	3	TAME	3
<i>sec</i> -Butanol	1	RFA Gasoline	79

Revised Daily QC Standard

Without Internal Standard

M-GRO-QC-R-10ML 1 x 10 mL
 M-GRO-QC-R-10ML-PAK **SAVE** 5 x 10 mL
 14 comps.

Oxygenate	Target Wt. %	Oxygenate	Target Wt. %
Methanol	1	<i>Di</i> -isopropyl ether	1
Ethanol	1	iso-Butanol	1
Isopropanol	1	EtBE	3
<i>t</i> -Butanol	1	<i>t</i> -Pentanol	1
Propanol	1	Butanol	1
MtBE	3	TAME	3
<i>sec</i> -Butanol	1	RFA Gasoline	81

D5599
 Meets
 EPA Guidelines
 for RFG
 Analysis

Technical Note

Additional Oxygenate calibration, check standards, and independent reference standards can be found in ASTM method D4815 or D5622. The required QA/QC procedures in EPA methods stipulate a calibration check standard be used once per analytical batch or per 10 sample set. AccuStandard has bulk packaged check standards to meet this increased usage.

Daily QC Standard

With Internal Standard

M-GRO-QC/IS-5ML 1 x 5 mL
 M-GRO-QC/IS-5ML-PAK **SAVE** 5 x 5 mL
 Internal Standard 1,2-Dimethoxyethane is combined in a 4 to 100 weight ratio. 15 comps.

Oxygenate	Target Wt. %	Oxygenate	Target Wt. %
Methanol	1	<i>Di</i> -isopropyl ether	3
Ethanol	1	iso-Butanol	1
Isopropanol	1	EtBE	3
<i>t</i> -Butanol	1	<i>t</i> -Pentanol	1
Propanol	1	Butanol	1
MtBE	3	TAME	3
<i>sec</i> -Butanol	1	RFA Gasoline	79

Revised Daily QC Standard

With Internal Standard

M-GRO-QC-R/IS-5ML 1 x 5 mL
 M-GRO-QC-R/IS-5ML-PAK **SAVE** 5 x 5 mL
 Internal Standard 1,2-Dimethoxyethane is combined in a 4 to 100 weight ratio. 15 comps.

Oxygenate	Target Wt. %	Oxygenate	Target Wt. %
Methanol	1	<i>Di</i> -isopropyl ether	1
Ethanol	1	iso-Butanol	1
Isopropanol	1	EtBE	3
<i>t</i> -Butanol	1	<i>t</i> -Pentanol	1
Propanol	1	Butanol	1
MtBE	3	TAME	3
<i>sec</i> -Butanol	1	RFA Gasoline	81

Gasoline Refinery Blank

With Internal Standard

M-GRO-BLNK/IS-10ML 1 x 10 mL
 M-GRO-BLNK/IS-10ML-PAK **SAVE** 5 x 10 mL
 2 comps.

	Wt. %
1,2-Dimethoxyethane (ISTD)	4
RFA Gasoline	96

O-FID/EPA Gasoline Refinery

Internal Standard

M-GRO-IS-5ML 1 x 5 mL
 M-GRO-IS-5ML-PAK **SAVE** 5 x 5 mL

1,2-Dimethoxyethane (Internal Standard)

O-FID Gasoline Refinery Blank

RFA-BLNK-10ML 1 x 10 mL
 RFA-BLNK-10ML-PAK **SAVE** 5 x 10 mL

RFA Gasoline (neat)

ASTM D5599 EPA Gasoline Refinery Oxygenates Calibration Curves

EPA O-FID Quantitative Calibration Mixes

Without Internal Standard

M-GRO-CAL-EPA-10ML-SET

5 comps.

5 x 10 mL

	Calibr. range	Std. 1 Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %
Methanol	0.30 - 12.00	6.00	12.00	3.00	0.30	9.00
Ethanol	0.30 - 12.00	0.30	3.00	6.00	9.00	12.00
<i>t</i> -Butanol	0.30 - 12.00	0.30	6.00	9.00	12.00	3.00
MtBE	0.30 - 15.00	15.00	7.50	11.25	3.75	0.30
RFA Gasoline		78.40	71.50	70.75	74.95	75.70

Technical Note

EPA O-FID Oxygenate Petrochemical Standards

This second oxygenate version has been formulated to meet the specific analyte requirements of the EPA methodology.

With Internal Standard

M-GRO-CAL-IS/EPA-SET

6 comps.

5 x 1 mL

	Calibr. range	Std. 1 Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %
Methanol	0.29 - 11.40	5.70	11.40	2.85	0.29	8.55
Ethanol	0.29 - 11.40	0.29	2.85	5.70	8.55	11.40
<i>t</i> -Butanol	0.29 - 11.40	0.29	5.70	8.55	11.40	2.85
MtBE	0.29 - 14.29	14.25	7.13	10.69	3.56	0.29
1,2-Dimethoxyethane (ISTD)		5.00	5.00	5.00	5.00	5.00
RFA Gasoline		74.48	67.93	67.31	71.20	71.92

EPA O-FID Quantitative Calibration Check Standard

Without Internal Standard

M-GRO-EPA-CC-10ML

M-GRO-EPA-CC-10ML-PAK **SAVE**

1 x 10 mL

5 x 10 mL

5 comps.

	Wt./Wt. %		Wt./Wt. %
Methanol	4.0	Methyl <i>tert</i> -butyl ether	12.0
Ethanol	8.0	RFA gasoline	71.0
<i>tert</i> -Butanol	5.0		

EPA O-FID Quantitative Calibration Check Standard

With Internal Standard

M-GRO-EPACC/IS-5ML

M-GRO-EPACC/IS-5ML-PAK **SAVE**

1 x 5 mL

5 x 5 mL

6 comps.

	Wt./Wt. %		Wt./Wt. %
Methanol	3.80	Methyl <i>tert</i> -butyl ether	11.40
Ethanol	7.60	RFA gasoline	67.45
<i>tert</i> -Butanol	4.75	DME (Internal Standard)	5.0

Technical Note

Additional Oxygenate calibration, check standards, and independent reference standards can be found in ASTM method D4815 or D5622. The required QA/QC procedures in EPA methods stipulate a calibration check standard be used once per analytical batch or per 10 sample set. AccuStandard has bulk packaged check standards to meet this increased usage.

EPA O-FID Spiking Solution

M-GRO-EPA-SP-5ML

M-GRO-EPA-SP-5ML-PAK **SAVE**

1 x 5 mL

5 x 5 mL

4 comps.

	Wt./Wt. %		Wt./Wt. %
Methanol	14.3	<i>tert</i> -Butanol	14.3
Ethanol	28.6	Methyl <i>tert</i> -butyl ether	42.8

Oxygenate Free Gasoline Refinery Blank

RFA-BLNK-10ML

RFA-BLNK-10ML-PAK **SAVE**

1 x 10 mL

5 x 10 mL

RFA Gasoline (neat)

Internal Standard

M-GRO-IS-5ML

M-GRO-IS-5ML-PAK **SAVE**

1 x 10 mL

5 x 10 mL

1,2-Dimethoxyethane (Internal Standard)

ASTM D5600 Trace Metals in Petroleum Coke by ICP-AES

see page 392

ASTM D5622 Total Oxygen in Gasoline & MeOH Fuels by Reductive Pyrolysis

Description (2 x 10 mL, plus an RFA gasoline blank)	Oxygenate Wt. %	Cat. No.	Unit
Ethanol in Oxygenate free RFA gasoline	5.0	ASTM-P-0061-SET	3 x 10 mL
Ethanol in Oxygenate free RFA gasoline	10.0	ASTM-P-0062-SET	3 x 10 mL
t-Amyl methyl ether in Oxygenate free RFA gasoline	10.0	ASTM-P-0063-SET	3 x 10 mL
t-Amyl methyl ether in Oxygenate free RFA gasoline	15.0	ASTM-P-0064-SET	3 x 10 mL
Ethyl t-butyl ether in Oxygenate free RFA gasoline	10.0	ASTM-P-0065-SET	3 x 10 mL
Ethyl t-butyl ether in Oxygenate free RFA gasoline	15.0	ASTM-P-0066-SET	3 x 10 mL
Methyl t-butyl ether in Oxygenate free RFA gasoline	10.0	ASTM-P-0067-SET	3 x 10 mL
Methyl t-butyl ether in Oxygenate free RFA gasoline	15.0	ASTM-P-0068-SET	3 x 10 mL
Methanol & t-Butanol in Oxygenate free RFA gasoline	10.0 & 5.0	ASTM-P-0069-SET	3 x 10 mL

Technical Note

All oxygenate blends come with a certificate to maintain traceability links to NIST SRMs (when available). The 10 mL size eliminates the need for special packaging and hazardous material fees.

Oxygenate Free Gasoline Refinery Blank

RFA-BLNK-10ML

1 x 10 mL

RFA Gasoline (neat)

ASTM D5623 Sulfur Compounds in Light Petroleum Liquids by GC & Sulfur Selective Detection

ASTM-P-0091-10X-SET

set of 22 x 1 mL

Approx. 2.0 mg/mL each in Toluene

Compound	Cat. No.	1 mL
Hydrogen sulfide	ASTM-P-0091-01-10X	
Carbonyl sulfide (Carbon oxysulfide)	ASTM-P-0091-02-10X	
Methyl mercaptan (Methanethiol)	ASTM-P-0091-03-10X	
Ethyl mercaptan (Ethanethiol)	ASTM-P-0091-04-10X	
Methyl sulfide (Dimethyl sulfide)	ASTM-P-0091-05-10X	
Carbon disulfide	ASTM-P-0091-06-10X	
2-Propanethiol (Isopropyl mercaptan)	ASTM-P-0091-07-10X	
2-Methyl-2-propanethiol (t-butyl mercaptan)	ASTM-P-0091-08-10X	
1-Propanethiol (Propyl mercaptan)	ASTM-P-0091-09-10X	
Ethyl methyl sulfide	ASTM-P-0091-10-10X	
1-Methyl-1-propanethiol (2-butanethiol)	ASTM-P-0091-11-10X	
Thiophene	ASTM-P-0091-12-10X	
2-Methyl-1-propanethiol (Isobutyl mercaptan)	ASTM-P-0091-13-10X	
Diethyl sulfide	ASTM-P-0091-14-10X	
1-Butanethiol (Butyl mercaptan)	ASTM-P-0091-15-10X	
Methyl disulfide (Dimethyl disulfide)	ASTM-P-0091-16-10X	
2-Methylthiophene	ASTM-P-0091-17-10X	
3-Methylthiophene	ASTM-P-0091-18-10X	
Diethyl disulfide (Ethyl disulfide)	ASTM-P-0091-19-10X	
3-Methylbenzo[b]thiophene	ASTM-P-0091-20-10X	
5-Methylbenzo[b]thiophene	ASTM-P-0091-21-10X	
Diphenyl sulfide	ASTM-P-0091-22-10X	

Technical Note

This set of qualitative Sulfur Standards is formulated for research evaluation of the presence of the sulfur analytes or their breakdown products.

ASTM D5708 Nickel, Vanadium, & Iron in Crude Oils & Residual Fuels by ICP-AES

see page 401

ASTM D5762 Nitrogen in Petroleum & Petroleum Products by Boat-Inlet Chemiluminescence

Nitrogen Calibration Set

D-5762-95-CAL-SET

6 x 1 mL

Nitrogen introduced using Acridine

Description	Cat. No.	1 mL
Xylene Blank	D-5762-95-BL	
Nitrogen @ 1.0 µg/mL in Xylene	D-5762-95-1X	
Nitrogen @ 5.0 µg/mL in Xylene	D-5762-95-5X	
Nitrogen @ 10 µg/mL in Xylene	D-5762-95-10X	
Nitrogen @ 50 µg/mL in Xylene	D-5762-95-50X	
Nitrogen @ 100 µg/mL in Xylene	D-5762-95-100X	

Low Level Nitrogen & Sulfur Calibration Set

ASTM-P-0071-SET

4 x 1 mL

The Nitrogen is introduced using Aniline, the Sulfur is introduced using di-n-butyl sulfide

Description	Cat. No. (1 mL)
Benzene Blank	ASTM-P-0071-BL
Nitrogen @ 0.25 µg/g & Sulfur @ 0.25 µg/g in Benzene	ASTM-P-0071-01
Nitrogen @ 0.50 µg/g & Sulfur @ 0.50 µg/g in Benzene	ASTM-P-0071-02
Nitrogen @ 1.00 µg/g & Sulfur @ 1.00 µg/g in Benzene	ASTM-P-0071-03

Nitrogen Calibration Set - Low Level

ASTM-P-0070-SET

6 x 1 mL

Nitrogen introduced using Aniline

Description	Cat. No. (1 mL)
Isooctane Blank	ASTM-P-0070-BL
Nitrogen @ 0.5 µg/g in Isooctane	ASTM-P-0070-1X
Nitrogen @ 1.0 µg/g in Isooctane	ASTM-P-0070-2X
Nitrogen @ 2.0 µg/g in Isooctane	ASTM-P-0070-4X
Nitrogen @ 5.0 µg/g in Isooctane	ASTM-P-0070-10X
Nitrogen @ 10.0 µg/g in Isooctane	ASTM-P-0070-20X

Stock Nitrogen Standard

D-5762-95-500X-PAK

5 x 1 mL

Nitrogen @ 500 µg/mL in Xylene (Acridine @ 6397 µg/mL)

Custom Services

Custom Synthesis

The AccuStandard Synthesis Department employs several PhD. Organic Chemists with many years of pertinent academic and industrial experience. The experienced staff has developed hundreds of pure chemical compounds for companies and governmental agencies around the world. The very well-equipped synthetic laboratory, with significant analytical support has made many notable synthesis projects possible. We specialize in synthesizing chemicals of high purity to be used as reference standards, and also offer custom synthesis capability on milligram to kilogram scales.



Analytical Capabilities

- GC-MS, GC-FID, GC-ECD, GC-NPD
- HPLC, LC-MS
- ICP, ICP-MS
- access to more analytical instrumentation if necessary

Synthesis and Purification

- Milligram to Kilogram Glassware
- Inert Conditions Equipment
- High Performance Flash Chromatography
- Distillation Equipment - High Vacuum, Molecular (Kugelrohr), and Spinning Band Columns Preparative TLC
- Parr Pressure and Hydrogenation Reactor

Custom Synthesized Products

- PCBs (all 209 congeners), & hydroxy, methoxy, and methylsulfonyl metabolites
- Halo-Dibenzodioxins and Furans
- PBDEs (205 out of 209 congeners) & hydroxy, methoxy, and chloro metabolites
- Fluorinated PBDEs
- Other Brominated Flame Retardants
- PBBs
- PAHs, Nitro-PAHs, Methyl-PAHs
- Pesticides and metabolites
- Explosives and metabolites
- Nonyl- and Octylphenol Ethoxylates
- Mono- and Diester Phthalates
- Organophosphates
- Other Rare Chemicals

AccuStandard is renowned for its quick response to the needs for new compounds. The company's especially strong Synthesis Department allows the synthesis of important and unique products. Featured in its history of firsts, are all of the 209 congeners of polychlorinated biphenyls (PCBs), 205 out of the 209 congeners of polybrominated diphenyl ethers (PBDEs) as well as many halogenated dioxins and dibenzofurans, PAHs, pesticides and fluorinated surrogates substituting the expensive isotopically labelled compounds.

Among the more recent introductions are the hydroxy and methoxy PBDE congeners, mixed bromo/chloro hydroxy and methoxy diphenyl ethers, organophosphate flame retardants, biofuels, plastic additives (AccuStandard authored the Handbook for the Chemical Analysis of Plastic and Polymer Additives published by CRC Press), EPA Method 535 pesticide derivatives and previously unavailable explosive standards.

Custom Formulations

With over 30,000+ custom and 10,000+ listed standards, there is a good chance that AccuStandard will have a standard to meet your needs. However, if your laboratory requires something specific, our Chemists will manufacture a Custom Standard to meet your unique requirements. Custom Standards are an economical and time saving way to have a Standard prepared for your individual needs.

Custom QC options

1. Gravimetric/Volumetric Certification: Each purity is measured gravimetrically and QC verified instrumentally (where available). Every component in the Standard is guaranteed to be within $\pm 0.5\%$ of the requested value unless otherwise stated on the Certificate of Analysis. The solutions are diluted to volume using Class A glassware. A Certificate of Analysis accompanies each Standard and documents the gravimetric values used.
2. Full Quantitative Certification: This QA/QC method includes extended GC analysis using both internal calibration standards plus statistical analysis. A data package containing analytical and gravimetric data can be provided if requested during the quotation phase (Organic Customs only).



Custom Packaging & Bulk Quantity Requirements

AccuStandard has the resources and equipment to meet your custom packaging requirements.

- Automated ampule filling & sealing 0.2 mL up to 20 mL and ampule sizes from 1 mL to 20 mL
- Quantities from 500 to over 500,000 ampules
- Homogeneity testing
- Amber ampules for added product stability
- Private labeling and packaging (OEM)

We can reduce your costs using the Cozzoli Auto Filling/Sealing Machine to package just the right size product for your application. OEM Standards - Privately labeled standards manufactured and tested to your specifications. Cold and under Nitrogen sealing available.



ASTM D5769 Benzene, Toluene & Total Aromatics in Finished Gasoline by GC/MS

These standards and methods are used in the monitoring of total aromatics according to the methods and amendments to the US Clean Air Act. Amendments containing more stringent specifications are in effect and can be found listed under this method. Standards for Method D5769 are listed on pages 299-306.

Calibration Curve with 3 Component Deuterated Internal Standard Added

Aromatics Calibration Standards Kit

Internal Standard Version

M-GRA-CAL/IS-SET

set of 5 x 1 mL

Core Calibration Mix 24 Comps.	Std. 1 Target Vol. %	Std. 2 Vol. %	Std. 3 Vol. %	Std. 4 Vol. %	Std. 5 Vol. %
Benzene	3	1.50	0.75	0.375	0.1875
Toluene	19	9.50	4.75	2.375	1.1875
Ethylbenzene	5	2.50	1.25	0.625	0.3125
<i>m</i> -Xylene	6	3.00	1.50	0.750	0.3750
<i>p</i> -Xylene	6	3.00	1.50	0.750	0.3750
<i>o</i> -Xylene	6	3.00	1.50	0.750	0.3750
Isopropylbenzene	3	1.50	0.75	0.375	0.1875
<i>n</i> -Propylbenzene	3	1.50	0.75	0.375	0.1875
1-Methyl-3-ethylbenzene	3	1.50	0.75	0.375	0.1875
1-Methyl-4-ethylbenzene	3	1.50	0.75	0.375	0.1875
1,3,5-Trimethylbenzene	3	1.50	0.75	0.375	0.1875
1-Methyl-2-ethylbenzene	3	1.50	0.75	0.375	0.1875
1,2,4-Trimethylbenzene	5	2.50	1.25	0.625	0.3125
1,2,3-Trimethylbenzene	3	1.50	0.75	0.375	0.1875
Indan	3	1.50	0.75	0.375	0.1875
1,4-Diethylbenzene	3	1.50	0.75	0.375	0.1875
<i>n</i> -Butylbenzene	3	1.50	0.75	0.375	0.1875
1,2-Diethylbenzene	3	1.50	0.75	0.375	0.1875
1,2,4,5-Tetramethylbenzene	2	1.00	0.50	0.250	0.1250
1,2,3,5-Tetramethylbenzene	2	1.00	0.50	0.250	0.1250
Naphthalene	2	1.00	0.50	0.250	0.1250
Pentamethylbenzene	2	1.00	0.50	0.250	0.1250
1-Methylnaphthalene	2	1.00	0.50	0.250	0.1250
2-Methylnaphthalene	2	1.00	0.50	0.250	0.1250
Isooctane	--	Bal	Bal	Bal	Bal

Internal Standard (M-GRA-IS)

Benzene-d ₆	2	2	2	2	2
Ethylbenzene-d ₁₀	2	2	2	2	2
Naphthalene-d ₈	1	1	1	1	1

Optional Sixth Standard

Internal Standard Added

M-GRA-ADD/IS

1 x 1 mL

Core Calibr. Mix 24 Comps.	Optional Std. 6 Target Vol. %
Benzene	2.25
Toluene	15
Ethylbenzene	3.75
<i>m</i> -Xylene	4.50
<i>p</i> -Xylene	4.50
<i>o</i> -Xylene	4.50
Isopropylbenzene	2.25
<i>n</i> -Propylbenzene	2.25
3-Ethyltoluene	2.25
4-Ethyltoluene	2.25
1,3,5-Trimethylbenzene	2.25
2-Ethyltoluene	2.25
1,2,4-Trimethylbenzene	3.75
1,2,3-Trimethylbenzene	2.25
Indan	2.25
1,4-Diethylbenzene	2.25
<i>n</i> -Butylbenzene	2.25
1,2-Diethylbenzene	2.25
1,2,4,5-Tetramethylbenzene	4.0
1,2,3,5-Tetramethylbenzene	1.5
Naphthalene	1.5
Pentamethylbenzene	1.5
1-Methylnaphthalene	1.5
2-Methylnaphthalene	1.5
Isooctane	Bal

Internal Standard (M-GRA-IS)

Benzene-d ₆	2
Ethylbenzene-d ₁₀	2
Naphthalene-d ₈	1

Disk Deliverable

(At no additional charge)

CALAMTS™

(Disk containing "Calibration Amounts")
Eliminates hand keyed-in data.

Each analyte in each standard is individually weighed. Actual weights and weight percents are provided.

Daily Quality Control Standard

Without Internal Standard

M-GRA-QC-10ML

M-GRA-QC-10ML-PAK **SAVE**

1 x 10 mL

5 x 10 mL

13 comps.

Wt. Ratio		Wt. Ratio
<i>n</i> -Hexane	12	Toluene
<i>n</i> -Heptane	17	Ethylbenzene
<i>n</i> -Octane	17	<i>m</i> -Xylene
<i>n</i> -Decane	12	<i>o</i> -Xylene
<i>n</i> -Dodecane	5	1,2,4-Trimethylbenzene
Isooctane	12	1,2,4,5-Tetramethylbenzene
Benzene	1	

Daily Quality Control Standard

With Internal Standard

M-GRA-QC/IS-5ML

M-GRA-QC/IS-5ML-PAK **SAVE**

1 x 5 mL

5 x 5 mL

16 comps.

Wt. Ratio	Compound	Wt. Ratio
<i>n</i> -Hexane	12	Toluene
<i>n</i> -Heptane	17	Ethylbenzene
<i>n</i> -Octane	17	<i>m</i> -Xylene
<i>n</i> -Decane	12	<i>o</i> -Xylene
<i>n</i> -Dodecane	5	1,2,4-Trimethylbenzene
Isooctane	12	1,2,4,5-Tetramethylbenzene
Benzene	1	
	13 comp. Core Mix	100

Technical Note

Use with any M-GRA Calibration Curve.

Includes M-GRA-IS (3 comp. Internal Standards mix) combined with the above 13 comp. Core Mix in a 5 to 100 weight ratio.

ASTM/EPA Sensitivity Test Solution

M-GRA-ST

M-GRA-ST-PAK **SAVE**

100 µg/mL in Isooctane

1 x 1 mL

5 x 1 mL

1,4-Diethylbenzene

3 Comp. Deuterated Internal Std. Mix

M-GRA-IS-5ML

M-GRA-IS-5ML-PAK **SAVE**

1 x 5 mL

5 x 5 mL

3 comps.

Mix Ratio		Mix Ratio
Benzene-d ₆	2 mL	Naphthalene-d ₈
Ethylbenzene-d ₁₀	2 mL	1 gm

ASTM D5769 continued on Next Pages

ASTM D5769 Benzene, Toluene & Total Aromatics in Finished Gasoline by GC/MS

Calibration Curve with 4 Component Deuterated Internal Standard Added

Aromatics Calibration Standards Kit

With Internal Standard

M-GRA-CAL-R/IS-R-SET

Core Calibr. Mix 24 comps.	Target	set of 5 x 1 mL				
		Std. 1 Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %
Benzene		3.13	1.78	0.95	0.490	0.2490
Toluene		19.65	11.11	5.90	3.058	1.5547
Ethylbenzene		5.12	2.92	1.55	0.805	0.4090
<i>m</i> -Xylene		6.27	3.50	1.86	0.962	0.4891
<i>p</i> -Xylene		6.33	3.50	1.86	0.962	0.4891
<i>o</i> -Xylene		6.51	3.56	1.89	0.980	0.4981
Isopropylbenzene		3.06	1.74	0.93	0.480	0.2439
<i>n</i> -Propylbenzene		3.04	1.74	0.93	0.480	0.2440
3-Ethyltoluene		3.08	1.75	0.93	0.481	0.2446
4-Ethyltoluene		3.05	1.74	0.93	0.479	0.2437
1,3,5-Trimethylbenzene		3.07	1.75	0.93	0.481	0.2448
2-Ethyltoluene		3.14	1.78	0.95	0.490	0.2492
1,2,4-Trimethylbenzene		5.18	2.95	1.57	0.812	0.4130
1,2,3-Trimethylbenzene		3.19	1.81	0.96	0.498	0.2530
Indan		3.46	1.95	1.04	0.536	0.2726
1,4-Diethylbenzene		3.04	1.74	0.93	0.480	0.2439
<i>n</i> -Butylbenzene		3.05	1.74	0.92	0.479	0.2434
1,2-Diethylbenzene		3.22	1.78	0.95	0.490	0.2489
1,2,4,5-Tetramethylbenzene		2.10	1.20	0.64	0.329	0.1674
1,2,3,5-Tetramethylbenzene		2.09	1.20	0.64	0.330	0.1679
Naphthalene		2.35	1.34	0.71	0.369	0.1877
Pentamethylbenzene		2.16	1.23	0.66	0.340	0.1727
1-Methylnaphthalene		2.32	1.34	0.71	0.369	0.1877
2-Methylnaphthalene		2.41	1.37	0.73	0.378	0.1922
Isooctane	-----	43.47	69.96	84.441	92.0905	

Internal Standard

(M-GRA-IS-R)	Mix Ratio				
Benzene-d ₆	(2 mL)	16.57	16.57	16.57	16.57
Ethylbenzene-d ₁₀	(2 mL)	16.76	16.76	16.76	16.76
Naphthalene-d ₈	(1 gm)	8.78	8.78	8.78	8.78
Toluene-d ₈	(7 mL)	57.88	57.88	57.88	57.88

Optional Sixth Standard

With Internal Standard

M-GRA-ADD/IS-R

1 x 1 mL

Core Calibr. Mix 24 comps.	Optional Std. 6 Target Wt. %
Benzene	2.48
Toluene	16.29
Ethylbenzene	4.07
<i>m</i> -Xylene	4.87
<i>p</i> -Xylene	4.87
<i>o</i> -Xylene	4.96
Isopropylbenzene	2.43
<i>n</i> -Propylbenzene	2.43
3-Ethyltoluene	2.44
4-Ethyltoluene	2.43
1,3,5-Trimethylbenzene	2.44
2-Ethyltoluene	2.48
1,2,4-Trimethylbenzene	4.11
1,2,3-Trimethylbenzene	2.52
Indan	2.71
1,4-Diethylbenzene	2.43
<i>n</i> -Butylbenzene	2.42
1,2-Diethylbenzene	2.48
1,2,4,5-Tetramethylbenzene	4.44
1,2,3,5-Tetramethylbenzene	1.67
Naphthalene	1.87
Pentamethylbenzene	1.72
1-Methylnaphthalene	1.87
2-Methylnaphthalene	1.91
Isooctane	17.67

Internal Standard

(M-GRA-IS-R)	Mix Ratio	
Benzene-d ₆	(2 mL)	16.57
Ethylbenzene-d ₁₀	(2 mL)	16.76
Naphthalene-d ₈	(1 mL)	8.78
Toluene-d ₈	(7 mL)	57.88

Technical Note

A sixth standard has been formulated to improve the linearity at the high end of the calibration curve. This can be especially helpful in the quantification of gasoline containing high levels of toluene.

Technical Note

This set of calibration solutions was formulated to improve quantification for Toluene by using Toluene-d₈ as an additional Internal Standard.

The 4 component internal standard mix (M-GRA-IS-R) is combined with the 25 component core calibration curve mixtures in a 12 to 100 weight ratio to formulate a complete calibration solution containing 29 components.

Daily Quality Control Standard

Without Internal Standard

M-GRA-QC-10ML

M-GRA-QC-10ML-PAK **SAVE**

1 x 10 mL

5 x 10 mL

13 comps.

Wt. Ratio		Wt. Ratio	
<i>n</i> -Hexane	12	Toluene	9
<i>n</i> -Heptane	17	Ethylbenzene	3
<i>n</i> -Octane	17	<i>m</i> -Xylene	3
<i>n</i> -Decane	12	<i>o</i> -Xylene	3
<i>n</i> -Dodecane	5	1,2,4-Trimethylbenzene	3
Isooctane	12	1,2,4,5-Tetramethylbenzene	3
Benzene	1		

Daily Quality Control Standard

With Internal Standard

M-GRA-QC/IS-R-5ML

M-GRA-QC/IS-R-5ML-PAK **SAVE**

1 x 5 mL

5 x 5 mL

17 comps.

Wt. Ratio		Wt. Ratio	
<i>n</i> -Hexane	12	Toluene	9
<i>n</i> -Heptane	17	Ethylbenzene	3
<i>n</i> -Octane	17	<i>m</i> -Xylene	3
<i>n</i> -Decane	12	<i>o</i> -Xylene	3
<i>n</i> -Dodecane	5	1,2,4-Trimethylbenzene	3
Isooctane	12	1,2,4,5-Tetramethylbenzene	3
Benzene	1	13 comp. Core Mix	100

Includes **M-GRA-IS-R** (4 comp. Internal Standard Mix) combined with the above 13 comp. Core Mix in a 12 to 100 weight ratio.

4 comp. Deuterated Internal Std. Mix

M-GRA-IS-R-10ML

M-GRA-IS-R-10ML-PAK **SAVE**

1 x 10 mL

5 x 10 mL

4 comps.

Mix Ratio	Mix Ratio
Benzene-d ₆	2 mL
Ethylbenzene-d ₁₀	2 mL
Naphthalene-d ₈	1 gm
Toluene-d ₈	7 mL

ASTM/EPA Sensitivity Test Solution

M-GRA-ST

M-GRA-ST-PAK

SAVE

1 x 1 mL

5 x 1 mL

100 µg/mL in Isooctane

1,4-Diethylbenzene

ASTM D5769 Benzene, Toluene & Total Aromatics in Finished Gasoline by GC/MS

Calibration Curve with No Internal Standard

Calibration Curve

Without Internal Standard

D-5769-CAL-5ML-SET

D-5769-CAL-10ML-SET

set of 5 x 5 mL

set of 5 x 10 mL

Core Calibr. Mix 23 Comps.	Target Wt. %	Std. 1 Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %
Benzene	5.25	2.95	1.575	0.8144	0.4143	
Toluene	19.67	11.06	5.898	3.0505	1.5519	
Ethylbenzene	5.18	2.91	1.552	0.8026	0.4083	
<i>m</i> -Xylene	6.19	3.48	1.856	0.9598	0.4883	
<i>p</i> -Xylene	6.19	3.48	1.856	0.9598	0.4883	
<i>o</i> -Xylene	6.30	3.54	1.890	0.9776	0.4973	
Isopropylbenzene	3.09	1.74	0.925	0.4786	0.2435	
<i>n</i> -Propylbenzene	3.09	1.74	0.926	0.4787	0.2435	
3-Ethyltoluene	3.10	1.74	0.928	0.4801	0.2442	
4-Ethyltoluene	3.08	1.73	0.925	0.4782	0.2433	
1,3,5-Trimethylbenzene	3.10	1.74	0.929	0.4804	0.2444	
2-Ethyltoluene	3.15	1.77	0.945	0.4890	0.2488	
1,2,4-Trimethylbenzene	5.23	2.94	1.567	0.8104	0.4123	
1,2,3-Trimethylbenzene	3.20	1.80	0.960	0.4965	0.2526	
Indan	3.45	1.94	1.034	0.5350	0.2722	
1,4-Diethylbenzene	3.09	1.74	0.925	0.4786	0.2435	
<i>n</i> -Butylbenzene	3.08	1.73	0.923	0.4776	0.2430	
1,2-Diethylbenzene	3.15	1.77	0.945	0.4885	0.2485	
1,2,4,5-Tetramethylbenzene	2.12	1.19	0.635	0.3284	0.1671	
1,2,3,5-Tetramethylbenzene	2.12	1.19	0.637	0.3295	0.1676	
Naphthalene	2.37	1.34	0.712	0.3683	0.1874	
1-Methylnaphthalene	2.37	1.34	0.712	0.3683	0.1874	
2-Methylnaphthalene	2.43	1.37	0.730	0.3773	0.1919	
Isooctane	-----	43.77	70.015	84.4922	92.1105	

Optional Sixth Standard

Without Internal Standard

D-5769-ADD-5ML

1 x 5 mL

D-5769-ADD-10ML

1 x 10 mL

Core Calibration Mix 23 Comps.	Target Wt. %
Benzene	4.16
Toluene	16.41
Ethylbenzene	4.10
<i>m</i> -Xylene	4.91
<i>p</i> -Xylene	4.91
<i>o</i> -Xylene	5.00
Isopropylbenzene	2.45
<i>n</i> -Propylbenzene	2.45
3-Ethyltoluene	2.45
4-Ethyltoluene	2.44
1,3,5-Trimethylbenzene	2.46
2-Ethyltoluene	2.50
1,2,4-Trimethylbenzene	4.14
1,2,3-Trimethylbenzene	2.54
Indan	2.73
1,4-Diethylbenzene	2.45
<i>n</i> -Butylbenzene	2.44
1,2-Diethylbenzene	2.50
1,2,4,5-Tetramethylbenzene	1.68
1,2,3,5-Tetramethylbenzene	1.68
Naphthalene	1.88
1-Methylnaphthalene	1.88
2-Methylnaphthalene	1.93
Isooctane	19.92

Disk Deliverable (At no additional charge)

CALAMTS™

(Disk containing "Calibration Amounts")
Eliminates hand keyed-in data.

Each analyte in each standard is individually weighed. Actual weights and weight percents are provided.

Daily Quality Control Standard

Without Internal Standard

D-5769-QC-10ML

1 x 10 mL

D-5769-QC-10ML-PAK

SAVE

5 x 10 mL

14 comps.

Wt. Ratio	Wt. Ratio
<i>n</i> -Hexane 12	Toluene 9
<i>n</i> -Heptane 17	Ethylbenzene 3
<i>n</i> -Octane 17	<i>m</i> -Xylene 3
<i>n</i> -Decane 12	<i>o</i> -Xylene 3
<i>n</i> -Dodecane 5	1,2,4-Trimethylbenzene 3
Isooctane 12	1,2,4,5-Tetramethylbenzene 2
Benzene 1	Naphthalene 1

4 comp. Deuterated Internal Std. Mix

M-GRA-IS-R-10ML

1 x 10 mL

M-GRA-IS-R-10ML-PAK

SAVE

5 x 10 mL

4 comps.

Mix Ratio	Mix Ratio
Benzene-d ₆ 2 mL	Naphthalene-d ₈ 1 gm
Ethylbenzene-d ₁₀ 2 mL	Toluene-d ₈ 7 mL

3 comp. Deuterated Internal Std. Mix

M-GRA-IS-5ML

1 x 5 mL

M-GRA-IS-5ML-PAK

SAVE

5 x 5 mL

3 comps.

Mix Ratio	Mix Ratio
Benzene-d ₆ 2 mL	Naphthalene-d ₈ 1 gm
Ethylbenzene-d ₁₀ 2 mL	

ASTM D5769 Benzene, Toluene & Total Aromatics in Finished Gasoline by GC/MS

With 3 Component Internal Standard

Calibration Curve

With Internal Standard

D-5769-CAL/IS-SET

Core Calibr. Mix 24 Comps.	Std. 1 Target Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %
Benzene	5.25	2.95	1.575	0.8144	0.4143
Toluene	19.67	11.06	5.898	3.0505	1.5519
Ethylbenzene	5.18	2.91	1.552	0.8026	0.4083
<i>m</i> -Xylene	6.19	3.48	1.856	0.9598	0.4883
<i>p</i> -Xylene	6.19	3.48	1.856	0.9598	0.4883
<i>o</i> -Xylene	6.30	3.54	1.890	0.9776	0.4973
Isopropylbenzene	3.09	1.74	0.925	0.4786	0.2435
<i>n</i> -Propylbenzene	3.09	1.74	0.926	0.4787	0.2435
3-Ethyltoluene	3.10	1.74	0.928	0.4801	0.2442
4-Ethyltoluene	3.08	1.73	0.925	0.4782	0.2433
1,3,5-Trimethylbenzene	3.10	1.74	0.929	0.4804	0.2444
2-Ethyltoluene	3.15	1.77	0.945	0.4890	0.2488
1,2,4-Trimethylbenzene	5.23	2.94	1.567	0.8104	0.4123
1,2,3-Trimethylbenzene	3.20	1.80	0.960	0.4965	0.2526
Indan	3.45	1.94	1.034	0.5350	0.2722
1,4-Diethylbenzene	3.09	1.74	0.925	0.4786	0.2435
<i>n</i> -Butylbenzene	3.08	1.73	0.923	0.4776	0.2430
1,2-Diethylbenzene	3.15	1.77	0.945	0.4885	0.2485
1,2,4,5-Tetramethylbenzene	2.12	1.19	0.635	0.3284	0.1671
1,2,3,5-Tetramethylbenzene	2.12	1.19	0.637	0.3295	0.1676
Naphthalene	2.37	1.34	0.712	0.3683	0.1874
1-Methylnaphthalene	2.37	1.34	0.712	0.3683	0.1874
2-Methylnaphthalene	2.43	1.37	0.730	0.3773	0.1919
Isooctane	-----	43.77	70.015	84.4922	92.1105

5 x 1 mL

Optional Sixth Standard

With Internal Standard

D-5769-ADD/IS

1 x 1 mL

Core Calibration Mix 24 Comps.	Target Wt. %
Benzene	4.16
Toluene	16.41
Ethylbenzene	4.10
<i>m</i> -Xylene	4.91
<i>p</i> -Xylene	4.91
<i>o</i> -Xylene	5.00
Isopropylbenzene	2.45
<i>n</i> -Propylbenzene	2.45
3-Ethyltoluene	2.45
4-Ethyltoluene	2.44
1,3,5-Trimethylbenzene	2.46
2-Ethyltoluene	2.50
1,2,4-Trimethylbenzene	4.14
1,2,3-Trimethylbenzene	2.54
Indan	2.73
1,4-Diethylbenzene	2.45
<i>n</i> -Butylbenzene	2.44
1,2-Diethylbenzene	2.50
1,2,4,5-Tetramethylbenzene	1.68
1,2,3,5-Tetramethylbenzene	1.68
Naphthalene	1.88
1-Methylnaphthalene	1.88
2-Methylnaphthalene	1.93
Isooctane	19.92

Technical Note

A sixth standard has been formulated to improve the linearity at the high end of the calibration curve. This can be especially helpful in the quantification of gasoline containing high levels of toluene.

Internal Standard

M-GRA-IS

Mix ratio

Benzene-d ₆	2 mL
Ethylbenzene-d ₁₀	2 mL
Naphthalene-d ₈	1 gm

The 3 comp. Internal Standard Mix (M-GRA-IS) is combined with the 24 component Core Calibration Curve Mixes above in a 5 to 100 weight ratio to formulate these 27 comp. calibration solutions.

Daily Quality Control Standard

With Internal Standard

D-5769-QC/IS-5ML

D-5769-QC/IS-5ML-PAK **SAVE**

1 x 5 mL

5 x 5 mL

17 comps.

Wt. Ratio		Wt. Ratio	
<i>n</i> -Hexane	12	Toluene	9
<i>n</i> -Heptane	17	Ethylbenzene	3
<i>n</i> -Octane	17	<i>m</i> -Xylene	3
<i>n</i> -Decane	12	<i>o</i> -Xylene	3
<i>n</i> -Dodecane	5	1,2,4-Trimethylbenzene	3
Isooctane	12	1,2,4,5-Tetramethylbenzene	2
Benzene	1	Naphthalene	1

Includes M-GRA-IS (3 comp. mix) added in 5 to 100 weight ratio

Resolution Standard

M-GRA-RES

M-GRA-RES-PAK **SAVE**

1 x 1 mL

5 x 1 mL

3 comps.

	Wt. %
1,3,5-Trimethylbenzene	3.0
1-Methyl-2-ethylbenzene	3.0
Isooctane	94.0

3 comp. Deuterated Internal Std. Mix

M-GRA-IS-5ML

M-GRA-IS-5ML-PAK

SAVE

1 x 5 mL

5 x 5 mL

3 comps.

Mix Ratio

Benzene-d ₆	2 mL
Ethylbenzene-d ₁₀	2 mL
Naphthalene-d ₈	1 gm

Sensitivity Test Solution

M-GRA-ST

M-GRA-ST-PAK

SAVE

1 x 1 mL

5 x 1 mL

100 µg/mL in Isooctane

1,4-Diethyl benzene

Fragmentation Pattern Standard

M-GRA-FP

M-GRA-FP-PAK

SAVE

1 x 1 mL

5 x 1 mL

3.0% w/w in Isooctane

1,2,3-Trimethylbenzene

Mass Scan Range Standard

M-GRA-MSR

M-GRA-MSR-PAK

SAVE

1 x 1 mL

5 x 1 mL

3.0% w/w in Isooctane

Toluene

ASTM D5769 Benzene, Toluene & Total Aromatics in Finished Gasoline by GC/MS

With 4 Component Internal Standard (includes Toluene-d₈)

Calibration Curve with Deuterated Toluene

With Internal Standard

D-5769-CAL/IS-R-SET

5 x 1 mL

Core Calibr. Mix 24 Comps.	Std. 1 Target Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %
Benzene	5.25	2.95	1.575	0.8144	0.4143
Toluene	19.67	11.06	5.898	3.0505	1.5519
Ethylbenzene	5.18	2.91	1.552	0.8026	0.4083
<i>m</i> -Xylene	6.19	3.48	1.856	0.9598	0.4883
<i>p</i> -Xylene	6.19	3.48	1.856	0.9598	0.4883
<i>o</i> -Xylene	6.30	3.54	1.890	0.9776	0.4973
Isopropylbenzene	3.09	1.74	0.925	0.4786	0.2435
<i>n</i> -Propylbenzene	3.09	1.74	0.926	0.4787	0.2435
3-Ethyltoluene	3.10	1.74	0.928	0.4801	0.2442
4-Ethyltoluene	3.08	1.73	0.925	0.4782	0.2433
1,3,5-Trimethylbenzene	3.10	1.74	0.929	0.4804	0.2444
2-Ethyltoluene	3.15	1.77	0.945	0.4890	0.2488
1,2,4-Trimethylbenzene	5.23	2.94	1.567	0.8104	0.4123
1,2,3-Trimethylbenzene	3.20	1.80	0.960	0.4965	0.2526
Indan	3.45	1.94	1.034	0.5350	0.2722
1,4-Diethylbenzene	3.09	1.74	0.925	0.4786	0.2435
<i>n</i> -Butylbenzene	3.08	1.73	0.923	0.4776	0.2430
1,2-Diethylbenzene	3.15	1.77	0.945	0.4885	0.2485
1,2,4,5-Tetramethylbenzene	2.12	1.19	0.635	0.3284	0.1671
1,2,3,5-Tetramethylbenzene	2.12	1.19	0.637	0.3295	0.1676
Naphthalene	2.37	1.34	0.712	0.3683	0.1874
1-Methylnaphthalene	2.37	1.34	0.712	0.3683	0.1874
2-Methylnaphthalene	2.43	1.37	0.730	0.3773	0.1919
Isooctane	-----	43.77	70.015	84.4922	92.1105

Optional Sixth Standard

With Internal Standard

D-5769-ADD/IS-R

1 x 1 mL

Core Calibration Mix 24 Comp.	Target Wt. %
Benzene	4.16
Toluene	16.41
Ethylbenzene	4.10
<i>m</i> -Xylene	4.91
<i>p</i> -Xylene	4.91
<i>o</i> -Xylene	5.00
Isopropylbenzene	2.45
<i>n</i> -Propylbenzene	2.45
3-Ethyltoluene	2.45
4-Ethyltoluene	2.44
1,3,5-Trimethylbenzene	2.46
2-Ethyltoluene	2.50
1,2,4-Trimethylbenzene	4.14
1,2,3-Trimethylbenzene	2.54
Indan	2.73
1,4-Diethylbenzene	2.45
<i>n</i> -Butylbenzene	2.44
1,2-Diethylbenzene	2.50
1,2,4,5-Tetramethylbenzene	1.68
1,2,3,5-Tetramethylbenzene	1.68
Naphthalene	1.88
1-Methylnaphthalene	1.88
2-Methylnaphthalene	1.93
Isooctane	19.92

Internal Standard

M-GRA-IS-R

Mix ratio

Benzene-d ₆	2 mL
Ethylbenzene-d ₁₀	2 mL
Naphthalene-d ₈	1 gm
Toluene-d ₈	7 mL

The 4 comp. Internal Standard Mix (M-GRA-IS-R) is combined with the 24 component core calibration curve mixtures above in a 12 to 100 weight ratio to formulate these 28 component calibration solutions.

Daily Quality Control Standard

With Internal Standard

D-5769-QC/IS-R-5ML

D-5769-QC/IS-R-5ML-PAK **SAVE**

1 x 5 mL

5 x 5 mL

18 comps.

Wt. Ratio		Wt. Ratio	
<i>n</i> -Hexane	12	Toluene	9
<i>n</i> -Heptane	17	Ethylbenzene	3
<i>n</i> -Octane	17	<i>m</i> -Xylene	3
<i>n</i> -Decane	12	<i>o</i> -Xylene	3
<i>n</i> -Dodecane	5	1,2,4-Trimethylbenzene	3
Isooctane	12	1,2,4,5-Tetramethylbenzene	2
Benzene	1	Naphthalene	1

Includes M-GRA-IS-R (4 comp. mix) added in 12 to 100 weight ratio

Sensitivity Test Solution

M-GRA-ST

M-GRA-ST-PAK

SAVE

1 x 1 mL

5 x 1 mL

100 µg/mL in Isooctane

1,4-Diethyl benzene

Resolution Standard

M-GRA-RES

M-GRA-RES-PAK

SAVE

1 x 1 mL

5 x 1 mL

3 comps.

	Wt. %
1,3,5-Trimethylbenzene	3.0
1-Methyl-2-ethylbenzene	3.0
Isooctane	94.0

4 comp. Deuterated Internal Std. Mix

M-GRA-IS-R-10ML

M-GRA-IS-R-10ML-PAK **SAVE**

1 x 10 mL

5 x 10 mL

Mix Ratio		Mix Ratio	
Benzene-d ₆	2 mL	Naphthalene-d ₈	1 gm
Ethylbenzene-d ₁₀	2 mL	Toluene-d ₈	7 mL

Fragmentation Pattern Standard

M-GRA-FP

M-GRA-FP-PAK

SAVE

1 x 1 mL

5 x 1 mL

3.0 w/w in Isooctane

1,2,3-Trimethylbenzene

ASTM D5769 Benzene, Toluene & Total Aromatics in Finished Gasoline by GC/MS

Proposed / Promulgated Method Modifications

Calibration Curve

With Chlorinated Internal Standard

D-5769-CAL/IS-R2-SET

Core Calibr. Mix 24 Comps.	Target	Std. 1 Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %
Benzene		5.25	2.95	1.575	0.8144	0.4143
Toluene		19.67	11.06	5.898	3.0505	1.5519
Ethylbenzene		5.18	2.91	1.552	0.8026	0.4083
<i>m</i> -Xylene		6.19	3.48	1.856	0.9598	0.4883
<i>p</i> -Xylene		6.19	3.48	1.856	0.9598	0.4883
<i>o</i> -Xylene		6.30	3.54	1.890	0.9776	0.4973
Isopropylbenzene		3.09	1.74	0.925	0.4786	0.2435
<i>n</i> -Propylbenzene		3.09	1.74	0.926	0.4787	0.2435
3-Ethyltoluene		3.10	1.74	0.928	0.4801	0.2442
4-Ethyltoluene		3.08	1.73	0.925	0.4782	0.2433
1,3,5-Trimethylbenzene		3.10	1.74	0.929	0.4804	0.2444
2-Ethyltoluene		3.15	1.77	0.945	0.4890	0.2488
1,2,4-Trimethylbenzene		5.23	2.94	1.567	0.8104	0.4123
1,2,3-Trimethylbenzene		3.20	1.80	0.960	0.4965	0.2526
Indan		3.45	1.94	1.034	0.5350	0.2722
1,4-Diethylbenzene		3.09	1.74	0.925	0.4786	0.2435
<i>n</i> -Butylbenzene		3.08	1.73	0.923	0.4776	0.2430
1,2-Diethylbenzene		3.15	1.77	0.945	0.4885	0.2485
1,2,4,5-Tetramethylbenzene		2.12	1.19	0.635	0.3284	0.1671
1,2,3,5-Tetramethylbenzene		2.12	1.19	0.637	0.3295	0.1676
Naphthalene		2.37	1.34	0.712	0.3683	0.1874
1-Methylnaphthalene		2.37	1.34	0.712	0.3683	0.1874
2-Methylnaphthalene		2.43	1.37	0.730	0.3773	0.1919
Isooctane	-----	43.77		70.015	84.4922	92.1105

5 x 1 mL

Optional Sixth Standard

With Internal Standard

D-5769-ADD/IS-R2

1 x 1 mL

Core Calibration Mix 24 Components	Target Wt. %
Benzene	4.16
Toluene	16.41
Ethylbenzene	4.10
<i>m</i> -Xylene	4.91
<i>p</i> -Xylene	4.91
<i>o</i> -Xylene	5.00
Isopropylbenzene	2.45
<i>n</i> -Propylbenzene	2.45
3-Ethyltoluene	2.45
4-Ethyltoluene	2.44
1,3,5-Trimethylbenzene	2.46
2-Ethyltoluene	2.50
1,2,4-Trimethylbenzene	4.14
1,2,3-Trimethylbenzene	2.54
Indan	2.73
1,4-Diethylbenzene	2.45
<i>n</i> -Butylbenzene	2.44
1,2-Diethylbenzene	2.50
1,2,4,5-Tetramethylbenzene	1.68
1,2,3,5-Tetramethylbenzene	1.68
Naphthalene	1.88
1-Methylnaphthalene	1.88
2-Methylnaphthalene	1.93
Isooctane	19.92

Disk Deliverable (At no additional charge)

CALAMTS™
(Disk containing "Calibration Amounts")
Eliminates hand keyed-in data.

Each analyte in each standard is individually weighed. Actual weights and weight percents are provided.

Internal Standard

M-GRA-IS-R2

Mix ratio
Chlorobenzene 2 mL
1,2-Dichlorobenzene 2 mL
1,2,4-Trichlorobenzene 1 mL

The 3 comp. Internal Standard Mix (M-GRA-IS-R2) is combined with the 24 Comp. Core Calibration Curve mixtures above in a 5 to 100 weight ratio to formulate these 27 Comp. calibration solutions.

Daily QC Standard

With Internal Standard

D-5769-QC/IS-R2-5ML

D-5769-QC/IS-R2-5ML-PAK **SAVE**

1 x 5 mL

5 x 5 mL

17 comps.

Wt. Ratio	Wt. Ratio
<i>n</i> -Hexane 12	Toluene 9
<i>n</i> -Heptane 17	Ethylbenzene 3
<i>n</i> -Octane 17	<i>m</i> -Xylene 3
<i>n</i> -Decane 12	<i>o</i> -Xylene 3
<i>n</i> -Dodecane 5	1,2,4-Trimethylbenzene 3
Isooctane 12	1,2,4,5-Tetramethylbenzene 2
Benzene 1	Naphthalene 1

Sensitivity Test Solution

M-GRA-ST

M-GRA-ST-PAK

100 µg/mL in Isooctane

1,4-Diethyl benzene

1 x 1 mL

5 x 1 mL

Fragmentation Pattern Standard

M-GRA-FP

M-GRA-FP-PAK

3.0 w/w in Isooctane

1,2,3-Trimethylbenzene

1 x 1 mL

5 x 1 mL

Includes M-GRA-IS-R2 added in 5 to 100 weight ratio.

3 comp. Chlorinated Internal Std. Mix

M-GRA-IS-R2-VAP

set of 25 x 1 mL

M-GRA-IS-R2-25ML

1 x 25 mL

3 comps.

Mix Ratio
Chlorobenzene 2 mL
1,2-Dichlorobenzene 2 mL
1,2,4-Trichlorobenzene 1 mL

Resolution Standard

M-GRA-RES

M-GRA-RES-PAK

Wt. %

1,3,5-Trimethylbenzene	3.0
1-Methyl-2-ethylbenzene	3.0
Isooctane	94

1 x 1 mL

5 x 1 mL

3 comps.

ASTM D5769 Benzene, Toluene & Total Aromatics in Finished Gasoline by GC/MS

Special QA/QC Formulations

Daily QC Standard

Without Internal Standard

M-GRA-QC-R-10ML	1 x 10 mL
M-GRA-QC-R-10ML-PAK SAVE	5 x 10 mL 15 comps.

Wt. Ratio		Wt. Ratio	
<i>n</i> -Hexane	12	Ethylbenzene	3
<i>n</i> -Heptane	17	<i>m</i> -Xylene	3
<i>n</i> -Octane	17	<i>o</i> -Xylene	3
<i>n</i> -Decane	12	1,2,4-Trimethylbenzene	3
<i>n</i> -Dodecane	5	1,2,4,5-Tetramethylbenzene	1
Isooctane	12	Pentamethylbenzene	1
Benzene	1	1-Methylnaphthalene	1
Toluene	9		

For use with any M-GRA Calibration Curve

Daily QC Standard

With Internal Standard M-GRA-IS

M-GRA-QC-R/IS-5ML	1 x 5 mL
M-GRA-QC-R/IS-5ML-PAK SAVE	5 x 5 mL 18 comps.

Wt. Ratio		Wt. Ratio	
<i>n</i> -Hexane	12	Ethylbenzene	3
<i>n</i> -Heptane	17	<i>m</i> -Xylene	3
<i>n</i> -Octane	17	<i>o</i> -Xylene	3
<i>n</i> -Decane	12	1,2,4-Trimethylbenzene	3
<i>n</i> -Dodecane	5	1,2,4,5-Tetramethylbenzene	1
Isooctane	12	Pentamethylbenzene	1
Benzene	1	1-Methylnaphthalene	1
Toluene	9		

Includes M-GRA-IS combined with the above 15 comp. Core Mix in a 5 to 100 weight ratio.

3 comp. Deuterated Internal Std. Mix

M-GRA-IS-5ML	1 x 5 mL
M-GRA-IS-5ML-PAK SAVE	5 x 5 mL 3 comps.

Mix Ratio	
Benzene-d ₆	2 mL
Ethylbenzene-d ₁₀	2 mL
Naphthalene-d ₈	1 gm

4 comp. Deuterated Internal Std. Mix

M-GRA-IS-R-10ML	1 x 10 mL
M-GRA-IS-R-10ML-PAK SAVE	5 x 10 mL 4 comps.

Mix Ratio	
Benzene-d ₆	2 mL
Ethylbenzene-d ₁₀	2 mL
Naphthalene-d ₈	1 gm
Toluene-d ₈	7 mL

Daily QC Standard

With Internal Standard M-GRA-IS-R

M-GRA-QCR/IS-R-5ML	1 x 5 mL
M-GRA-QCR/IS-R-5ML-PAK SAVE	5 x 5 mL 19 comps.

Wt. Ratio		Wt. Ratio	
<i>n</i> -Hexane	12	Ethylbenzene	3
<i>n</i> -Heptane	17	<i>m</i> -Xylene	3
<i>n</i> -Octane	17	<i>o</i> -Xylene	3
<i>n</i> -Decane	12	1,2,4-Trimethylbenzene	3
<i>n</i> -Dodecane	5	1,2,4,5-Tetramethylbenzene	1
Isooctane	12	Pentamethylbenzene	1
Benzene	1	1-Methylnaphthalene	1
Toluene	9		

Includes M-GRA-IS-R combined with the above 15 comp. Core Mix in a 12 to 100 weight ratio.

Aromatics for Analysis by GC/MS (Daily QC Standards) Set

Original Formulations

M-GRA-K1-SET Set

Set includes:	Units	Function
M-GRA-CAL/IS-SET	5 x 1 mL	5 Point Curve with 3 Internal Standards
M-GRA-QC/IS-5ML	1 x 5 mL	Daily QC with 3 Internal Standards
M-GRA-IS-5ML	1 x 5 mL	3 Component Internal Standard
M-GRA-ST	1 x 1 mL	Sensitivity Test Solution

4 Component Internal Standard Formulations

M-GRA-K4-SET Set

Set includes:	Units	Function
M-GRA-CAL-R/IS-R-SET	5 x 1 mL	5 Point Curve with 4 Internal Standards
M-GRA-ADD/IS-R	1 x 1 mL	6th Standard for Revision 5 F
M-GRA-QC-R/IS-R-5ML	1 x 5 mL	Daily QC with 4 Internal Standards
M-GRA-IS-R-10ML	1 x 10 mL	4 Component Internal Standard
M-GRA-ST	1 x 1 mL	Sensitivity Test Solution

Revision 5 F

M-GRA-K2-SET Set

Set includes:	Units	Function
M-GRA-CAL/IS-SET	5 x 1 mL	5 Point Curve with 3 Internal Standards
M-GRA-ADD/IS	1 x 1 mL	6th Standard for Revision 5 F
M-GRA-QC/IS-5ML	1 x 5 mL	Daily QC with 3 Internal Standards
M-GRA-IS-5ML	1 x 5 mL	3 Component Internal Standard
M-GRA-ST	1 x 1 mL	Sensitivity Test Solution

Technical Note

Used to meet the Toluene-d₈ internal standard version recommended by a network of major petroleum refineries.

ASTM D5769 Additional Internal, Deuterated and Quality Control Standards

4 comp. Deuterated Internal Std. Mix

ASTM-P-0140-IS 1 x 10 mL
 ASTM-P-0140-IS-PAK **SAVE** 5 x 10 mL
 4 comps.

	Vol. %	Compound	Vol. %
Benzene-d ₆	2	Naphthalene-d ₈	1
Ethylbenzene-d ₁₀	2	Isooctane *	balance

4 comp. Deuterated Internal Std. Mix

ASTM-P-0140-IS2 1 x 10 mL
 ASTM-P-0140-IS2-PAK **SAVE** 5 x 10 mL
 5 comps.

	Vol. %		Vol. %
Benzene-d ₆	2	Toluene-d ₈	7
Ethylbenzene-d ₁₀	2	Isooctane *	balance
Naphthalene-d ₈	1		

Performance Evaluation Standard

ASTM-P-0140-PES 1 x 1 mL
 ASTM-P-0140-PES-PAK **SAVE** 5 x 1 mL
 11 comps.

	Target Vol. %
Benzene	1
1,2-Diethylbenzene	0.005
1,3,5-Trimethylbenzene	1
1-Methyl-2-ethylbenzene	1
Styrene	0.1
Indene	0.1
Biphenyl	0.1
1,2,4,5-Tetramethylbenzene	1
1,2,3,5-Tetramethylbenzene	1
Hexadecane	1
Isooctane:Toluene(1:1) *	balance

Composition of Daily QC Standard

ASTM-P-0140-QC 1 x 10 mL
 ASTM-P-0140-QC-PAK **SAVE** 5 x 10 mL
 9 comps.

	Target Vol. %
Benzene	1
Toluene	10
Ethylbenzene	3
1,3-Dimethylbenzene	6
1,2-Dimethylbenzene	3
1,2,4-Trimethylbenzene	3
1,2-Diethylbenzene	0.02
Naphthalene	1
Isooctane (solvent) *	balance

^A This component is a solid at room temperature

* The isooctane balance is the amount of material to make up a 100 mL calibration standard.
 Certificate will reflect actual weight of each component in the 100 mL batch including the isooctane.

ASTM D5771 Cloud Point of Petroleum Products

see page 275

ASTM D5772 Cloud Point of Petroleum Products (Linear Cooling Rate Method)

see page 275

ASTM D5773 Cloud Point of Petroleum Products (Constant Cooling Rate Method)

see page 275

ASTM D5836 Determination of Diisocyanates (1,2-PP Method)
Diisocyanate Sets

D-5836-SET 9 x 1 mL
D-5836-01N, D-5836-02N, D-5836-03N, D-5836-04N,
D-5836-01-DER, D-5836-02-DER, D-5836-03-DER, D-5836-04-DER, D-5836-DER-5ML-VAP

Underivatized Diisocyanates

Compound	Unit	Cat. No.
2,4-Toluene diisocyanate	100 mg	D-5836-01N
2,6-Toluene diisocyanate	100 mg	D-5836-02N
Hexamethylene diisocyanate	100 mg	D-5836-03N
4,4'-Methylenebis(phenyl isocyanate)	100 mg	D-5836-04N

Diisocyanate Storage - Refrig 0-5° C

Derivatized Diisocyanates (Weight Compensated to 1000 µg/mL of each Diisocyanate)

Compound	Cat. No.	1 mL
N,N'-(4-Methyl-1,3-phenylene)bis[4-(2-pyridinyl)-1-piperazinecarboxamide] 72375-21-4 (2,4-TDIP)	D-5836-01-DER 2840 µg/mL in DMSO	
N,N'-(2-Methyl-1,3-phenylene)bis[4-(2-pyridinyl)-1-piperazinecarboxamide] (2,6-TDIP)	D-5836-02-DER 2840 µg/mL in DMSO	
N,N'-1,6-Hexanediyldis[4-(2-pyridinyl)-1-piperazinecarboxamide] 72375-27-0 (1,6-HDIP)	D-5836-03-DER 2900 µg/mL in DMSO	
N,N'-(Methylenediphenylene)bis[4-(2-pyridinyl)-1-piperazinecarboxamide] 72375-24-7 (4,4'-MDIP)	D-5836-04-DER 2280 µg/mL in DMSO	

Derivatizing Agents

1-(2-Pyridyl)piperazine D-5836-DER-5ML-VAP
34803-66-2 2 mg/mL in CH₂Cl₂ 4 x 5 mL

Individual Derivatized Diisocyanates

N,N'-(4-Methyl-1,3-phenylene)bis[4-(2-pyridinyl)-1-piperazinecarboxamide] 72375-21-4 (2,4-TDIP)	D-5836-01A-DER 1000 µg/mL in DMSO
N,N'-(2-Methyl-1,3-phenylene)bis[4-(2-pyridinyl)-1-piperazinecarboxamide] (2,6-TDIP)	D-5836-02A-DER 1000 µg/mL in DMSO
N,N'-1,6-Hexanediyldis[4-(2-pyridinyl)-1-piperazinecarboxamide] 72375-27-0 (1,6-HDIP)	D-5836-03A-DER 1000 µg/mL in DMSO
N,N'-(Methylenediphenylene)bis[4-(2-pyridinyl)-1-piperazinecarboxamide] 72375-24-7 (4,4'-MDIP)	D-5836-04A-DER 1000 µg/mL in DMSO

ASTM D5863 Ni, V, Fe, & Na in Crude Oils & Residual Fuels by Flame AA Spectrometry

see

ASTM D5901 Freezing Point Aviation Fuels (Automated Optical Method)

see pages 274-275

ASTM D5972 Freezing Point Aviation Fuels (Automated Phase Transition Method)

see pages 274-275

ASTM D5986 Oxygenates, Benzene, Toluene, C8-C12, Aromatics & Total Aromatics in Finished Gasolines by GC/FTIR
Daily QC Standard
Without Internal Standard

M-GRA-QC-10ML

M-GRA-QC-10ML-PAK

SAVE

1 x 10 mL
5 x 10 mL

Wt. Ratio		Wt. Ratio	
<i>n</i> -Hexane	12	Toluene	9
<i>n</i> -Heptane	17	Ethylbenzene	3
<i>n</i> -Octane	17	<i>m</i> -Xylene	3
<i>n</i> -Decane	12	<i>o</i> -Xylene	3
<i>n</i> -Dodecane	5	1,2,4-Trimethylbenzene	3
Isooctane	12	1,2,4,5-Tetramethylbenzene	3
Benzene	1	13 Comp. Core Mix	100

Technical Note

This quality control standard was formulated to meet Section 11 of ASTM D-5986 specifications stipulating to "analyze the quality control reference material before every batch of samples. Bracket the samples with the reference materials".

ASTM D6160 Polychlorinated Biphenyls (PCBs in Waste Materials by GC)

Aroclor Standards

Aroclor #	35 µg/mL in Isooctane Cat. No.	1 mL	35 µg/mL in MeOH Cat. No.	1 mL	1000 µg/mL in Hexane Cat. No.	1 mL
Aroclor 1016	C-216S		C-216S-M		C-216S-H-10X	
Aroclor 1221	C-221S		C-221S-M		C-221S-H-10X	
Aroclor 1232	C-232S		C-232S-M		C-232S-H-10X	
Aroclor 1242	C-242S		C-242S-M		C-242S-H-10X	
Aroclor 1248	C-248S		C-248S-M		C-248S-H-10X	
Aroclor 1254	C-254S		C-254S-M		C-254S-H-10X	
Aroclor 1260	C-260S		C-260S-M		C-260S-H-10X	
Aroclor 1262	C-262S		C-262S-M		C-262S-H-10X	
Aroclor 1268	C-268S		C-268S-M		C-268S-H-10X	

ASTM D6258 Solvent Red 164 Dye Concentration in Diesel Fuels

Stock Solvent Red 26 Standard

D-6258-CONC-5ML

1 x 5 mL

Solvent Red 26 @ 300 µg/mL in Xylene

D-6258 Calibration Curve

D-6258-5ML-SET

6 x 5 mL

Set includes the following Cat. No.'s

Description	Cat. No.	Unit
Xylene Blank	D-6258-BL	1 x 5 mL
Solvent Red 26 Dye @ 3 µg/mL in Xylene	D-6258-01	1 x 5 mL
Solvent Red 26 Dye @ 6 µg/mL in Xylene	D-6258-02	1 x 5 mL
Solvent Red 26 Dye @ 9 µg/mL in Xylene	D-6258-03	1 x 5 mL
Solvent Red 26 Dye @ 12 µg/mL in Xylene	D-6258-04	1 x 5 mL
Solvent Red 26 Dye @ 15 µg/mL in Xylene	D-6258-05	1 x 5 mL

Technical Note

Solvent Red 26 is the azo dye standard against which the concentration of Solvent Red 164 is measured. The visible spectrum of Solvent Red 164 is virtually identical to the spectrum of Solvent Red 26.

ASTM D6293 Oxygenates & Paraffin, Olefin, Naphthene, Aromatics (O-PONA) Hydrocarbon types in Low-Olefin Spark-Ignition Engine Fuels by GC

O-PONA System Validation Mixture

ASTM-P-0080

ASTM-P-0080-PAK

SAVE

1 x 1 mL

5 x 1 mL

33 comps.

	Wt./Wt. %		Wt./Wt. %
Cyclopentane	1.5	Benzene	2.5
<i>n</i> -Pentane	1.5	Toluene	2.5
Cyclohexane	2.0	<i>trans</i> -Decahydronaphthelene	3.5
2,3-Dimethylbutane	2.0	<i>n</i> -Tetradecane	2.0
<i>n</i> -Hexane	2.0	Ethylbenzene	3.5
1-Hexene	1.5	<i>o</i> -Xylene	3.0
Methylcyclohexane	3.5	<i>n</i> -Propylbenzene	3.5
4-Methyl-1-hexene	1.5	1,2,4-Trimethylbenzene	3.0
<i>n</i> -Heptane	3.0	1,2,3-Trimethylbenzene	2.0
<i>cis</i> -1,2-Dimethylcyclohexane	4.5	1,2,4,5-Tetramethylbenzene	2.0
Isooctane	4.0	Pentamethylbenzene	2.5
<i>n</i> -Octane	4.0	Ethanol	5.0
1,2,4-Trimethylcyclohexane	3.5	<i>t</i> -Butanol	4.0
<i>n</i> -Nonane	3.0	MtBE	8.0
<i>n</i> -Decane	3.5	ETBE	3.0
<i>n</i> -Undecane	2.0	TAME	5.0
<i>n</i> -Dodecane	2.0		

O-PONA Olefin Mix

ASTM-P-0081

ASTM-P-0081-PAK

At stated conc. in Hexane:Heptane (1:1)

1 x 1 mL

5 x 1 mL

5 comps.

	Wt./Wt. %
1-Pentene	5.0
1-Hexene	2.0
1-Heptene	2.0
1-Octene	2.0
1-Nonene	3.0

O-PONA Paraffin Mixes

ASTM-P-0082

ASTM-P-0082-PAK

At stated conc. in Hexane:Heptane (1:1)

1 x 1 mL

5 x 1 mL

2 comps.

	Wt./Wt. %
<i>n</i> -Nonane	5.0
<i>n</i> -Decane	2.0

ASTM-P-0082-R1

ASTM-P-0082-R1-PAK

At stated conc. in Hexane:Heptane (1:1)

1 x 1 mL

5 x 1 mL

2 comps.

	Wt./Wt. %
<i>n</i> -Nonane	3.0
<i>n</i> -Decane	3.0

ASTM D6296 Total Olefins in Spark-Ignition Engine Fuels by Multidimensional GC
System Setup & Verification Standard Set

D-6296-VER-SET

2 x 1 mL

(D-6296-VER1, D-6296-VER2)

D-6296-VER-SET-PAK

SAVE

5 x (2 x 1 mL)

Set of 5 each (D-6296-VER1, D-6296-VER2)

System Setup & Verification 1

D-6296-VER1

1 x 1 mL

2 comps.

	Wt. %		Wt. %
MTBE	5%	Isooctane	95%

System Setup & Verification 2

D-6296-VER2

1 x 1 mL

2 comps.

	Wt. %		Wt. %
ETBE	5%	Isooctane	95%

Calibration Standard with MTBE

D-6296-CAL1

1 x 1 mL

D-6296-CAL1-PAK

SAVE

5 x 1 mL

10 comps.

	Wt. %		Wt. %
Pentene	1.0	Decene	1.0
Hexene	1.0	Undecane	1.0
Heptene	1.0	Dodecane	1.0
Octene	1.0	Isooctane	87.0
Nonene	1.0	MTBE	5.0

Calibration Standard with ETBE

D-6296-CAL2

1 x 1 mL

D-6296-CAL2-PAK

SAVE

5 x 1 mL

11 comps.

	Wt. %		Wt. %
Pentene	1.0	Decane	1.0
Hexene	1.0	Undecane	1.0
Heptene	1.0	Dodecane	1.0
Octene	1.0	Isooctane	86.0
Nonene	1.0	ETBE	5.0
Decene	1.0		

Isooctane Blank Compensation Standard

D-6296-BL

1 x 5 mL

Isooctane (Neat)

ASTM D6304 Determination of Water in Petroleum Products Lubricating oil, and additives by Coulometric Karl Fischer Titration

see pages 275, 312

ASTM D6334 Sulfur in Gasoline by Wavelength Dispersive X-Ray Fluorescence

see pages 276-279

ASTM D6352 Boiling Range Distribution of Petroleum Distillates from 174 to 700°C by GC
Polywax 500®

ASTM-P-0051N-2G

2 grams

Polywax 500

Polywax 850®

ASTM-P-0137N-2G

2 grams

Polywax 850

Polywax 655®

ASTM-P-0053N-2G

2 grams

Polywax 655

Polywax 1000®

ASTM-P-0138N-2G

2 grams

Polywax 1000

Hydrocarbon Window Defining Standard

DRH-008S-R2

1 x 1 mL

DRH-008S-R2-PAK

SAVE

5 x 1 mL

500 µg/mL each in Chloroform

35 comps.

Octane	Nonadecane	Triacontane
Nonane	Phytane	<i>n</i> -Hentriacontane
Decane	Eicosane	Dotriacontane
Undecane	Heneicosane	Tritriacontane
Dodecane	Docosane	Tetraatriacontane
Tridecane	Tricosane	Pentatriacontane
Tetradecane	Tetracosane	Hexatriacontane
Pentadecane	Pentacosane	Heptatriacontane
Hexadecane	Hexacosane	Octatriacontane
Heptadecane	Heptacosane	Nonatriacontane
Octadecane	Octacosane	Tetracontane
Pristane	Nonacosane	

Calibration Mix

DRH-002N

100 mg

DRH-002N-10X

1 gm

17 comps.

	Wt. %		Wt. %
<i>n</i> -Hexane	6	<i>n</i> -Octadecane	5
<i>n</i> -Heptane	6	<i>n</i> -Eicosane	2
<i>n</i> -Octane	8	<i>n</i> -Tetracosane	2
<i>n</i> -Nonane	8	<i>n</i> -Octacosane	1
<i>n</i> -Decane	12	<i>n</i> -Dotriacontane	1
<i>n</i> -Undecane	12	<i>n</i> -Hexatriacontane	1
<i>n</i> -Dodecane	12	<i>n</i> -Tetracontane	1
<i>n</i> -Tetradecane	12	<i>n</i> -Tetratetracontane	1
<i>n</i> -Hexadecane	10		

Column Test Mixture

D-2887

1 x 1 mL

1% wt./v in *n*-Octane

2 comps.

n-Hexadecane*n*-Octadecane

ASTM D6378 Vapor Pressure (VPx) of Petroleum Products, Hydrocarbons, & Hydrocarbon-Oxygenate Mixtures (Triple Expansion Method)

see page 289

ASTM D6379 Aromatic Hydrocarbon Types in Aviation Fuels & Petroleum Distillates - HPLC method with Refractive Index

System Resolution Standards

D-6379-SRS 1 x 1 mL
D-6379-SRS-PAK **SAVE** 5 x 1 mL
At stated conc. (mg/mL) in n-Heptane 3 comps.

Cyclohexane	10
o-Xylene	0.5
1-Methyl naphthalene	0.05

D-6379-SRS-R1 1 x 1 mL
D-6379-SRS-R1-PAK **SAVE** 5 x 1 mL
At stated conc. (mg/mL) in n-Heptane 3 comps.

Cyclohexane	10
o-Xylene	5
1-Methyl naphthalene	0.5

Calibration Curves

D-6379-SET 4 x 1 mL
D-6379-SET-PAK **SAVE** 5 x (4 x 1 mL)
At stated conc. (mg/mL) in n-Heptane

Analyte	Std. 1	Std. 2	Std. 3	Std. 4
Cyclohexane	5	2	0.5	0.1
o-Xylene	15	5	1.0	0.1
1-Methyl naphthalene	5	1.0	0.2	0.05

D-6379-10X-SET 4 x 1 mL
D-6379-10X-SET-PAK **SAVE** 5 x (4 x 1 mL)
At stated conc. (mg/mL) in n-Heptane

Analyte	Std. 1	Std. 2	Std. 3	Std. 4
Cyclohexane	50	20	5	1
o-Xylene	150	50	10	1
1-Methyl naphthalene	50	10	2	0.5

ASTM D6417 Estimation of Engine Oil Volatility by Capillary GC

see page 309

ASTM D6428 Sulfur by Combustion and Electrochemical Detection

D-6428-R1-100ML-SET 7 x 100 mL
D-6428-R1-SET 7 x 1 mL
In Isooctane

Description	D-6428-R1-100ML-SET 7 x 100 mL	D-6428-R1-SET 7 x 1 mL
Sulfur Blank	D-6428-BL-100ML	D-6428-BL
Sulfur @ 0.1 µg/g	D-6428-0.1X-100ML	D-6428-0.1X
Sulfur @ 0.5 µg/g	D-6428-0.5X-100ML	D-6428-0.5X
Sulfur @ 1.0 µg/g	D-6428-1X-100ML	D-6428-1X
Sulfur @ 2.5 µg/g	D-6428-2.5X-100ML	D-6428-2.5X
Sulfur @ 5.0 µg/g	D-6428-5X-100ML	D-6428-5X
Sulfur @ 10 µg/g	D-6428-10X-100ML	D-6428-10X

D-6428-R2-100ML-SET 6 x 100 mL
D-6428-R2-SET 6 x 1 mL
In Isooctane

Description	D-6428-R2-100ML-SET 6 x 100 mL	D-6428-R2-SET 6 x 1 mL
Sulfur Blank	D-6428-BL-100ML	D-6428-BL
Sulfur @ 10 µg/g	D-6428-10X-100ML	D-6428-10X
Sulfur @ 25 µg/g	D-6428-25X-100ML	D-6428-25X
Sulfur @ 50 µg/g	D-6428-50X-100ML	D-6428-50X
Sulfur @ 75 µg/g	D-6428-75X-100ML	D-6428-75X
Sulfur @ 100 µg/g	D-6428-100X-100ML	D-6428-100X

Technical Note

Sulfur introduced using di-n-butyl sulfide

ASTM D6443 Ca, Cl, Cu, Mg, P, S, Zn in Unused Lubricating Oils & Additives by Wave-length Dispersive X-ray Fluorescence & Spectrometry

see pages 403-404

ASTM D6445 Sulfur in Gasoline by ED - XRF

see pages 276-279

ASTM D6481 P, S, Ca and Zn in Lube Oils by ED-XRF

see pages 402-403

ASTM D6550 Olefin Content of Gasolines by SFC

Stock Olefin Calibration Standard

D-6550-CONC 1 x 1 mL
D-6550-CONC-5ML 1 x 5 mL
At stated Conc. by Wt. % 15 comps.

Wt. %	Wt. %	Wt. %
1-Nonene 2.5	2-Methyl-1,3-butadiene 5	2-Methyl-2-pentene 10
Cyclohexene 5	4-Methyl-1-pentene 5	1-Heptene 10
1-Hexene 5	1,5-Hexadiene 3	2-Methyl-1-octene 2.5
1-Octene 5	3-Methyl-1,3-pentadiene 2	2-Methyl-1-heptene 5
1-Decene 5	2-Methyl-1-butene 25	5-Methyl-1-hexene 10

ASTM D6584 / EN 14105 Free and Total Glycerin in Biodiesel by GC

Compound	Conc.	Matrix	Cat. No.	Unit
Glycerin	0.5 mg/mL	Pyridine	BF-D-6584-01	/ 2 mL
Monoolein	5 mg/mL	Pyridine	BF-D-6584-02	/ 2 mL
1,3-Diolein	5 mg/mL	Pyridine	BF-D-6584-03	/ 2 mL
Triolein	5 mg/mL	Pyridine	BF-D-6584-04	/ 2 mL
(S)-(-)-1,2,4-Butanetriol	1 mg/mL	Pyridine	BF-D-6584-05-IS	/ 5 mL
Tricaprin	8 mg/mL	Pyridine	BF-D-6584-06	/ 5 mL
MSTFA	5 mL	Neat	BF-D-6584-07N	/ 5 mL
Set of 7 above compounds			BF-D-6584-SET	7 units
Mix of above compounds, on right (MSTFA separate)				
Biofuel 20	0.5 mg/mL	CH ₂ Cl ₂	BF-FU-030-D	/ 2 mL
	20 mg/mL	CH ₂ Cl ₂	BF-FU-030-D-40X	/ 2 mL
Biofuel 100 Consumer grade	0.5 mg/mL	CH ₂ Cl ₂	BF-FU-029-D	/ 2 mL
	20 mg/mL	CH ₂ Cl ₂	BF-FU-029-40X	/ 2 mL
Biofuel 100	0.5 mg/mL	CH ₂ Cl ₂	BF-FU-032-D	/ 2 mL
	20 mg/mL	CH ₂ Cl ₂	BF-FU-032-D-40X	/ 2 mL

ASTM D6584 Mixture

BF-D-6584-MIX 1 x 5 mL
At stated conc. in Pyridine 6 comps.

Glycerol	0.5 mg/mL
Monoolein	5 mg/mL
1,3-Diolein	5 mg/mL
Trioctadecenoin (Olein)	5 mg/mL
(S)-(-)-1,2,4-Butanetriol	1 mg/mL
Tricaprin	8 mg/mL

Note: MSTFA (BF-D-6584-07N) can be ordered separately.

ASTM D6591 (IP 391) Aromatic Hydrocarbon Types in Middle Distillates - HPLC method with Refractive Index Detection
System Performance Standard

ASTM-P-0135 1 x 5 mL
ASTM-P-0135-PAK **SAVE** 5 x 5 mL
At stated conc. (mg/mL) in *n*-Heptane 4 comps.

Cyclohexane	10
<i>o</i> -Xylene	5.0
Dibenzothiophene	0.5
9-Methylanthracene	0.5

IP 391-95 Calibration Curve

ASTM-P-0136-SET 4 x 1 mL
At stated conc. (mg/mL) in *n*-Heptane

Analyte	Std. 1	Std. 2	Std. 3	Std. 4
Cyclohexane	50	20	5	1
<i>o</i> -Xylene	40	10	2.5	0.5
1-Methyl naphthalene	40	10	2.5	0.2
Phenanthrene	4	2	0.5	0.1



ASTM D6751 & ASTM D5453 Sulfur as Di-n-butyl sulfide in Biodiesel

Sulfur in Biodiesel 5%

ppm (µg/g)	% Wt.	Cat. No.	100 mL
0	0	BF-5453-B5-BL	
5	0.0005	BF-5453-B5-5X-SET	2 x 100 mL
10	0.001	BF-5453-B5-10X-SET	2 x 100 mL
15	0.0015	BF-5453-B5-15X-SET	2 x 100 mL
30	0.003	BF-5453-B5-30X	
50	0.005	BF-5453-B5-50X	
75	0.0075	BF-5453-B5-75X	
100	0.01	BF-5453-B5-100X	
200	0.02	BF-5453-B5-200X	
500	0.05	BF-5453-B5-500X	

Sulfur in Biodiesel 100%

ppm (µg/g)	% Wt.	Cat. No.	100 mL
0	0	BF-5453-B100-BL	
5	0.0005	BF-5453-B100-5X-SET	2 x 100 mL
10	0.001	BF-5453-B100-10X-SET	2 x 100 mL
15	0.0015	BF-5453-B100-15X-SET	2 x 100 mL
30	0.003	BF-5453-B100-30X	
50	0.005	BF-5453-B100-50X	
75	0.0075	BF-5453-B100-75X	
100	0.01	BF-5453-B100-100X	
200	0.02	BF-5453-B100-200X	
500	0.05	BF-5453-B100-500X	

Sulfur in Biodiesel 20%

0	0	BF-5453-B20-BL	
5	0.0005	BF-5453-B20-5X-SET	2 x 100 mL
10	0.001	BF-5453-B20-10X-SET	2 x 100 mL
15	0.0015	BF-5453-B20-15X-SET	2 x 100 mL
30	0.003	BF-5453-B20-30X	
50	0.005	BF-5453-B20-50X	
75	0.0075	BF-5453-B20-75X	
100	0.01	BF-5453-B20-100X	
200	0.02	BF-5453-B20-200X	
500	0.05	BF-5453-B20-500X	

Technical Note

The 5, 10 and 15 ppm sulfurs are supplied as a set including a blank. We suggest using the blank for analysis to compensate for matrix interferences, such as low levels of native sulfur.

Technical Note

All products are refinery grade stock, unless specifically marked consumer grade.

Note: 10,000 ppm = 1% Wt.

As the matrix may contain some native sulfur, AccuStandard encourages purchasing sulfur blanks for calibration analysis

Physical Standards

Compound	Conc.	Matrix	Cat. No.	Unit
ASTM D2500				
Cloud Point	-16 °C *	B5	BF-D-2500-B5	200 mL
	-14 °C *	B20	BF-D-2500-B20	200 mL
	-1 °C *	B100	BF-D-2500-B100	200 mL
ASTM D93 / EN-ISO 3679				
Flash Point	60 °C *		BF-D-93-60C	200 mL
	65 °C *		BF-D-93-65C	200 mL
	140 °C *		BF-D-93-140C	200 mL
ASTM D4951 / EN 14107				
Phosphorus Content	0.001 % Wt.	B100	BF-D-4951-B100	100 g
ASTM D6304 / EN ISO 12937				
(KF) Water Content	60 µg/g		BF-KF-0.6X-5ML-VAP	10 x 5 mL
	100 µg/g		BF-KF-1X-5ML-VAP	10 x 5 mL
	1000 µg/g		BF-KF-10X-5ML-VAP	10 x 5 mL
	5000 µg/g		BF-KF-50X-5ML-VAP	10 x 5 mL
ASTM D6751 / UOP 391 / EN 14108 / EN 14109				
Sodium / Potassium	100 ppm	B100	BF-UOP-391-B100	100 g
EN 14538				
Calcium / Magnesium	100 ppm	B100	BF-14538-B100	100 g

* These are nominal values and the actual value will be recorded on the certificate.



AccuStandard stands for accuracy in Cloud Points.

UOP (Universal Oil Products) methods were developed to facilitate the refining industry in analyzing refinery feeds, products and process streams for composition, purity and physical and chemical properties. In addition to the products listed below, AccuStandard can custom formulate products to fit your exact needs. Please contact our Technical Service Department for additional information.

UOP Method 543 Standard

Non-Aromatic Hydrocarbons in High-Purity Aromatics by GC.

UOP-M-543-PAK 5 x 1 mL
At stated Wt./Wt.% 2 comps.

	Wt./Wt. %
n-Dodecane	70
Toluene	30

UOP Method 551 Standard

Hexanes and Lower-Boiling Hydrocarbons in Olefin-Free Gasolines by GC. May also be used for UOP Method 690 - Octanes and Lower Boiling Hydrocarbons in Olefin-Free Gasolines by GC.

UOP-M-551-PAK 5 x 1 mL
Equal Mass % 7 comps.

n-Hexane	o-Xylene
Benzene	m-Xylene
Toluene	p-Xylene
Ethylbenzene	

UOP Method 660 Standard

UOP-M-660-PAK 5 x 1 mL

1% in Water

UOP-M-660-10X-PAK 5 x 1 mL

10% in Water

UOP-M-660-0.1X-PAK 5 x 1 mL

1000 ppm in Water

Tetramethylene sulfone

UOP Method 720 Standard

Impurities in High Purity p-Xylene by GC.

UOP-M-720-PAK 5 x 1 mL
At stated Mass % 5 comps.

	Mass %
o-Xylene	0.1
m-Xylene	0.1
Ethylbenzene	0.1
n-Undecane	1.0
p-Xylene	98.7

UOP Method 744 Standard

Aromatics in Hydrocarbons by GC.

UOP-M-744-PAK 5 x 1 mL
At stated Wt./Wt.% 8 comps.

	Wt./Wt. %
n-Heptane	25
Benzene	15
Toluene	20
m-Xylene	6.7
o-Xylene	6.6
p-Xylene	6.7
o-Ethyltoluene	10
1,2,3,4-Tetramethylbenzene	10

UOP Method 831 Standard

UOP-M-831-PAK

10 µg/g each in Sulfolane

5 x 1 mL

5 comps.

Benzene	Isopropylbenzene
Toluene	n-Nonane
Ethylbenzene	

UOP Method 868 Standard

Trace Saturates in High Purity Aromatics by GC.

UOP-M-868-PAK 5 x 1 mL
Stated conc. in Toluene 10 comps.

	µg/g
n-Butylcyclohexane	500
n-Propylcyclohexane	400
n-Decane	500
n-Nonane	500
n-Octane	300
n-Hexane	100
Ethylcyclohexane	300
Cyclohexane	100
n-Heptane	200
Methylcyclohexane	200

UOP Method 931 Standard

Trace Impurities in Mixed Xylenes by GC.

UOP-M-931-PAK 5 x 1 mL
At stated Wt./Wt.% 5 comps.

	Wt./Wt. %
Benzene	2.0
Toluene	2.0
o-Ethyltoluene	2.0
n-Undecane	2.0
n-Heptane	92.0

Skinner List for Refinery Waste

Semi-Volatiles

Base/Neutral Extractables

M-005B		1 x 1 mL
M-005B-PAK	SAVE	5 x 1 mL
<i>0.2 mg/mL each in CH₂Cl₂</i>		
M-005B-10X		1 x 1 mL
M-005B-10X-PAK	SAVE	5 x 1 mL
<i>2.0 mg/mL each in CH₂Cl₂</i>		
27 comps.		
Anthracene	7,12-Dimethylbenz[a]anthracene	
Benzo[a]anthracene	Dimethyl phthalate	
Benzo[b]fluoranthene	Di- <i>n</i> -butyl phthalate	
Benzo[k]fluoranthene	Di- <i>n</i> -octyl phthalate	
Benzo[a]pyrene	Indene	
bis(2-Ethylhexyl)phthalate	Fluoranthene	
Butyl benzyl phthalate	6-Methylchrysene	
Chrysene	1-Methylnaphthalene	
Dibenz[a,h]acridine	Naphthalene	
Dibenz[a,h]anthracene	Phenanthrene	
<i>o</i> -Dichlorobenzene	Pyrene	
<i>m</i> -Dichlorobenzene	Pyridine	
<i>p</i> -Dichlorobenzene	Quinoline	
Diethyl phthalate		

Acid Extractables

M-005A		1 x 1 mL
M-005A-PAK	SAVE	5 x 1 mL
<i>0.2 mg/mL each in CH₂Cl₂</i>		
M-005A-10X		1 x 1 mL
M-005A-10X-PAK	SAVE	5 x 1 mL
<i>2.0 mg/mL each in CH₂Cl₂</i>		
8 comps.		
<i>o</i> -Cresol	2,4-Dinitrophenol	
<i>m</i> -Cresol	4-Nitrophenol	
<i>p</i> -Cresol	Phenol	
2,4-Dimethylphenol	Thiophenol	

Volatiles

M-005V		1 x 1 mL
M-005V-PAK	SAVE	5 x 1 mL
<i>0.2 mg/mL each in MeOH</i>		
M-005V-10X		1 x 1 mL
M-005V-10X-PAK	SAVE	5 x 1 mL
<i>2.0 mg/mL each in MeOH</i>		
14 comps.		
Benzene	Ethylene dibromide	
Carbon disulfide	Methyl ethyl ketone	
Chlorobenzene	Styrene	
Chloroform	Toluene	
1,2-Dichloroethane	<i>o</i> -Xylene	
1,4-Dioxane	<i>m</i> -Xylene	
Ethyl benzene	<i>p</i> -Xylene	

Resolution Check for Fire Debris Analysis

ASTM E1387 Resolution Check Mix

ASTM-E1387		1 x 1 mL
ASTM-E1387-PAK	SAVE	5 x 1 mL
<i>2.0 mg/mL each in CH₂Cl₂</i>		
13 comps.		
Decane	Hexadecane	Tetradecane
Dodecane	Hexane	Toluene
Eicosane	Octadecane	1,2,4-Trimethylbenzene
2-Ethyltoluene	Octane	<i>p</i> -Xylene
3-Ethyltoluene		

ASTM E1618 Test Mix for Fire Debris Analysis

ASTM-E1618		1 x 1 mL
ASTM-E1618-PAK	SAVE	5 x 1 mL
<i>0.05% v/v (0.50 µL/mL) each in CH₂Cl₂</i>		
13 comps.		
<i>n</i> -Decane	<i>n</i> -Hexadecane	<i>n</i> -Tetradecane
<i>n</i> -Dodecane	<i>n</i> -Hexane	Toluene
<i>n</i> -Eicosane	<i>n</i> -Octadecane	1,2,4-Trimethylbenzene
<i>o</i> -Ethyltoluene	<i>n</i> -Octane	<i>p</i> -Xylene
<i>m</i> -Ethyltoluene		



ASTM, EN and other test methods have been developed to monitor the properties (physical and chemical), constituent distribution, impurities and suitability of use.

The source materials that are used to produce these fuels vary from plant oils, ethyl alcohol (usually from corn) and even waste products.

Biodiesel refineries have opened all over the world.

- The Minister for the Environment and Heritage of Australia has signed the Fuel Standard (Biodiesel) in 2006 which sets out the physical and chemical parameters with the associated test methods to determine compliance.
- In Germany the sale of biodiesel in gas stations is over 2 million cubic meters.
- In the USA, some state legislatures have mandated 2% biodiesel content in all diesels sold in those states.

ASTM D6584 / EN 14105 Free and Total Glycerin in Biodiesel by GC

Compound	Qty. /	Conc.	Matrix	Cat. No.	Unit
Glycerin	0.5	mg/mL	Pyridine	BF-D-6584-01	2 mL
Monoolein	5	mg/mL	Pyridine	BF-D-6584-02	2 mL
1,3-Diolein	5	mg/mL	Pyridine	BF-D-6584-03	2 mL
Triolein	5	mg/mL	Pyridine	BF-D-6584-04	2 mL
(S)-(-)-1,2,4-Butanetriol	1	mg/mL	Pyridine	BF-D-6584-05-IS	5 mL
Tricaprin	8	mg/mL	Pyridine	BF-D-6584-06	5 mL
MSTFA	5	mL	Neat	BF-D-6584-07N	5 mL
Set of 7 above compounds				BF-D-6584-SET	7 units
Mix of above compounds, on right (MSTFA separate)					
Biofuel 20	0.5	mg/mL	CH ₂ Cl ₂	BF-FU-030-D	2 mL
	20	mg/mL	CH ₂ Cl ₂	BF-FU-030-D-40X	2 mL
Biofuel 100 Consumer grade	0.5	mg/mL	CH ₂ Cl ₂	BF-FU-029-D	2 mL
	20	mg/mL	CH ₂ Cl ₂	BF-FU-029-40X	2 mL
Biofuel 100	0.5	mg/mL	CH ₂ Cl ₂	BF-FU-032-D	2 mL
	20	mg/mL	CH ₂ Cl ₂	BF-FU-032-D-40X	2 mL

ASTM D6584 Mixture

BF-D-6584-MIX 1 x 5 mL
At stated conc. in Pyridine 6 comps.

Glycerol	0.5 mg/mL
Monoolein	5 mg/mL
1,3-Diolein	5 mg/mL
Triolein	5 mg/mL
Triolein (Olein)	5 mg/mL
(S)-(-)-1,2,4-Butanetriol	1 mg/mL
Tricaprin	8 mg/mL

Note: MSTFA (BF-D-6584-07N) can be ordered separately.

EN 14103 Fatty Acid Methyl Esters (FAMES)

The methyl esters in the mixture are those derived from typical glycerides present in biomass sources.

Soy & Corn

BF-SOY-ME	100 mg
16:0 Palmitate	6% Wt.
18:0 Stearate	3% Wt.
20:0 Arachidate	3% Wt.
18:1 Oleate	35% Wt.
18:2 Linoleate	50% Wt.
18:3 Linolenate	3% Wt.

Palm Kernel

BF-PALM-ME	100 mg
8:0 Caprylate	7% Wt.
10:0 Caprate	5% Wt.
12:0 Laurate	48% Wt.
14:0 Myristate	15% Wt.
16:0 Palmitate	7% Wt.
18:0 Stearate	3% Wt.
18:1 Oleate	12% Wt.
18:2 Linoleate	3% Wt.

Percent Methanol Calibration Standard Set (EN 14110)

BF-MEOH-SET	5 x 1 mL
BF-MEOH-1X (100 µg/g)	BF-MEOH-25X (2500 µg/g)
BF-MEOH-5X (500 µg/g)	BF-MEOH-50X (5000 µg/g)
BF-MEOH-10X (1000 µg/g)	

Methanol in Water

Rapeseed Oil

BF-RAP-ME	100 mg
14:0 Myristate	1% Wt.
16:0 Palmitate	4% Wt.
18:0 Stearate	3% Wt.
20:0 Arachidate	3% Wt.
22:0 Behenate	3% Wt.
24:0 Lignocerate	3% Wt.
18:1 Oleate	60% Wt.
22:1 Erucate	5% Wt.
18:2 Linoleate	12% Wt.
18:3 Linolenate	5% Wt.
20:1 Eicosenoate	1% Wt.

Beef Tallow & Palm Oil

BF-BT-ME	100 mg
14:0 Myristate	2% Wt.
16:0 Palmitate	30% Wt.
16:1 Palmitoleate	3% Wt.
18:0 Stearate	14% Wt.
18:1 Oleate	41% Wt.
18:2 Linoleate	7% Wt.
18:3 Linolenate	3% Wt.

Technical Note

All products are refinery grade stock, unless specifically marked consumer grade.

Technical Note

Individual Mixes packaged under Nitrogen for stability.



Fatty Acid Ethyl Esters (FAEEs)

Ethyl Esters in Soy & Corn

BF-SOY-EE	100 mg
16:0 Ethyl palmitate	6% Wt.
18:0 Ethyl stearate	3% Wt.
20:0 Ethyl arachidate	3% Wt.
18:1 Ethyl oleate	35% Wt.
18:2 Ethyl linoleate	50% Wt.
18:3 Ethyl linolenate	3% Wt.

Ethyl Esters in Palm Kernel Oil

BF-PALM-EE	100 mg
8:0 Ethyl caprylate	7% Wt.
10:0 Ethyl caprate	5% Wt.
12:0 Ethyl laurate	48% Wt.
14:0 Ethyl myristate	15% Wt.
16:0 Ethyl palmitate	7% Wt.
18:0 Ethyl stearate	3% Wt.
18:1 Ethyl oleate	12% Wt.
18:2 Ethyl linoleate	3% Wt.

Ethyl Esters in Rapeseed Oil

BF-RAP-EE	100 mg
14:0 Ethyl myristate	1% Wt.
16:0 Ethyl palmitate	4% Wt.
18:0 Ethyl stearate	3% Wt.
20:0 Ethyl arachidate	3% Wt.
22:0 Ethyl behenate	3% Wt.
24:0 Ethyl lignocerate	3% Wt.
18:1 Ethyl oleate	60% Wt.
22:1 Ethyl erucate	5% Wt.
18:2 Ethyl linoleate	12% Wt.
18:3 Ethyl linolenate	5% Wt.
20:1 Ethyl eicosenoate	1% Wt.

Ethyl Esters in Beef Tallow

BF-BT-EE	100 mg
14:0 Ethyl myristate	2% Wt.
16:0 Ethyl palmitate	30% Wt.
16:1 Ethyl palmitoleate	3% Wt.
18:0 Ethyl stearate	14% Wt.
18:1 Ethyl oleate	41% Wt.
18:2 Ethyl linoleate	7% Wt.
18:3 Ethyl linolenate	3% Wt.

Compound	Neat (100 mg) Cat. No.	Solution (10 mg/mL in Hexane) Cat. No.	1 mL
Ethyl palmitate (16:0)	FAEE-006N	FAEE-006S	
Ethyl stearate (18:0)	FAEE-007N	FAEE-007S	
Ethyl arachidate (20:0)	FAEE-008N	FAEE-008S	
Ethyl oleate (18:1)	FAEE-014N	FAEE-014S	
Ethyl linoleate (18:2)	FAEE-012N	FAEE-012S	
Ethyl linolenate (18:3)	FAEE-016N	FAEE-016S	
Ethyl myristate (14:0)	FAEE-005N	FAEE-005S	
Ethyl behenate (22:0)	FAEE-009N	FAEE-009S	
Ethyl lignocerate (24:0)	FAEE-010N	FAEE-010S	
Ethyl erucate (22:1)	FAEE-011N	FAEE-011S	
Ethyl caprylate (8:0)	FAEE-002N	FAEE-002S	
Ethyl caprate (10:0)	FAEE-003N	FAEE-003S	
Ethyl laurate (12:0)	FAEE-004N	FAEE-004S	
Ethyl palmitoleate (16:1)	FAEE-001N	FAEE-001S	
Ethyl nervonate (24:1)	FAEE-013N	FAEE-013S	
Ethyl heptadecanoate (17:0)	FAEE-015N	FAEE-015S	
Ethyl linolenate (gamma) (18:3)	FAEE-020N	FAEE-020S	

ASTM D6751 & ASTM D5453 Sulfur as Di-n-butyl sulfide in Biodiesel

Sulfur in Biodiesel 5%

ppm (µg/g)	% Wt.	Cat. No.	100 mL
0	0	BF-5453-B5-BL	
5	0.0005	BF-5453-B5-5X-SET	2 x 100 mL
10	0.001	BF-5453-B5-10X-SET	2 x 100 mL
15	0.0015	BF-5453-B5-15X-SET	2 x 100 mL
30	0.003	BF-5453-B5-30X	
50	0.005	BF-5453-B5-50X	
75	0.0075	BF-5453-B5-75X	
100	0.01	BF-5453-B5-100X	
200	0.02	BF-5453-B5-200X	
500	0.05	BF-5453-B5-500X	

Sulfur in Biodiesel 100%

ppm (µg/g)	% Wt.	Cat. No.	100 mL
0	0	BF-5453-B100-BL	
5	0.0005	BF-5453-B100-5X-SET	2 x 100 mL
10	0.001	BF-5453-B100-10X-SET	2 x 100 mL
15	0.0015	BF-5453-B100-15X-SET	2 x 100 mL
30	0.003	BF-5453-B100-30X	
50	0.005	BF-5453-B100-50X	
75	0.0075	BF-5453-B100-75X	
100	0.01	BF-5453-B100-100X	
200	0.02	BF-5453-B100-200X	
500	0.05	BF-5453-B100-500X	

Sulfur in Biodiesel 20%

0	0	BF-5453-B20-BL	
5	0.0005	BF-5453-B20-5X-SET	2 x 100 mL
10	0.001	BF-5453-B20-10X-SET	2 x 100 mL
15	0.0015	BF-5453-B20-15X-SET	2 x 100 mL
30	0.003	BF-5453-B20-30X	
50	0.005	BF-5453-B20-50X	
75	0.0075	BF-5453-B20-75X	
100	0.01	BF-5453-B20-100X	
200	0.02	BF-5453-B20-200X	
500	0.05	BF-5453-B20-500X	

Technical Note

The 5, 10 and 15 ppm sulfurs are supplied as a set including a blank. We suggest using the blank for analysis to compensate for matrix interferences, such as low levels of native sulfur.

Technical Note

All products are refinery grade stock, unless specifically marked consumer grade.

Note: 10,000 ppm = 1% Wt.



Physical Standards

Compound	Conc.	Matrix	Cat. No.	Unit
ASTM D2500				
Cloud Point	-16 °C *	B5	BF-D-2500-B5	200 mL
	-14 °C *	B20	BF-D-2500-B20	200 mL
	-1 °C *	B100	BF-D-2500-B100	200 mL
ASTM D93 / EN-ISO 3679				
Flash Point	60 °C *		BF-D-93-60C	200 mL
	65 °C *		BF-D-93-65C	200 mL
	140 °C *		BF-D-93-140C	200 mL
ASTM D4951 / EN 14107				
Phosphorus Content	0.001 % Wt.	B100	BF-D-4951-B100	100 g
ASTM D6304 / EN ISO 12937				
(KF) Water Content	60 µg/g		BF-KF-0.6X-5ML-VAP	10 x 5 mL
	100 µg/g		BF-KF-1X-5ML-VAP	10 x 5 mL
	1000 µg/g		BF-KF-10X-5ML-VAP	10 x 5 mL
	5000 µg/g		BF-KF-50X-5ML-VAP	10 x 5 mL
ASTM D6751 / UOP 391 / EN 14108 / EN 14109				
Sodium / Potassium	100 ppm	B100	BF-UOP-391-B100	100 g
EN 14538				
Calcium / Magnesium	100 ppm	B100	BF-14538-B100	100 g

* These are nominal values and the actual value will be recorded on the certificate.

EN 14214 Wear Metals

Each is 100 grams at 500 µg/g concentration.

Compound	Matrix	Cat. No.	100 grams
Aluminum	B100	BF-WM-B100-01-0.5X	
Calcium	B100	BF-WM-B100-09-0.5X	
Chromium	B100	BF-WM-B100-13-0.5X	
Copper	B100	BF-WM-B100-15-0.5X	
Iron	B100	BF-WM-B100-27-0.5X	
Lead	B100	BF-WM-B100-29-0.5X	
Magnesium	B100	BF-WM-B100-32-0.5X	
Phosphorus	B100	BF-WM-B100-41-0.5X	
Potassium	B100	BF-WM-B100-43-0.5X	
Sodium	B100	BF-WM-B100-54-0.5X	
Zinc	B100	BF-WM-B100-70-0.5X	

Biofuel Blank

B100

BF-WM-B100-BL-1	100 g
BF-WM-B100-BL-5	500 g

Biofuel Metals Mix

Multi-Element Biofuel Standard

BF-WM-B100-MIX1	100 g
200 µg/g each in B100	5 comps.

Ca (Calcium)	Na (Sodium)
K (Potassium)	P (Phosphorus)
Mg (Magnesium)	



AccuStandard stands for accuracy in Cloud Points.

Technical Note

Formulations for EN 12916, other methods and custom formulations are available.

Technical Note

Algae, as a biofuel feedstock, yields energy balances higher than even soybeans. (source: "Widescale Biodiesel Production from Algae", Briggs, Michael, University of New Hampshire Biodiesel Group, UNH (revised August 2004) page 8.

Technical Note

"Liquid biofuels have been used since the early days of the car industry. Nikolaus August Otto, the German inventor of the combustion engine, conceived his invention to run on ethanol. Rudolf Diesel, the German inventor of the Diesel engine, designed it to run on peanut oil. Henry Ford originally designed the Ford Model T, a car produced from 1903 to 1926, to run completely on ethanol." (source: <http://en.wikipedia.org/wiki/Biofuel> Retrieved 8/31/2007).



TPH & Fuel & Hydrocarbons

Petroleum is a broadly defined class of liquid hydrocarbon mixtures that are used in a large variety of products for many different uses. In general, they are oil-based products that can be obtained by distillation and are normally used outside the refining industry. Petroleum products include aviation gasoline, motor gasoline, jet fuels, kerosene, gas/diesel oil, heavy fuel oil, naphtha, and lubricants among others.

Most analytical methods for petroleum products focus on the level of benzene, toluene, ethyl benzene and xylene (BTEX), the total petroleum hydrocarbon number (TPH) and the finger print of the petroleum product.

Individual Fuel and Hydrocarbons

Compound	Conc.	Matrix	Cat. No.	1 mL	Compound	Conc.	Matrix	Cat. No.	1 mL
5-alpha Androstane 438-22-2	1 mg/mL	CH ₂ Cl ₂	GRH-IS		#6 Fuel Oil 68553-00-4	0.5 mg/mL	Hexane	FU-008	
Arctic Diesel	10 mg/mL	CH ₂ Cl ₂	GRH-IS-10X			20 mg/mL	Hexane	FU-008-40X	
	0.5 mg/mL	MeOH	FU-023			20 mg/mL	CH ₂ Cl ₂	FU-008-D-40X	
	20 mg/mL	MeOH	FU-023-40X		Gasoline Regular, unleaded	0.5 mg/mL	MeOH	GA-001	
	20 mg/mL	CH ₂ Cl ₂	FU-023-D-40X			5 mg/mL	MeOH	GA-001-10X	
Aviation (gas) (grade 100-LL)	0.5 mg/mL	MeOH	GA-004			20 mg/mL	MeOH	GA-001-40X	
	20 mg/mL	MeOH	GA-004-40X			20 mg/mL	CH ₂ Cl ₂	GA-001-D-40X	
	20 mg/mL	CH ₂ Cl ₂	GA-004-D-40X		Gasoline Premium	0.5 mg/mL	MeOH	GA-003	
Biodiesel 20	0.5 mg/mL	CH ₂ Cl ₂	FU-030-D			20 mg/mL	MeOH	GA-003-40X	
	20 mg/mL	CH ₂ Cl ₂	FU-030-D-40X			20 mg/mL	CH ₂ Cl ₂	GA-003-D-40X	
Biodiesel 100	0.5 mg/mL	CH ₂ Cl ₂	FU-029-D		Hydraulic Fluid 64742-54-7	0.5 mg/mL	Hexane	FU-020-H	
	20 mg/mL	CH ₂ Cl ₂	FU-029-D-40X			20 mg/mL	Hexane	FU-020-H-40X	
Biodiesel 100 (refinery grade)	0.5 mg/mL	CH ₂ Cl ₂	FU-032-D			20 mg/mL	CH ₂ Cl ₂	FU-020-D-40X	
	20 mg/mL	CH ₂ Cl ₂	FU-032-D-40X		Jet Reference Fuel Type I	0.5 mg/mL	MeOH	FU-011	
p-Bromofluorobenzene 460-00-4	2.5 mg/mL	Acetone	GARH-SS			20 mg/mL	MeOH	FU-011-40X	
1-Chloro-4-fluorobenzene 352-33-0	2 mg/mL	MeOH	AK-101.0-IS-10X			20 mg/mL	CH ₂ Cl ₂	FU-011-D-40X	
1-Chlorooctadecane 3386-33-2	1 mg/mL	Hexane	DRH-007-SS		JP-4 Jet Fuel (weathered)	0.5 mg/mL	MeOH	FU-010	
						20 mg/mL	MeOH	FU-010-40X	
1-Chloro-4-fluorobenzene 352-33-0	1 mg/mL	CH ₂ Cl ₂	GARH-IS			20 mg/mL	CH ₂ Cl ₂	FU-010-D-40X	
2,5-Dibromotoluene 615-59-8	50 µg/mL	MeOH	GRH-004-SS		JP-5 Fuel	0.5 mg/mL	MeOH	FU-012	
	500 µg/mL	MeOH	GRH-004-SS-10X			20 mg/mL	MeOH	FU-012-40X	
	5 mg/mL	MeOH	GRH-004-SS-100X			20 mg/mL	CH ₂ Cl ₂	FU-012-D-40X	
Diesel	0.5 mg/mL	MeOH	FU-009		JP-7 Fuel	0.5 mg/mL	MeOH	FU-014	
	5 mg/mL	CH ₂ Cl ₂	FU-009-D-10X			20 mg/mL	MeOH	FU-014-40X	
	20 mg/mL	MeOH	FU-009-40X			20 mg/mL	CH ₂ Cl ₂	FU-014-D-40X	
	20 mg/mL	CH ₂ Cl ₂	FU-009-D-40X		JP-8 Fuel	0.5 mg/mL	MeOH	FU-015	
#1 Diesel - Low Sulfur	0.5 mg/mL	MeOH	FU-013			20 mg/mL	MeOH	FU-015-40X	
	20 mg/mL	MeOH	FU-013-40X			20 mg/mL	CH ₂ Cl ₂	FU-015-D-40X	
	20 mg/mL	CH ₂ Cl ₂	FU-013-D-40X		JP-TS Aviation Fuel 64742-47-8	0.5 mg/mL	MeOH	FU-016	
#2 Diesel 68334-30-5	50 mg/mL	Acetone	AK-102-LCS-R1-10X			20 mg/mL	MeOH	FU-016-40X	
#2 Diesel (Extra Low Sulfur) 68476-43-6	0.5 mg/mL	MeOH	FU-017		JP-10 Aviation Fuel 2825-82-3	0.5 mg/mL	MeOH	FU-022	
	5 mg/mL	CH ₂ Cl ₂	FU-017-D-10X			20 mg/mL	MeOH	FU-022-40X	
	5 mg/mL	Acetone	AK-102.0-LCS			20 mg/mL	CH ₂ Cl ₂	FU-022-D-40X	
	50 mg/mL	Acetone	AK-102.0-LCS-10X		Kerosene 25% Weathered	5 mg/mL	CH ₂ Cl ₂	FK-W25-10X	
	20 mg/mL	MeOH	FU-017-40X		Kerosene 50% Weathered	5 mg/mL	CH ₂ Cl ₂	FK-W50-10X	
	20 mg/mL	CH ₂ Cl ₂	FU-017-D-40X		Kerosene 75% Weathered	5 mg/mL	CH ₂ Cl ₂	FK-W75-10X	
#2 Diesel (Low Sulfur) 25% Weathered	5 mg/mL	CH ₂ Cl ₂	FD2-W25-10X		Kerosene 8008-20-6	0.5 mg/mL	MeOH	FU-005	
#2 Diesel (Low Sulfur) 50% Weathered	5 mg/mL	CH ₂ Cl ₂	FD2-W50-10X			20 mg/mL	MeOH	FU-005-40X	
#2 Diesel (Low Sulfur) 75% Weathered	5 mg/mL	CH ₂ Cl ₂	FD2-W75-10X			5 mg/mL	CH ₂ Cl ₂	FU-005-D-10X	
#2 Diesel 25% Weathered	5 mg/mL	CH ₂ Cl ₂	FD2-W25-R1-10X			20 mg/mL	CH ₂ Cl ₂	FU-005-D-40X	
#2 Diesel 50% Weathered	5 mg/mL	CH ₂ Cl ₂	FD2-W50-R1-10X		Lacquer Thinner	1 gram	Neat	HS-001N	
#2 Diesel 75% Weathered	5 mg/mL	CH ₂ Cl ₂	FD2-W75-R1-10X			0.5 mg/mL	MeOH	HS-001S	
Docosane 629-97-0	50 % w/w	Toluene	D-5186-91-PM			20 mg/mL	MeOH	HS-001S-40X	
n-Dodecane 112-40-3	5 mg/mL	MeOH	AS-E0238			20 mg/mL	CH ₂ Cl ₂	HS-001S-D-40X	
	1.5 % w/w	Isooctane	M-GRA-SCS-AS		Mineral Spirits 8030-30-6	1 gram	Neat	HS-002N	
#1 Fuel oil 70892-10-3	0.5 mg/mL	MeOH	FU-001			0.5 mg/mL	MeOH	HS-002S	
	20 mg/mL	MeOH	FU-001-40X			20 mg/mL	MeOH	HS-002S-40X	
	20 mg/mL	CH ₂ Cl ₂	FU-001-D-40X			20 mg/mL	CH ₂ Cl ₂	HS-002S-D-40X	
#2 Fuel oil 68476-30-2	0.5 mg/mL	MeOH	FU-002		Naphtha 64742-89-8	1 gram	Neat	HS-003N	
	20 mg/mL	MeOH	FU-002-40X			0.5 mg/mL	MeOH	HS-003S	
	20 mg/mL	CH ₂ Cl ₂	FU-002-D-40X			20 mg/mL	MeOH	HS-003S-40X	
#3 Fuel oil	0.5 mg/mL	Hexane	FU-003			20 mg/mL	CH ₂ Cl ₂	HS-003S-D-40X	
	20 mg/mL	Hexane	FU-003-40X		Nonatriacontane 7194-86-7	750 µg/mL	Chloroform	DRH-FL-SS-R1	
	20 mg/mL	CH ₂ Cl ₂	FU-003-D-40X			1 mg/mL	CS ₂	DRH-FL-SS	
#4 Fuel oil 68476-31-3	0.5 mg/mL	Hexane	FU-004			3 mg/mL	CS ₂	DRH-FL-SS-3X	
	20 mg/mL	Hexane	FU-004-40X		n-Pentadecane 629-62-9	5 mg/mL	MeOH	AS-E0241	
	20 mg/mL	CH ₂ Cl ₂	FU-004-D-40X		RFA Gasoline (oxygenate-free)	0.5 mg/mL	MeOH	GA-005	
						20 mg/mL	MeOH	GA-005-40X	
						20 mg/mL	CH ₂ Cl ₂	GA-005-D-40X	
					Regular Leaded Gasoline	0.5 mg/mL	MeOH	GA-002	
						20 mg/mL	MeOH	GA-002-40X	
						20 mg/mL	CH ₂ Cl ₂	GA-002-D-40X	

TPH & Fuel & Hydrocarbons



Individual Fuel and Hydrocarbons

Compound	Conc.	Matrix	Cat. No.	1 mL	Compound	Conc.	Matrix	Cat. No.	1 mL
SAE 5W30 Motor oil	0.5 mg/mL	Hexane	FU-025-H		o-Terphenyl 84-15-1	200 µg/mL	Acetone	AK-102.0-SS	
	20 mg/mL	Hexane	FU-025-H-40X			1 mg/mL	CH ₂ Cl ₂	DRH-006-SS	
	20 mg/mL	CH ₂ Cl ₂	FU-025-D-40X			2 mg/mL	Acetone	AK-102.0-SS-10X	
SAE 10W30 Motor oil	0.5 mg/mL	Hexane	FU-026-H			2 mg/mL	Acetone	GRH-SS	
	20 mg/mL	Hexane	FU-026-H-40X		n-Tetradecane 629-59-4	5 mg/mL	MeOH	AS-E0240	
	20 mg/mL	CH ₂ Cl ₂	FU-026-D-40X						
SAE 10W40 Motor oil	0.5 mg/mL	Hexane	FU-027-H		Tetracosane (5 mL) 646-31-1	500 µg/mL	CS ₂	D-5480-C40-5ML	
	20 mg/mL	Hexane	FU-027-H-40X			500 µg/mL	Chloroform	D-5480-C40-R1-5ML	
	20 mg/mL	CH ₂ Cl ₂	FU-027-D-40X		n-Tridecane 629-50-5	5 mg/mL	MeOH	AS-E0239	
SAE 20W50 Motor oil	0.5 mg/mL	Hexane	FU-028-H		1,2,3-Trimethylbenzene 526-73-8	1 mg/mL	CH ₂ Cl ₂	V-028S-D-10X	
	20 mg/mL	Hexane	FU-028-H-40X						
	20 mg/mL	CH ₂ Cl ₂	FU-028-D-40X		n-Triacontane-d ₆₂ 93952-07-9	500 µg/mL	Acetone	AK-103.0-SS	
SAE 30W Motor oil	0.5 mg/mL	Hexane	FU-018-H			5 mg/mL	Acetone:THF	AK-103.0-SS-10X	
	20 mg/mL	Hexane	FU-018-H-40X			5 mg/mL	THF	DRH-SS	
	20 mg/mL	CH ₂ Cl ₂	FU-018-D-40X		Turbine (Jet) fuel	0.5 mg/mL	MeOH	FU-006	
SAE 40W Motor oil	0.5 mg/mL	Hexane	FU-019-H			20 mg/mL	MeOH	FU-006-40X	
	5 mg/mL	Acetone	AK-103.0-LCS			20 mg/mL	CH ₂ Cl ₂	FU-006-D-40X	
	20 mg/mL	Hexane	FU-019-H-40X			1 gram	Neat	HS-004N	
	20 mg/mL	CH ₂ Cl ₂	FU-019-D-40X		Turpentine 8006-64-2	0.5 mg/mL	MeOH	HS-004S	
	25 mg/mL	Acetone:CH ₂ Cl ₂	AK-103.0-LCS-5X			20 mg/mL	MeOH	HS-004S-40X	
SAE 50W Motor oil	20 mg/mL	CH ₂ Cl ₂	FU-021-D-40X			20 mg/mL	MeOH	HS-004S-D-40X	
	1 gram	Neat	HS-005N			5 mg/mL	MeOH	GA-W25-10X	
Stoddard solvent 8052-41-3	0.5 mg/mL	MeOH	HS-005S		Unleaded Gasoline 25% Weathered				
	5 mg/mL	MeOH	HS-005S-10X		Unleaded Gasoline 50% Weathered	5 mg/mL	MeOH	GA-W50-10X	
	20 mg/mL	MeOH	HS-005S-40X		Unleaded Gasoline 75% Weathered	5 mg/mL	MeOH	GA-W75-10X	
	20 mg/mL	CH ₂ Cl ₂	HS-005S-D-40X						

Complete Set of Total Petroleum Hydrocarbon (TPH) Pattern Recognition Standards

AccuStandard has assembled the following sets to identify specific petroleum product types found during LUFT/LUST investigations. The sets can be purchased using one convenient Cat. No. or as individuals. **Other concentrations are listed on the next page.**

TPH-R2-SET

34 x 1 mL (includes TPH-001-R1-SET, TPH-002-R1-SET, TPH-003-SET, TPH-004-SET)

Motor Fuels & Lubricating Oils Set

TPH-001-R1-SET

13 x 1 mL

	mg/mL	Solv.	Cat. No.
Gasoline, regular unleaded	20	MeOH	GA-001-40X
Gasoline, regular leaded	20	MeOH	GA-002-40X
Gasoline, premium	20	MeOH	GA-003-40X
RFA Gasoline (oxygenate free)	20	MeOH	GA-005-40X
#2 Diesel (conventional)	20	CH ₂ Cl ₂	FU-009-D-40X
#1 Diesel (low sulfur)	20	CH ₂ Cl ₂	FU-013-D-40X
#2 Diesel (extra low sulfur)	20	CH ₂ Cl ₂	FU-017-D-40X
Arctic Diesel	20	CH ₂ Cl ₂	FU-023-D-40X
SAE 30W Motor oil	20	CH ₂ Cl ₂	FU-018-D-40X
SAE 40W Motor oil	20	CH ₂ Cl ₂	FU-019-D-40X
SAE 50W Motor oil	20	CH ₂ Cl ₂	FU-021-D-40X
Biodiesel 20	20	CH ₂ Cl ₂	FU-030-D-40X
Biodiesel 100 (consumer grade)	20	CH ₂ Cl ₂	FU-029-D-40X

Heating Fuel Oils Set

TPH-002-R1-SET

6 x 1 mL

	mg/mL	Solv.	Cat. No.
#1 Fuel oil	20	CH ₂ Cl ₂	FU-001-D-40X
#2 Fuel oil	20	CH ₂ Cl ₂	FU-002-D-40X
#3 Fuel oil	20	CH ₂ Cl ₂	FU-003-D-40X
#4 Fuel oil	20	CH ₂ Cl ₂	FU-004-D-40X
#6 Fuel oil	20	CH ₂ Cl ₂	FU-008-D-40X
Kerosene	20	CH ₂ Cl ₂	FU-005-D-40X

Aviation Fuels & Oils Set

TPH-003-SET

10 x 1 mL

	mg/mL	Solv.	Cat. No.
Aviation gasoline Grade 100 LL	20	CH ₂ Cl ₂	GA-004-D-40X
JP-4 Fuel (weathered)	20	CH ₂ Cl ₂	FU-010-D-40X
JP-5 Fuel	20	CH ₂ Cl ₂	FU-012-D-40X
JP-7 Fuel	20	CH ₂ Cl ₂	FU-014-D-40X
JP-8 Fuel	20	CH ₂ Cl ₂	FU-015-D-40X
JP-10 Fuel (Cruise Missile)	20	CH ₂ Cl ₂	FU-022-D-40X
JP-TS	20	CH ₂ Cl ₂	FU-016-D-40X
Jet Fuel (type 1)	20	CH ₂ Cl ₂	FU-011-D-40X
Turbine (Jet A) Fuel	20	CH ₂ Cl ₂	FU-006-D-40X
Hydraulic oil	20	CH ₂ Cl ₂	FU-020-D-40X

Household & Industrial Solvent Set

TPH-004-SET

5 x 1 mL

	mg/mL	Solv.	Cat. No.
Lacquer thinner	20	CH ₂ Cl ₂	HS-001S-D-40X
Mineral spirits	20	CH ₂ Cl ₂	HS-002S-D-40X
Naphtha	20	CH ₂ Cl ₂	HS-003S-D-40X
Turpentine	20	CH ₂ Cl ₂	HS-004S-D-40X
Stoddard solvent	20	CH ₂ Cl ₂	HS-005S-D-40X

Motor Oil Standards

	mg/mL	Solv.	Cat. No.
SAE 5W30 Motor oil	0.5	Hexane	FU-025-H
	20.0	Hexane	FU-025-H-40X
	20.0	CH ₂ Cl ₂	FU-025-D-40X
SAE 10W30 Motor oil	0.5	Hexane	FU-026-H
	20.0	Hexane	FU-026-H-40X
	20.0	CH ₂ Cl ₂	FU-026-D-40X
SAE 10W40 Motor oil	0.5	Hexane	FU-027-H
	20.0	Hexane	FU-027-H-40X
	20.0	CH ₂ Cl ₂	FU-027-D-40X

	mg/mL	Solv.	Cat. No.
SAE 20W50 Motor oil	0.5	Hexane	FU-028-H
	20.0	Hexane	FU-028-H-40X
	20.0	CH ₂ Cl ₂	FU-028-D-40X
Composite Standard	20.0	CH ₂ Cl ₂	MO-COMP-D-40X

Individual Fuels and Hydrocarbons continued on next page



TPH & Fuel & Hydrocarbons

AccuStandard designed the weathered fuel line to mimic the weathering, evaporation, and migration process. Use of these standards can help in the identification of the fuel type if it has been present in the ground for some time, in a sandy type soil with possible evaporation loss, or has migrated from the plume point of origin.

Weathered LUFT/LUST Fuel Sets

Weathered Gasoline Set

WGA-SET	Each in 5.0 mg/mL in MeOH	Cat. No.	4 x 1 mL
Gasoline, regular unleaded		GA-001-10X	1 mL
Gasoline, regular unleaded (25% Weathered)		GA-W25-10X	1 mL
Gasoline, regular unleaded (50% Weathered)		GA-W5-10X	1 mL
Gasoline, regular unleaded (75% Weathered)		GA-W75-10X	1 mL

Weathered Kerosene Set

WFK-SET	Each in 5.0 mg/mL in CH ₂ Cl ₂		4 x 1 mL
Kerosene		FU-005-D-10X	1 mL
Kerosene (25% Weathered)		FK-W25-10X	1 mL
Kerosene (50% Weathered)		FK-W50-10X	1 mL
Kerosene (75% Weathered)		FK-W75-10X	1 mL

Weathered #2 Diesel (extra Low Sulfur Content) Set

WFD2-SET	Each in 5.0 mg/mL in CH ₂ Cl ₂		4 x 1 mL
#2 Diesel (extra Low Sulfur)		FU-017-D-10X	1 mL
#2 Diesel (extra Low Sulfur) (25% Weathered)		FD2-W25-10X	1 mL
#2 Diesel (extra Low Sulfur) (50% Weathered)		FD2-W50-10X	1 mL
#2 Diesel (extra Low Sulfur) (75% Weathered)		FD2-W75-10X	1 mL

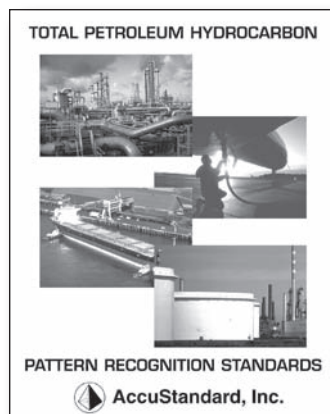
Weathered #2 Diesel (Conventional) Set

WFD2-R1-SET	Each in 5.0 mg/mL in CH ₂ Cl ₂		4 x 1 mL
#2 Diesel (Conventional)		FU-009-D-10X	1 mL
#2 Diesel (Conventional) (25% Weathered)		FD2-W25-R1-10X	1 mL
#2 Diesel (Conventional) (50% Weathered)		FD2-W50-R1-10X	1 mL
#2 Diesel (Conventional) (75% Weathered)		FD2-W75-R1-10X	1 mL

Technical Note

Petroleum Products contain many different chemicals, plus synthetic product additives. Typically, these petroleum products are subdivided into two groups based on their volatility: [a] gasoline related products (more volatile) and [b] fuel related products (less volatile such as kerosene, aviation fuels, diesel fuels and heating oils).

Most analytical methods for petroleum products focus on several items: the level of BTEX, the total petroleum hydrocarbon number (TPH), and the fingerprint of the petroleum product. Depending on the volatility of the petroleum product spilled, the nature of the contaminated soil, and the age of the spill, analysis becomes even more difficult. Weathering, evaporation, and the migration of the lighter volatiles at the contamination site can affect the fingerprint identification portion of the fuel products analysis.



Total Petroleum Hydrocarbon Pattern Recognition Standards

This book contains chromatography for the various petroleum products typically found during LUFT/LUST site investigations. The chromatography shows each fuel pattern in a 25 minute analytical run for early eluting petroleum products like gasoline to late eluting products like motor oil. In addition, an n-alkane standard (DRH-008S) analyzed under identical conditions has been overlaid on each petroleum product chromatogram. Use of the book will assist the chemist's identification of the fuel for pattern recognition.

The n-alkane standard (DRH-008S) overlay provides n-alkane reference points between the standard and the unknown sample. These beginning and ending n-alkane reference points can be used to establish gross hydrocarbon concentrations. By comparing the specific n-alkane range of the closest identified petroleum standard to that of the unknown sample, a reproducible gross hydrocarbon number can be achieved.

To Order,

BOOK-TPH-001



TPH & Fuel & Hydrocarbons

Brownfield Regulation & ISO/DIS 9337



Petroleum Brownfield Regulation

Brownfield Regulation that has been approved by the Canadian Ministry of the Environment as of October 1, 2004.

Light Petroleum Fraction

CCME-LPF-SET

At stated conc. (µg/mL) in MeOH

	CCME-LPF-0.05X	CCME-LPF-0.1X	CCME-LPF-0.2X	CCME-LPF-0.5X	CCME-LPF
n-Decane	12.5	25	50	125	250
n-Hexane	12.5	25	50	125	250
Toluene	12.5	25	50	125	250
Benzene	12.5	25	50	125	250
o-Xylene	12.5	25	50	125	250
m-Xylene	6.25	12.5	25	62.5	125
p-Xylene	6.25	12.5	25	62.5	125
Ethylbenzene	12.5	25	50	125	250

Medium & Heavy Petroleum Fraction

CCME-MHPF-SET

At stated conc. (µg/mL) in n-Hexane

	CCME-MHPF-0.1X	CCME-MHPF-0.5X	CCME-MHPF
n-Decane	40	200	400
n-Hexadecane	40	200	400
n-Tetatriacontane	40	200	400

Performance Check Standard

CCME-QC

1 x 1 mL

CCME-QC-PAK **SAVE**

5 x 1 mL

At 40 µg/mL each in n-Hexane:Cyclohexane

2 comps.

n-Pentacontane
n-Tetracontane

Hydrocarbon Standard

D-5442-R1

100 µg/mL each in Cyclohexane

1 x 1 mL

18 comps.

n-Decane
n-Dodecane
n-Tetradecane
n-Hexadecane
n-Octadecane
n-Eicosane
n-Docosane
n-Tetracosane
n-Hexacosane
n-Octacosane
n-Triacontane
n-Dotriacontane
n-Tetatriacontane
n-Hexatriacontane
n-Octatriacontane
n-Tetracontane
n-Tetratetracontane
n-Pentacontane

Spike Standard

CCME-SPIKE

1 x 1 mL

At 2500 µg/mL each in n-Hexane

2 comps.

SAE 30W Motor Oil - Non-Detergent Formula
#2 Diesel - 50% Weathered

Canadian Atlantic RBCA EPH Mix

CCME-EPH

1 x 1 mL

1000 µg/mL each in Hexane:CH₂Cl₂ 85:15

11 comps.

Acenaphthene
Anthracene
Benzo[a]pyrene
Chrysene
n-Decane
n-Dodecane
n-Dotriacontane
n-Heneicosane
n-Hexadecane
n-Octacosane
Naphthalene

Surrogate Standard

CCME-EPH/SS

1 x 1 mL

1000 µg/mL each in CH₂Cl₂

2 comps.

n-Dotriacontane
Isobutylbenzene

Canadian Atlantic RBCA VPH Mix

CCME-VPH

1 x 1 mL

1000 µg/mL each in MeOH

12 comps.

Benzene
n-Decane
Ethylbenzene
n-Heptane
n-Hexane
1-Methyl-3-ethylbenzene
n-Octane
Toluene
1,2,4-Trimethylbenzene
1,3,5-Trimethylbenzene
o-Xylene
p-Xylene

Surrogate Standard

CCME-VPH/SS

1 x 1 mL

1000 µg/mL in MeOH

Isobutylbenzene

ISO/DIS 9377 Hydrocarbon Oil Index

Diesel #2/Mineral Oil Standard

ENISO9377-2-1

1 x 1 mL

10000 µg/mL total hydrocarbons in Hexane

2 comps.

#2 Diesel (5000 µg/mL)
Mineral Oil (5000 µg/mL)

Quality Control Standard Mix

ISO/DIS9377-4-1

1 x 1 mL

1000 µg/mL total hydrocarbons in Acetone

2 comps.

#2 Diesel (500 µg/mL)
Mineral Oil (500 µg/mL)

Extraction Solvent Stock Soln.

ENISO9377-2-3

1 x 5 mL

At stated conc. in Hexane

2 comps.

n-Decane (20 µL/L)
n-Tetracontane (20 mg/L)

Stearyl Stearate Test Solution

ISO/DIS9377-4-2

1 x 10 mL

2000 µg/mL in Cyclohexane

Stearyl stearate

Florisil Cartridge QC Std. Mix

ENISO9377-2-4

1 x 10 mL

2000 µg/mL total hydrocarbons in Hexane

2 comps.

#2 Diesel (1000 µg/mL)
Mineral Oil (1000 µg/mL)

System Performance Standard of n-alkanes

ENISO9377-2-2

1 x 1 mL

50 µg/mL each in Hexane

16 comps.

n-Decane
n-Dodecane
n-Tetradecane
n-Hexadecane
n-Octadecane
n-Eicosane
n-Docosane
n-Tetracosane
n-Hexacosane
n-Octacosane
n-Triacontane
n-Dotriacontane
n-Tetatriacontane
n-Hexatriacontane
n-Octatriacontane
n-Tetracontane

ISO/DIS 9377-4 Standard Mixture Stock Solution

TPH-006-10X

1 x 1 mL

TPH-006-10X-PAK **SAVE**

5 x 1 mL

5000 µg/mL each in Cyclohexane

2 comps.

#2 Diesel
Mineral oil



LUFT/LUST Standards

Multi-State

There are approximately 625,000 underground storage tanks nationwide that store petroleum or hazardous substances that can harm the environment and human health if their contents are released. Until the mid-1980s, most tanks were made of bare steel. Over time, these tanks would corrode and their contents would leak into the environment. Leaking could also occur due to faulty installation or inadequate maintenance procedures. The greatest potential hazard from a leaking underground storage tank is contaminated groundwater, the source of drinking water for nearly half of all Americans. Other health and environmental risks, including the potential for fire and explosion also exist.

From 1988 through March of 2008 there have been 478,457 confirmed releases reported, 453,065 cleanups have been initiated, and 371,880 cleanups have been completed.

The standards listed in this section are designed to meet federal and state monitoring and testing regulations for underground storage tanks.

LUFT/LUST (UST) Standards



Leaking
Underground
Fuel
Tank

Leaking
Underground
Storage
Tank



Multi-State Hydrocarbon Window Defining	326
Alaska GRO, DRO Hydrocarbons, RRO, DRO Hydrocarbons (Fuel) DRO Hydrocarbons (Standards)	327-329
Arizona Diesel Range	330
California Gasoline	330
Connecticut Extractable TPH	331
Florida FTRPH	331
Massachusetts EPH, VPH	332-333
Mississippi DRO	334
Pennsylvania Storage Tank Monitoring Standards	334
Tennessee DRO	334
Texas Method 1005 (PST)	335
Washington VPH, EPH	336-337
Wisconsin Gasoline Range Hydrocarbons	337

Additional LUFT/LUST

GRH
DRH, Oil, Grease & TPH (Method 1664, 413.2/418.1 & 8440)
Automotive Engine Exhaust, Refinery Waste (Method 1004, ASTM E1387, E1618, Skinner List)

Multi-State Method Hydrocarbon Window Defining

DRH-008S-R2
DRH-008S-R2-PAK
500 µg/mL each in Chloroform

SAVE

1 x 1 mL
5 x 1 mL
35 comps.

Octane	Heptadecane	Tetracosane
Nonane	Pristane	Pentacosane
Decane	Octadecane	Hexacosane
Undecane	Phytane	Heptacosane
Dodecane	Nonadecane	Octacosane
Tridecane	Eicosane	Nonacosane
Tetradecane	Heneicosane	Triacontane
Pentadecane	Docosane	<i>n</i> -Hentriacontane
Hexadecane	Tricosane	Dotriacontane

Tritriacontane
Tetratriacontane
Pentatriacontane
Hexatriacontane
Heptatriacontane
Octatriacontane
Nonatriacontane
Tetracontane

Technical Note

We offer a hydrocarbon window defining standard with the C₈ to C₄₀ odd and even alkanes. Use of this one standard should meet the numerous state-to-state variations for hydrocarbon validation and reporting. As an added benefit, AccuStandard has included Pristane and Phytane in the formulation. Again, use of this one standard can meet numerous LUFT/LUST programs requiring that the C₁₇ (Pristane) and C₁₈ (Phytane) ratio be used to estimate subsurface degradation of fuel oil spills.

LUFT/LUST Standards

Alaska GRO Methods



Alaska Method 101 Determination of Gasoline Range Organic (GRO) Hydrocarbons

Normal Alkane Standard - GRO Defining Mix

GRO-AK-101-NAS-10X		1 x 1 mL
GRO-AK-101-NAS-10X-PAK	SAVE	5 x 1 mL
2.0 mg/mL each in MeOH		5 comps.
<i>n</i> -Hexane	<i>n</i> -Nonane	
<i>n</i> -Heptane	<i>n</i> -Decane	
<i>n</i> -Octane		

Laboratory Control Standard

GRO-AK-101-LCS		1 x 1 mL
GRO-AK-101-LCS-PAK	SAVE	5 x 1 mL
5.0 mg/mL in MeOH		
Gasoline, regular unleaded		

Internal Standard

GRO-AK-101-IS-10X		1 x 1 mL
GRO-AK-101-IS-10X-PAK	SAVE	5 x 1 mL
2.0 mg/mL in MeOH		
1-Chloro-4-fluorobenzene		

Surrogate Control Standard

GRO-AK-101-SS		1 x 1 mL
GRO-AK-101-SS-PAK	SAVE	5 x 1 mL
50 µg/mL each in MeOH		
GRO-AK-101-SS-10X		1 x 1 mL
GRO-AK-101-SS-10X-PAK	SAVE	5 x 1 mL
500 µg/mL each in MeOH		
GRO-AK-101-SS-100X		1 x 1 mL
GRO-AK-101-SS-100X-PAK	SAVE	5 x 1 mL
5,000 µg/mL each in MeOH		2 comps.
<i>p</i> -Bromofluorobenzene	a,a,a-Trifluorotoluene	

Alaska Method Determination of Aromatic & Aliphatic Hydrocarbons in GRO

AK101AA Aromatics Mix

GRO-AK-101AA-ARO		1 x 1 mL
GRO-AK-101AA-ARO-PAK	SAVE	5 x 1 mL
2000 µg/mL each in MeOH		14 comps.
Benzene	1,2,4-Trimethylbenzene	
Toluene	1,3,5-Trimethylbenzene	
Ethylbenzene	Isopropylbenzene	
<i>m</i> -Xylene	<i>m</i> -Ethyltoluene	
<i>p</i> -Xylene	<i>p</i> -Ethyltoluene	
<i>o</i> -Xylene	<i>o</i> -Ethyltoluene	
1,2,3-Trimethylbenzene	<i>n</i> -Propylbenzene	

Certified BTEX in Gasoline (Single Source)

GA-001-20X-BTEX	1 x 1 mL
10.0 mg/mL in MeOH	
Gasoline, regular unleaded	

Technical Note

Laboratory Control Standard

The gasoline laboratory control standard was taken from an ASTM selected fuel set and a source independent of what is being used in the Gasoline Composite Mix.

Simultaneous BTEX / Gasoline QA/QC

Our QC Department has certified the benzene, toluene, ethyl benzene and xylene concentrations in the unleaded gasoline standard (GA-001-20X-BTEX and GRO-AK-101-GCS-BTEX). This allows the use of a single injection to verify that the QA/QC requirements are being met for the BTEX analytes as well as for the gasoline.

We have added a multi source certified BTEX in gasoline composite mix (GRO-AK-101-GCS-BTEX). The BTEX values for this multi-source calibration standard have been determined through in-house analysis against a BTEX multi-level calibration curve listed on the certificate.

Certified BTEX in Gasoline Composite (Multi Source)

GRO-AK-101-GCS-BTEX	1 x 1 mL
5 mg/mL total in MeOH	
3 comps.	

	Wt. Vol.
Gasoline, premium	1.66 mg/mL
Gasoline, regular leaded	1.67 mg/mL
Gasoline, regular unleaded	1.67 mg/mL

Gasoline Calibration Composite Mix

GRO-AK-101-GCS		1 x 1 mL
GRO-AK-101-GCS-PAK	SAVE	5 x 1 mL
Total 5.0 mg/mL in MeOH		3 comps.

	Wt. Vol.
Gasoline, premium	1.66 mg/mL
Gasoline, regular leaded	1.67 mg/mL
Gasoline, regular unleaded	1.67 mg/mL

Gasoline Calibration Mix Version

GRO-AK-101-GSC-R1		1 x 1 mL
GRO-AK-101-GSC-R1-PAK	SAVE	5 x 1 mL
Equal parts by weight of each		

Gasoline, regular unleaded
Gasoline, plus unleaded
Gasoline, premium unleaded



LUFT/LUST Standards

Alaska DRO Methods

Alaska Method 102 Determination of Diesel Range Organic (DRO) Hydrocarbons

Diesel Calibration Composite Mixture (low sulfur)

DRO-AK-102-DCS		1 x 1 mL
DRO-AK-102-DCS-PAK	SAVE	5 x 1 mL
Total 5.0 mg/mL in CH ₂ Cl ₂		
DRO-AK-102-DCS-10X		1 x 1 mL
DRO-AK-102-DCS-10X-PAK	SAVE	5 x 1 mL
Total 50.0 mg/mL in CH ₂ Cl ₂		

	DRO-AK-102-DCS	DRO-AK-102-DCS-10X
Diesel Fuel (Arctic)	1.66 mg/mL	16.6 mg/mL
#1 Diesel (Low Sulfur)	1.67 mg/mL	16.6 mg/mL
#2 Diesel (extra Low Sulfur)	1.67 mg/mL	16.6 mg/mL

Stock Concentrate Diesel Calibration Composite Mix

DRO-AK-102-DCS-10X-R1		1 x 1 mL
DRO-AK-102-DCS-10X-R1-PAK	SAVE	5 x 1 mL
Total 50.0 mg/mL in CH ₂ Cl ₂		

	Wt. Vol.
Diesel Fuel (Arctic)	16.6 mg/mL
#1 Diesel (Low Sulfur)	16.7 mg/mL
#2 Diesel (Conventional)	16.7 mg/mL

Laboratory Control Standard (low sulfur)

DRO-AK-102-LCS		1 x 1 mL
DRO-AK-102-LCS-PAK	SAVE	5 x 1 mL
5.0 mg/mL in Acetone		
DRO-AK-102-LCS-10X		1 x 1 mL
DRO-AK-102-LCS-10X-PAK	SAVE	5 x 1 mL
50.0 mg/mL in Acetone		

#2 Diesel (extra Low Sulfur)

Laboratory Control Standard

DRO-AK-102-LCS-10X-R1		1 x 1 mL
DRO-AK-102-LCS-10X-R1-PAK	SAVE	5 x 1 mL
50.0 mg/mL in Acetone		

#2 Diesel (Conventional)

Technical Note

Laboratory Control Standards are prepared from an independent source.

Technical Note

AccuStandard formulated the Diesel Calibration Composite Mix and Laboratory Control Standard using two independent sources of #2 Diesel as required by the Alaskan method. Unfortunately, the chromatographic patterns for the #2 diesel sources (conventional & extra low sulfur) are different. We have obtained independent sources of each type of #2 diesel to insure similar chromatographic patterns and recommend that when a customer is analyzing the Diesel Calibration Composite and Laboratory Control standard that the client orders DRO-AK-102-DCS and DRO-AK-102-LCS products together to obtain similar chromatographic patterns for #2 diesel extra low sulfur patterns and DRO-AK-102-DCS-10X-R1 and DRO-AK-102-LCS-10X-R1 products to obtain similar chromatographic patterns for #2 Diesel conventional patterns. Laboratories performing the Alaskan DRO analysis will find the #2 Diesel conventional chromatographic pattern more closely resembles typical Diesel samples drawn from environmental sites.

Normal Alkane Standard - DRO Defining Mix

DRO-AK-102-NAS-10X		1 x 1 mL
DRO-AK-102-NAS-10X-PAK	SAVE	5 x 1 mL
2.0 mg/mL each in CH ₂ Cl ₂		

<i>n</i> -Decane	<i>n</i> -Hexadecane	<i>n</i> -Heneicosane
<i>n</i> -Undecane	<i>n</i> -Heptadecane	<i>n</i> -Docosane
<i>n</i> -Dodecane	<i>n</i> -Octadecane	<i>n</i> -Tricosane
<i>n</i> -Tridecane	<i>n</i> -Nonadecane	<i>n</i> -Tetracosane
<i>n</i> -Tetradecane	<i>n</i> -Eicosane	<i>n</i> -Pentacosane
<i>n</i> -Pentadecane		

Surrogate Standards

DRO-AK-102-SS		1 x 1 mL
DRO-AK-102-SS-PAK	SAVE	5 x 1 mL
200 µg/mL in Acetone		
DRO-AK-102-SS-10X		1 x 1 mL
DRO-AK-102-SS-10X-PAK	SAVE	5 x 1 mL
2.0 mg/mL in Acetone		
<i>o</i> -Terphenyl		

Internal Standard

DRO-AK-102-IS		1 x 1 mL
DRO-AK-102-IS-PAK	SAVE	5 x 1 mL
1.0 mg/mL in CH ₂ Cl ₂		
5- α Androstane		

Alaska Method 102/103AA Determination of Aromatic & Aliphatic Hydrocarbons in Diesel Range Organic (DRO)

Diesel Range Standard

DRO-AK-102AA		1 x 1 mL
DRO-AK-102AA-PAK	SAVE	5 x 1 mL
2000 µg/mL each in CH ₂ Cl ₂		

<i>n</i> -Undecane	<i>n</i> -Tetracosane	Fluorene
<i>n</i> -Pentadecane	Naphthalene	Pyrene
<i>n</i> -Heptadecane	Acenaphthene	Anthracene
<i>n</i> -Octadecane		

Surrogate Standard

DRO-AK-102/103AA-SS		1 x 1 mL
DRO-AK-102/103AA-SS-PAK	SAVE	5 x 1 mL
1000 µg/mL each in CH ₂ Cl ₂		

Squalane
o-Terphenyl
5,6,7,8-Tetrahydro-1-naphthol

Retention Time Marker Standard

DRO-AK-102/103AA-RT		1 x 1 mL
DRO-AK-102/103AA-RT-PAK	SAVE	5 x 1 mL
50 µg/mL each in CH ₂ Cl ₂		

<i>n</i> -Decane	<i>n</i> -Hexatriacontane
<i>n</i> -Pentacosane	

LUFT/LUST Standards

Alaska Methods



Alaska Method 103 Determination of Residual Range Organic (RRO) Hydrocarbons

Residual Composite Mixtures

RRO-AK-103-RCS 1 x 1 mL
RRO-AK-103-RCS-PAK 5 x 1 mL
Total 5.0 mg/mL in CH₂Cl₂ 3 comps.

SAVE

SAE 30W Motor oil (1.66 mg) SAE 50W Motor Oil (1.67 mg)
 SAE 40W Motor oil (1.67 mg)

RRO-AK-103-RCS-10X 1 x 1 mL
RRO-AK-103-RCS-10X-PAK 5 x 1 mL
Total 50.0 mg/mL in CH₂Cl₂ 3 comps.

SAVE

SAE 30W Motor oil (16.6 mg) SAE 50W Motor Oil (16.7 mg)
 SAE 40W Motor oil (16.7 mg)

Laboratory Control Standard

RRO-AK-103-LCS 1 x 1 mL
RRO-AK-103-LCS-PAK 5 x 1 mL
5.0 mg/mL in Acetone

SAVE

RRO-AK-103-LCS-5X 1 x 1 mL
RRO-AK-103-LCS-5X-PAK 5 x 1 mL
25.0 mg/mL in Acetone: CH₂Cl₂ (1:1)

SAVE

SAE 40W Motor oil

Surrogate Control Standard

RRO-AK-103-SS 1 x 1 mL
RRO-AK-103-SS-PAK 5 x 1 mL
500 µg/mL in Acetone:THF (9:1)

SAVE

RRO-AK-103-SS2 1 x 1 mL
RRO-AK-103-SS2-PAK 5 x 1 mL
5.0 mg/mL in THF:Acetone (3:1)

SAVE

n-Triacontane-d₃₂

Alaska Method 103AA Determination of Aromatic & Aliphatic Hydrocarbons in Residual Range Organic

Residual Standard

RRO-AK-103AA 1 x 1 mL
RRO-AK-103AA-PAK 5 x 1 mL
2000 µg/mL each in CH₂Cl₂ 9 comps.

SAVE

n-Hexacosane
n-Octacosane
n-Triacontane
n-Dotriacontane
n-Tetratriacontane

Benzo[b]fluoranthene
 Benzo[a]pyrene
 Benzo[g,h,i]perylene
 Dibenzo[a,h]anthracene

Surrogate Standard

DRO-AK-102/103AA-SS 1 x 1 mL
DRO-AK-102/103AA-SS-PAK 5 x 1 mL
1000 µg/mL each in CH₂Cl₂ 3 comps.

SAVE

Squalane
o-Terphenyl

5,6,7,8-Tetrahydro-1-naphthol

Retention Time Marker Standard

DRO-AK-102/103AA-RT 1 x 1 mL
DRO-AK-102/103AA-RT-PAK 5 x 1 mL
50 µg/mL each in CH₂Cl₂ 3 comps.

SAVE

n-Decane
n-Pentacosane

n-Hexatriacontane

Alaska RRO LUFT/LUST



LUFT/LUST Standards

Arizona, California & Connecticut Methods

Arizona Method 8015 Determination of Diesel Range and Oil Range Organic (DRO & ORO) Hydrocarbons

Diesel & Oil Range Standard

DRO/ORO-AZ-8015		1 x 1 mL
DRO/ORO-AZ-8015-PAK	SAVE	5 x 1 mL
2000 µg/mL each in CH ₂ Cl ₂		12 comps.
<i>n</i> -Decane	<i>n</i> -Hexadecane	
<i>n</i> -Dodecane	<i>n</i> -Octacosane	
<i>n</i> -Docosane	<i>n</i> -Octadecane	
<i>n</i> -Dotriacontane	<i>n</i> -Tetracosane	
<i>n</i> -Eicosane	<i>n</i> -Tetradecane	
<i>n</i> -Hexacosane	<i>n</i> -Triacontane	

Surrogate Standards

DRO-AK-102-SS-10X		1 x 1 mL
DRO-AK-102-SS-10X-PAK	SAVE	5 x 1 mL
2.0 mg/mL in Acetone		
<i>o</i> -Terphenyl		

Retention Time Verification Standard

DRO/ORO-AZ-8015-RTV		1 x 1 mL
DRO/ORO-AZ-8015-RTV-PAK	SAVE	1 x 1 mL
1000 µg/mL each in CH ₂ Cl ₂		3 comps.
<i>n</i> -Decane	<i>n</i> -Dotriacontane	
<i>n</i> -Docosane		

Stock Calibration Standard

DRO/ORO-AZ-8015-SCS		1 x 1 mL
DRO/ORO-AZ-8015-SCS-PAK	SAVE	1 x 1 mL
10,000 µg/mL each in CH ₂ Cl ₂		2 comps.
#2 Diesel	10W 30 Motor Oil	

California Method (including LA County)

California - Gasoline Range Hydrocarbons

S-603A-10X		1 x 1 mL
S-603A-10X-PAK	SAVE	5 x 1 mL
2.0 mg/mL each in MeOH		7 comps.
Benzene	<i>o</i> -Xylene	
Ethylbenzene	<i>m</i> -Xylene	
Methyl <i>t</i> -butyl ether	<i>p</i> -Xylene	
Toluene		

LA County Well Investigation & Monitoring Program

Purgeable Aromatics - Gasoline ID

M-602-GAS-10X		1 x 1 mL
2.0 mg/mL each in MeOH		11 comps.
Benzene	Toluene	
Chlorobenzene	<i>o</i> -Xylene	
1,2-Dichlorobenzene	<i>p</i> -Xylene	
1,3-Dichlorobenzene	<i>m</i> -Xylene	
1,4-Dichlorobenzene	MtBE	
Ethylbenzene		

Oxygenate Gasoline Additive Standard

OGAD-001		1 x 1 mL
OGAD-001-PAK	SAVE	5 x 1 mL
At stated conc. in MeOH		5 comps.
MtBE (2000 µg/mL)	TAME (2000 µg/mL)	
ETBE (2000 µg/mL)	<i>t</i> -Butanol (10000 µg/mL)	
Isopropyl ether (2000 µg/mL)		

Ethanol

M-8015B/5031-11		1 x 1 mL
10 mg/mL in Water		

Methanol

M-8015B/5031-17		1 x 1 mL
10 mg/mL in Water		

Method 1004 Carbonyl Compounds as DNPH Derivatives by HPLC

M-1004		1 x 1 mL
At stated conc. in AcCN		13 comps.
M-1004-10X		1 x 1 mL
At 10 times the stated conc. in AcCN		13 comps.

Carbonyl Compound	DNPH Derivative
Acetaldehyde (3.0 µg/mL)	(15.3 µg/mL)
Acetone (3.0 µg/mL)	(12.3 µg/mL)
Acrolein (3.0 µg/mL)	(12.7 µg/mL)
Benzaldehyde (3.0 µg/mL)	(8.1 µg/mL)
2-Butanone (MEK) (3.0 µg/mL)	(10.5 µg/mL)
<i>n</i> -Butyraldehyde (3.0 µg/mL)	(10.5 µg/mL)
Crotonaldehyde (3.0 µg/mL)	(10.7 µg/mL)
Formaldehyde (3.0 µg/mL)	(21.0 µg/mL)
Hexanal (3.0 µg/mL)	(8.4 µg/mL)
Methacrolein (3.0 µg/mL)	(10.7 µg/mL)
Propionaldehyde (3.0 µg/mL)	(12.3 µg/mL)
<i>m</i> -Tolualdehyde (3.0 µg/mL)	(7.5 µg/mL)
Valeraldehyde (3.0 µg/mL)	(9.3 µg/mL)

CAR-DNPH

At stated conc. in AcCN as DNPH derivatives		1 x 1 mL
		7 comps.
Acetaldehyde (1000 µg/mL)	Butyraldehyde (500 µg/mL)	
Acetone (500 µg/mL)	Formaldehyde (1500 µg/mL)	
Acrolein (500 µg/mL)	Propionaldehyde (500 µg/mL)	
Benzaldehyde (500 µg/mL)		

Reference Gas Oil Sample

RGS-001		1 x 1 mL
Hydrocarbon Mixture (boiling point range 250-850°F)		

Technical Note

Alcohol Oxidation Products in Automotive Engine Exhaust by HPLC of DNPH Derivatives The California Air Resources Board, in conjunction with some of the larger automobile manufacturers, has developed an HPLC method in which the 2,4-Dinitrophenylhydrazine derivatives of the by-products are quantitated.



Connecticut Method Extractable Total Petroleum Hydrocarbons

CT ETPH Alkane Standard

DRH-009S 1 x 1 mL
 DRH-009S-PAK 5 x 1 mL
 1000 µg/mL in CH₂Cl₂ 15 comps.

SAVE

<i>n</i> -Nonane	<i>n</i> -Tetracosane
<i>n</i> -Decane	<i>n</i> -Hexacosane
<i>n</i> -Dodecane	<i>n</i> -Octacosane
<i>n</i> -Tetradecane	<i>n</i> -Triacontane
<i>n</i> -Hexadecane	<i>n</i> -Dotriacontane
<i>n</i> -Octadecane	<i>n</i> -Tetraatriacontane
<i>n</i> -Eicosane	<i>n</i> -Hexatriacontane
<i>n</i> -Docosane	

Internal Standard

GRH-IS 1 x 1 mL
 GRH-IS-PAK 5 x 1 mL
 1.0 mg/mL in CH₂Cl₂
 5- α Androstane

SAVE

Surrogate Standard

GRH-SS 1 x 1 mL
 GRH-SS-PAK 5 x 1 mL
 2.0 mg/mL in Acetone
o-Terphenyl (OTP)

SAVE

Florida Method Total Recoverable Petroleum Hydrocarbon (FTRPH) Standard & Surrogates

Calibration/Window Defining Hydrocarbon Standard

DRH-004S-R1-5X 1 x 1 mL
 DRH-004S-R1-5X-PAK 5 x 1 mL
 1.0 mg/mL each in Chloroform 17 comps.

SAVE

Octane C ₈	Eicosane C ₂₀	Dotriacontane C ₃₂
Decane C ₁₀	Docosane C ₂₂	Tetraatriacontane C ₃₄
Dodecane C ₁₂	Tetracosane C ₂₄	Hexatriacontane C ₃₆
Tetradecane C ₁₄	Hexacosane C ₂₆	Octatriacontane C ₃₈
Hexadecane C ₁₆	Octacosane C ₂₈	Tetracontane C ₄₀
Octadecane C ₁₈	Triacontane C ₃₀	

FTRPH Surrogate Standard

DRH-FL-SS-3X 1 x 1 mL
 DRH-FL-SS-3X-PAK 5 x 1 mL
 3.0 mg/mL in Carbon disulfide
 DRH-FL-SS 1 x 1 mL
 DRH-FL-SS-PAK 5 x 1 mL
 1.0 mg/mL in Carbon disulfide
 Nonatriacontane

SAVE

SAVE

FTRPH Combined Surrogate Standard

DRH/GRH-FL-SS 1 x 1 mL
 DRH/GRH-FL-SS-PAK 5 x 1 mL
 5.0 mg/mL in Carbon disulfide 2 comps.
 Nonatriacontane *o*-Terphenyl (OTP)

SAVE

FTRPH Calibration / Window Defining Standard

DRH-FTRPH 1 x 1 mL
 DRH-FTRPH-PAK 5 x 1 mL
 500 µg/mL each in Hexane 17 comps.
 DRH-FTRPH-0.1X 1 x 1 mL
 50 µg/mL each in Hexane 17 comps.

SAVE

<i>n</i> -Octane	<i>n</i> -Eicosane	<i>n</i> -Dotriacontane
<i>n</i> -Decane	<i>n</i> -Docosane	<i>n</i> -Tetraatriacontane
<i>n</i> -Dodecane	<i>n</i> -Tetracosane	<i>n</i> -Hexatriacontane
<i>n</i> -Tetradecane	<i>n</i> -Hexacosane	<i>n</i> -Octatriacontane
<i>n</i> -Hexadecane	<i>n</i> -Octacosane	<i>n</i> -Tetracontane
<i>n</i> -Octadecane	<i>n</i> -Triacontane	

Technical Note

FTRPH Calibration/Window Defining Standard was formulated at a lower concentration to insure solubility of the analytes & eliminate the odor caused by the introduction of Carbon disulfide as a cosolvent.

Internal Standard

GRH-IS 1 x 1 mL
 GRH-IS-PAK 5 x 1 mL
 1.0 mg/mL in CH₂Cl₂
 5- α Androstane

SAVE

Surrogate Standards

DRH-SS 1 x 1 mL
 DRH-SS-PAK 5 x 1 mL
 5.0 mg/mL in THF
n-Triacontane-d₆₂

SAVE

GRH-SS 1 x 1 mL
 GRH-SS-PAK 5 x 1 mL
 2.0 mg/mL in Acetone
o-Terphenyl (OTP)

SAVE

Technical Note

FTRPH Surrogate Standard was formulated at a higher concentration for combined DRH & GRH analysis. This standard has proven useful for those laboratories performing gasoline & diesel analysis simultaneously.

DRH/GRH-FL-SS-R2 1 x 1 mL
 DRH/GRH-FL-SS-R2-PAK 5 x 1 mL
 At stated conc. in Carbon disulfide 2 comps.
 Nonatriacontane (6000 µg/mL) *o*-Terphenyl (OTP) (1500 µg/mL)

SAVE



Carbon disulfide can not ship by air. When possible alternate solvents can be used. Please contact our Technical Service Department for other options.



LUFT/LUST Standards

Massachusetts Methods - Ready-to-Inject Working Level EPH Standards

Massachusetts Method Determination of Extractable Petroleum Hydrocarbons (EPH)

Aromatic Hydrocarbons Calibration Set

DRH-006-CAL-SET

At stated conc. in CH_2Cl_2

5 x 1 mL
18 comps.

Components (units in $\mu\text{g/mL}$)	Level 1 (1X)	Level 2 (4X)	Level 3 (10X)	Level 4 (20X)	Level 5 (40X)
Acenaphthene	5	20	50	100	200
Acenaphthylene	5	20	50	100	200
Anthracene	5	20	50	100	200
Benz[a]anthracene	5	20	50	100	200
Benzo[a]pyrene	5	20	50	100	200
Benzo[b]fluoranthene	5	20	50	100	200
Benzo[g,h,i]perylene	5	20	50	100	200
Benzo[k]fluoranthene	5	20	50	100	200
Chrysene	5	20	50	100	200
Dibenz[a,h]anthracene	5	20	50	100	200
Fluoranthene	5	20	50	100	200
Fluorene	5	20	50	100	200
Indeno[1,2,3-cd]pyrene	5	20	50	100	200
2-Methylnaphthalene	5	20	50	100	200
Naphthalene	5	20	50	100	200
Phenanthrene	5	20	50	100	200
Pyrene	5	20	50	100	200
o-Terphenyl (Surrogate)	5	20	50	100	200

DEP (MA) - Aromatic Hydrocarbons

DRH-006S

DRH-006S-PAK

1.0 mg/mL each in CH_2Cl_2

SAVE

1 x 1 mL
5 x 1 mL
17 comps.

Acenaphthene	Dibenz[a,h]anthracene
Acenaphthylene	Fluoranthene
Anthracene	Fluorene
Benz[a]anthracene	Indeno[1,2,3-cd]pyrene
Benzo[a]pyrene	2-Methylnaphthalene
Benzo[b]fluoranthene	Naphthalene
Benzo[g,h,i]perylene	Phenanthrene
Benzo[k]fluoranthene	Pyrene
Chrysene	

Technical Note

Two high concentration EPH stocks for laboratories that prepare in-house working level solutions are available. In addition, Ready-to-Use working level aromatic and aliphatic calibration sets are also available. Larger volumes of daily calibration solutions can be purchased by contacting our Technical Service Department.

DEP (MA) - Aliphatic Hydrocarbons

DRH-007S

DRH-007S-PAK

1.0 mg/mL each in CH_2Cl_2 : Hexane (1:1)

SAVE

1 x 1 mL
5 x 1 mL
14 comps.

n-Nonane	n-Octadecane	n-Hexacosane
n-Decane	n-Nonadecane	n-Octacosane
n-Dodecane	n-Eicosane	n-Triacontane
n-Tetradecane	n-Docosane	n-Hexatriacontane
n-Hexadecane	n-Tetracosane	

Aliphatic Surrogate

DRH-007-SS

DRH-007-SS-PAK

1.0 mg/mL in Hexane

SAVE

1 x 1 mL
5 x 1 mL

1-Chlorooctadecane

EPH Surrogate Spike

DRH-MA-SS

DRH-MA-SS-10X

DRH-MA-SS-100X

DRH-MA-SS-100X-PAK

2,000 $\mu\text{g/mL}$ each in Acetone

1 x 1 mL
1 x 1 mL
1 x 1 mL
5 x 1 mL
2 comps.

1-Chlorooctadecane

o-Terphenyl

EPH Matrix Spike

DRH-MA-MS

DRH-MA-MS-PAK

DRH-MA-MS-10X

DRH-MA-MS-10X-PAK

DRH-MA-MS-40X

DRH-MA-MS-40X-PAK

1,000 $\mu\text{g/mL}$ in Acetone

1,000 $\mu\text{g/mL}$ in Acetone

SAVE

SAVE

SAVE

1 x 1 mL
5 x 1 mL
1 x 1 mL
5 x 1 mL
1 x 1 mL
5 x 1 mL
10 comps.

Acenaphthene	n-Nonadecane
Anthracene	n-Nonane
Chrysene	n-Octacosane
n-Eicosane	Pyrene
Naphthalene	n-Tetradecane

Internal Standard

GRH-IS

GRH-IS-PAK

GRH-IS-10X

1,000 $\mu\text{g/mL}$ in CH_2Cl_2

1,000 $\mu\text{g/mL}$ in CH_2Cl_2

10.0 mg/mL in CH_2Cl_2

SAVE

1 x 1 mL
5 x 1 mL
1 x 1 mL

5-alpha Androstane

Aliphatic Hydrocarbons Calibration Set

DRH-007-CAL-R1-SET

At stated conc. in CH_2Cl_2 : n-Hexane (1:1)

5 x 1 mL
15 comps.

Components (units in $\mu\text{g/mL}$)	Level 1 (1X)	Level 2 (4X)	Level 3 (10X)	Level 4 (20X)	Level 5 (40X)
n-Nonane	5	20	50	100	200
n-Decane	5	20	50	100	200
n-Dodecane	5	20	50	100	200
n-Tetradecane	5	20	50	100	200
n-Hexadecane	5	20	50	100	200
n-Octadecane	5	20	50	100	200
n-Nonadecane	5	20	50	100	200
n-Eicosane	5	20	50	100	200
n-Docosane	5	20	50	100	200
n-Tetracosane	5	20	50	100	200
n-Hexacosane	5	20	50	100	200
n-Octacosane	5	20	50	100	200
n-Triacontane	5	20	50	100	200
n-Hexatriacontane	5	20	50	100	200
1-Chlorooctadecane (Surrogate)	5	20	50	100	200

Combined Aromatic/Aliphatic Matrix Spike Standard

DRH-MS-ASL

DRH-MS-ASL-PAK

25 $\mu\text{g/mL}$ each in Hexane

SAVE

1 x 1 mL
5 x 1 mL
31 comps.

Acenaphthene	n-Docosane	Naphthalene
Acenaphthylene	n-Dodecane	n-Nonadecane
Anthracene	n-Eicosane	n-Nonane
Benz[a]anthracene	Fluoranthene	n-Octacosane
Benzo[a]pyrene	Fluorene	n-Octadecane
Benzo[b]fluoranthene	n-Hexacosane	Phenanthrene
Benzo[g,h,i]perylene	n-Hexadecane	Pyrene
Benzo[k]fluoranthene	n-Hexatriacontane	n-Tetracosane
Chrysene	Indeno[1,2,3-cd]pyrene	n-Tetradecane
n-Decane	2-Methylnaphthalene	n-Triacontane
Dibenz[a,h]anthracene		

DEP (MA) - Fractionation Surrogate Spike

DRH-MA-FSS-10ML

DRH-MA-FSS-50X

DRH-MA-FSS-50X-PAK

40 $\mu\text{g/mL}$ in Hexane

2.0 mg/mL in Hexane

2.0 mg/mL in Hexane

SAVE

1 x 10 mL
1 x 1 mL
5 x 1 mL
2 comps.

2-Fluorobiphenyl

2-Bromonaphthalene

Aromatic Surrogate

DRH-006-SS

DRH-006-SS-PAK

1.0 mg/mL in CH_2Cl_2

SAVE

1 x 1 mL
5 x 1 mL

o-Terphenyl

LUFT/LUST Standards

Massachusetts Methods - Ready-to-Inject Working Level EPH Standards



Massachusetts Method Determination of Volatile Petroleum Hydrocarbons (VPH)

Stock Concentrate

Volatile Petroleum Hydrocarbon Mix

GRH-004S-10X		1 x 1 mL
GRH-004S-10X-PAK		5 x 1 mL
<i>At stated conc. (mg/mL) in MeOH</i>		13 comps.
Benzene	(5.0)	<i>n</i> -Pentane (10.0)
Ethylbenzene	(5.0)	Toluene (15.0)
Isooctane	(15.0)	1,2,4-Trimethylbenzene (10.0)
2-Methylpentane	(15.0)	<i>o</i> -Xylene (10.0)
MtBE	(15.0)	<i>m</i> -Xylene (10.0)
Naphthalene	(10.0)	<i>p</i> -Xylene (10.0)
<i>n</i> -Nonane	(10.0)	

DEP (MA)-VPH Surrogate Standard

GRH-004-SS		1 x 1 mL
GRH-004-SS-PAK		5 x 1 mL
<i>50 µg/mL in MeOH</i>		
GRH-004-SS-10X		1 x 1 mL
GRH-004-SS-10X-PAK		5 x 1 mL
<i>500 µg/mL in MeOH</i>		
GRH-004-SS-100X		1 x 1 mL
GRH-004-SS-100X-PAK		5 x 1 mL
<i>5,000 µg/mL in MeOH</i>		
2,5-Dibromotoluene		

MA VPH Matrix Spike Mix with Surrogate

GRH-004-MS/SS		1 x 1 mL
<i>50 µg/mL each in MeOH</i>		14 comps.
Benzene	Naphthalene	
<i>n</i> -Butylcyclohexane	<i>n</i> -Nonane	
<i>n</i> -Decane	<i>n</i> -Pentane	
2,5-dibromotoluene	Toluene	
Ethylbenzene	1,2,4-Trimethylbenzene	
2-Methylpentane	Isooctane	
MtBE	<i>m</i> -Xylene	

VPH Matrix Spike

GRH-004-MS		1 x 1 mL
GRH-004-MS-PAK		5 x 1 mL
<i>50 µg/mL each in MeOH</i>		
GRH-004-MS-10X		1 x 1 mL
GRH-004-MS-10X-PAK		5 x 1 mL
<i>500 µg/mL each in MeOH</i>		
GRH-004-MS-100X		1 x 1 mL
GRH-004-MS-100X-PAK		5 x 1 mL
<i>5,000 µg/mL each in MeOH</i>		8 comps.
Benzene	Toluene	
Ethylbenzene	<i>o</i> -Xylene	
MtBE	<i>m</i> -Xylene	
Naphthalene	<i>p</i> -Xylene	

Certified BTEX in Unleaded Gasoline

GA-001-20X-BTEX		1 x 1 mL
<i>10.0 mg/mL in MeOH</i>		
Gasoline - Regular, unleaded		

Volatile Petroleum Hydrocarbons without Surrogate

GRH-004S-R1-10X		1 x 1 mL
<i>At stated conc. (mg/mL) in MeOH</i>		15 comps.
Benzene	(5.0)	Toluene (15.0)
Ethylbenzene	(5.0)	1,2,4-Trimethylbenzene (10.0)
Isooctane	(15.0)	<i>o</i> -Xylene (10.0)
2-Methylpentane	(15.0)	<i>m</i> -Xylene (10.0)
MtBE	(15.0)	<i>p</i> -Xylene (10.0)
Naphthalene	(10.0)	<i>n</i> -Butylcyclohexane (10.0)
<i>n</i> -Nonane	(10.0)	<i>n</i> -Decane (10.0)
<i>n</i> -Pentane	(10.0)	

GRH-004S-R2		1 x 1 mL
<i>10 mg/mL each in MeOH</i>		15 comps.

Benzene	Toluene
Ethylbenzene	1,2,4-Trimethylbenzene
Isooctane	<i>o</i> -Xylene
2-Methylpentane	<i>m</i> -Xylene
MtBE	<i>p</i> -Xylene
Naphthalene	<i>n</i> -Butylcyclohexane
<i>n</i> -Nonane	<i>n</i> -Decane
<i>n</i> -Pentane	

Volatile Petroleum Hydrocarbons with Surrogate

GRH-004S/SS		1 x 1 mL
GRH-004S/SS-PAK		5 x 1 mL
<i>At stated conc. (µg/mL) in MeOH</i>		14 comps.
Benzene	(500)	<i>n</i> -Nonane (1,000)
2,5-Dibromotoluene (Surrogate)	(1,000)	<i>n</i> -Pentane (1,000)
Ethylbenzene	(500)	Toluene (1,500)
Isooctane	(1,500)	1,2,4-Trimethylbenzene (1,000)
2-Methylpentane	(1,500)	<i>o</i> -Xylene (1,000)
MtBE	(1,500)	<i>m</i> -Xylene (1,000)
Naphthalene	(1,000)	<i>p</i> -Xylene (1,000)

GRH-004S/SS-R1		1 x 1 mL
<i>At stated conc. (µg/mL) in MeOH</i>		16 comps.

Benzene	(500)	<i>n</i> -Pentane (1,000)
2,5-Dibromotoluene (Surrogate)	(1,000)	Toluene (1,500)
Ethylbenzene	(500)	1,2,4-Trimethylbenzene (1,000)
Isooctane	(1,500)	<i>o</i> -Xylene (1,000)
2-Methylpentane	(1,500)	<i>m</i> -Xylene (1,000)
MtBE	(1,500)	<i>p</i> -Xylene (1,000)
Naphthalene	(1,000)	<i>n</i> -Butylcyclohexane (1,000)
<i>n</i> -Nonane	(1,000)	<i>n</i> -Decane (1,000)

GRH-004S/SS-R2		1 x 1 mL
<i>10.0 mg/mL each in MeOH</i>		16 comps.

Benzene	<i>n</i> -Pentane
2,5-Dibromotoluene (Surrogate)	Toluene
Ethylbenzene	1,2,4-Trimethylbenzene
Isooctane	<i>o</i> -Xylene
2-Methylpentane	<i>m</i> -Xylene
MtBE	<i>p</i> -Xylene
Naphthalene	<i>n</i> -Butylcyclohexane
<i>n</i> -Nonane	<i>n</i> -Decane

Technical Note

Calibration Curve

Analytical chemists can develop the VPH Calibration Curve using one primary dilution standard that includes the surrogate.

Simultaneous BTEX / Gasoline QA/QC

Our QC Dept. has certified the benzene, toluene, ethyl benzene and xylene concentrations in the unleaded gasoline standard (GA-001-20X-BTEX). This allows the use of a single injection to verify that the QA/QC requirements are being met for the BTEX analytes as well as for the gasoline.



LUFT/LUST Standards

Mississippi / Tennessee, New Jersey and Pennsylvania Methods

Mississippi / Tennessee Method

DRO Defining Mix

DRO-AK-102-NAS-10X

DRO-AK-102-NAS-10X-PAK

2.0 mg/mL each in CH_2Cl_2

SAVE

1 x 1 mL

5 x 1 mL

16 comps.

n-Decane
n-Undecane
n-Dodecane
n-Tridecane
n-Tetradecane
n-Pentadecane

n-Hexadecane
n-Heptadecane
n-Octadecane
n-Nonadecane
n-Eicosane

n-Heneicosane
n-Docosane
n-Tricosane
n-Tetracosane
n-Pentacosane

New Jersey Method

DEP (NJ) Aliphatic Hydrocarbon Standard

DRH-NJ-001S

1.0 mg/mL each in Hexane



1 x 1 mL

20 comps.

n-Nonane
n-Decane
n-Dodecane
n-Tetradecane
n-Hexadecane
n-Octadecane
n-Eicosane

n-Heneicosane
n-Docosane
n-Tetracosane
n-Hexacosane
n-Octacosane
n-Triacontane
n-Dotriacontane

n-Tetratriacontane
n-Hexatriacontane
n-Octatriacontane
n-Tetracontane
Naphthalene
2-Methylnaphthalene

DEP (NJ) Aromatic Hydrocarbon Standard

DRH-NJ-002S

2.0 mg/mL each in CH_2Cl_2



1 x 1 mL

18 comps.

Acenaphthene
Acenaphthylene
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene

Benzo(g,h,i)perylene
Benzo(k)fluoranthene
Chrysene
Dibenz(a,h)anthracene
Fluoranthene
Fluorene

Indeno(1,2,3-cd)pyrene
2-Methylnaphthalene
Naphthalene
Phenanthrene
Pyrene
1,2,3-Trimethylbenzene

Pennsylvania Method Storage Tank Site Closure & Monitoring Petroleum Standards

PA Extractable PAH Standard

DRH-PA-001

DRH-PA-001-PAK

2000 µg/mL each in CH_2Cl_2

SAVE

1 x 1 mL

5 x 1 mL

5 comps.

Benz[a]anthracene
Benzo[a]pyrene
Fluorene

Naphthalene
Phenanthrene

PA Volatile Petroleum Standard

GRH-PA-001

GRH-PA-001-PAK

At stated conc. in MeOH

SAVE

1 x 1 mL

5 x 1 mL

9 comps.

Benzene (1000 µg/mL)
Ethylbenzene (1000 µg/mL)
MTBE (2000 µg/mL)
Naphthalene (1000 µg/mL)
Toluene (1000 µg/mL)

o-Xylene (1000 µg/mL)
m-Xylene (1000 µg/mL)
p-Xylene (1000 µg/mL)
Isopropylbenzene (1000 µg/mL)





Texas Method 1005 & 1006 Petroleum Storage Tanks (PST)

Stock Hydrocarbon Calibration Standard

DRH-TX-001-10X		1 x 1 mL
DRH-TX-001-10X-PAK	SAVE	5 x 1 mL
2000 µg/mL each in <i>n</i> -Pentane		12 comps.
<i>n</i> -Hexane	<i>n</i> -Tetradecane	<i>n</i> -Docosane
<i>n</i> -Octane	<i>n</i> -Hexadecane	<i>n</i> -Tetracosane
<i>n</i> -Decane	<i>n</i> -Octadecane	<i>n</i> -Hexacosane
<i>n</i> -Dodecane	<i>n</i> -Eicosane	<i>n</i> -Octacosane

Gasoline & Diesel Calibration Curve Set

DRH-TX-002-D-SET		8 x 1 mL
Each at stated conc. in CH ₂ Cl ₂		2 comps.
Regular Unleaded Gasoline	#2 Diesel Fuel	
Each set contains 8 concentrations:		
5 µg/mL	50 µg/mL	200 µg/mL
20 µg/mL	100 µg/mL	500 µg/mL
		1000 µg/mL
		5000 µg/mL

Gasoline/Diesel Continuing Calibration Standard

DRH-TX-002-D-0.4X-10ML		1 x 10 mL
200 µg/mL each in CH ₂ Cl ₂		2 comps.
Regular Unleaded Gasoline	#2 Diesel Fuel	

Gasoline/Diesel Calibration/Matrix Spike Standard

DRH-TX-002-10X		1 x 1 mL
DRH-TX-002-10X-PAK	SAVE	5 x 1 mL
5000 µg/mL each in MeOH		2 comps.
Regular Unleaded Gasoline	#2 Diesel Fuel	

Stock Gasoline/Diesel Calibration Standard

DRH-TX-002-D-40X		1 x 1 mL
DRH-TX-002-D-40X-PAK	SAVE	5 x 1 mL
20,000 µg/mL each in CH ₂ Cl ₂		2 comps.
Regular Unleaded Gasoline	#2 Diesel Fuel	

Technical Note

TCEQ Methods 1005 and 1006

Texas Commission on Environmental Quality (TCEQ) has developed these methods in response to notifications of leaking petroleum storage tanks that have contaminated ground water. These methods govern the testing of Total Petroleum Hydrocarbon (TPH) concentrations.

Gasoline & Diesel Calibration Curve Set

DRH-TX-003-SET		8 x 1 mL
Each at stated conc. in Pentane		2 comps.
Regular Unleaded Gasoline	#2 Diesel Fuel	
Each set contains 8 concentrations:		
20 µg/mL	250 µg/mL	750 µg/mL
100 µg/mL	500 µg/mL	1000 µg/mL
		5000 µg/mL
		10,000 µg/mL

Gasoline and Diesel Standard

DRH-TX-003-20X		1 x 5 mL
DRH-TX-003-20X-PAK	SAVE	5 x 5 mL
10,000 µg/mL each in Pentane		2 comps.
Regular Unleaded Gasoline	#2 Diesel Fuel	

Surrogate Standard

DRH-TX-003-SS1		1 x 5 mL
DRH-TX-003-SS1-PAK	SAVE	5 x 5 mL
10 mg/mL each in Pentane		2 comps.
1-Chlorooctadecane	1-Chlorooctane	

Carbon Number Distribution Maker

DRH-TX-003-CNM		1 x 1 mL
DRH-TX-003-CNM-PAK	SAVE	5 x 1 mL
2000 µg/mL each in Pentane		9 comps.
<i>n</i> -Decane	<i>n</i> -Heptane	<i>n</i> -Octacosane
<i>n</i> -Dodecane	<i>n</i> -Hexadecane	<i>n</i> -Octane
<i>n</i> -Heneicosane	<i>n</i> -Hexane	<i>n</i> -Pentatriacontane

Aromatic Fractionation Check Standard

DRH-TX-003-FCS		1 x 10 mL
DRH-TX-003-FCS-PAK	SAVE	5 x 10 mL
20 µg/mL each in Pentane		24 comps.
Acenaphthene	Benzo[e]pyrene	Naphthalene
Acenaphthylene	Benzo[g,h,i]perylene	Phenanthrene
Anthracene	Chrysene	Pyrene
Benzene	Dibenz[a,h]anthracene	Toluene
Benz[a]anthracene	Ethylbenzene	1,2,3-Trimethylbenzene
Benzo[b]fluoranthene	Fluoranthene	<i>m</i> -Xylene
Benzo[k]fluoranthene	Fluorene	<i>p</i> -Xylene
Benzo[a]pyrene	Indeno[1,2,3-cd]pyrene	<i>o</i> -Xylene



LUFT/LUST Standards

Washington Methods

Washington Method Determination of Volatile Petroleum Hydrocarbons (VPH)

VPH Standard

VPH-WA		1 x 1 mL
VPH-WA-PAK	SAVE	5 x 1 mL
200 µg/mL each in MeOH		15 comps.

Benzene	<i>p</i> -Xylene	<i>n</i> -Decane
Ethylbenzene	MtBE	<i>n</i> -Dodecane
Toluene	<i>n</i> -Pentane	1-Methylnaphthalene
<i>o</i> -Xylene	<i>n</i> -Hexane	Naphthalene
<i>m</i> -Xylene	<i>n</i> -Octane	1,2,3-Trimethylbenzene

VPH Primary Dilution Standard with Surrogate

VPH-WA-SS-10X		1 x 1 mL
VPH-WA-SS-10X-PAK	SAVE	5 x 1 mL
2,000 µg/mL each in MeOH		16 comps.

Benzene	MtBE	<i>n</i> -Dodecane
Ethylbenzene	<i>n</i> -Pentane	1-Methylnaphthalene
Toluene	<i>n</i> -Hexane	Naphthalene
<i>o</i> -Xylene	<i>n</i> -Octane	1,2,3-Trimethylbenzene
<i>m</i> -Xylene	<i>n</i> -Decane	2,5-Dibromotoluene (surrogate)
<i>p</i> -Xylene		

Stock Concentrate VPH Standards

VPH-WA-10X		1 x 1 mL
VPH-WA-10X-PAK	SAVE	5 x 1 mL
2,000 µg/mL each in MeOH		15 comps.
VPH-WA-100X		1 x 1 mL
VPH-WA-100X-PAK	SAVE	5 x 1 mL
20.0 mg/mL each in MeOH		15 comps.

Benzene	<i>p</i> -Xylene	<i>n</i> -Decane
Ethylbenzene	MtBE	<i>n</i> -Dodecane
Toluene	<i>n</i> -Pentane	1-Methylnaphthalene
<i>o</i> -Xylene	<i>n</i> -Hexane	Naphthalene
<i>m</i> -Xylene	<i>n</i> -Octane	1,2,3-Trimethylbenzene

Certified BTEX in Unleaded Gasoline (Single Source)

GA-001-20X-BTEX	1 x 1 mL
10.0 mg/mL in MeOH	
Regular Unleaded Gasoline	

Certified BTEX in Gasoline Composite (Multi Source)

GRO-AK-101-GCS-BTEX	1 x 1 mL
5 mg/mL in MeOH	3 comps.

	Wt. Vol.
Gasoline (Premium)	1.66 mg/mL
Gasoline (Regular Leaded)	1.67 mg/mL
Gasoline (Regular Unleaded)	1.67 mg/mL

VPH Matrix Spike

VPH-WA-MS		1 x 1 mL
VPH-WA-MS-PAK	SAVE	5 x 1 mL
Varied conc. in MeOH		11 comps.

Benzene	(60 µg/mL)	Toluene	(60 µg/mL)
Ethylbenzene	(60 µg/mL)	1,2,3-Trimethylbenzene	(60 µg/mL)
MtBE	(180 µg/mL)	<i>m</i> -Xylene	(60 µg/mL)
Naphthalene	(360 µg/mL)	<i>p</i> -Xylene	(60 µg/mL)
<i>n</i> -Nonane	(200 µg/mL)	<i>o</i> -Xylene	(60 µg/mL)
<i>n</i> -Pentane	(600 µg/mL)		

VPH Surrogate Standard

GRH-004-SS		1 x 1 mL
GRH-004-SS-PAK	SAVE	5 x 1 mL
50 µg/mL in MeOH		
GRH-004-SS-10X		1 x 1 mL
GRH-004-SS-10X-PAK	SAVE	5 x 1 mL
500 µg/mL in MeOH		
GRH-004-SS-100X		1 x 1 mL
GRH-004-SS-100X-PAK	SAVE	5 x 1 mL
5,000 µg/mL in MeOH		
2,5-Dibromotoluene		

VPH Retention Time Marker

VPH-WA-RT		1 x 1 mL
VPH-WA-RT-PAK	SAVE	5 x 1 mL
2,000 µg/mL each in MeOH		6 comps.
<i>n</i> -Pentane	<i>n</i> -Octane	<i>n</i> -Dodecane
<i>n</i> -Hexane	<i>n</i> -Decane	<i>n</i> -Tridecane

1,2,3-Trimethylbenzene Standard

V-028S-D-10X		1 x 1 mL
V-028S-D-10X-PAK	SAVE	5 x 1 mL
1000 µg/mL each in CH ₂ Cl ₂		
1,2,3-Trimethylbenzene		

Technical Note

Simultaneous BTEX / Gasoline QA/QC

Our QC Department has certified the benzene, toluene, ethyl benzene and xylene concentrations in the unleaded gasoline standard GA-001-20X-BTEX and GRO-AK-101-GCS-BTEX. This allows the use of a single injection to verify that the QA/QC requirements are being met for the BTEX analytes as well as for the gasoline.

We have added a multi source certified BTEX in gasoline composite mix GRO-AK-101-GCS-BTEX. The BTEX values for this multi-source calibration standard have been determined through in-house analysis against a BTEX multi-level calibration curve listed on the certificate.



Washington Method Determination of Extractable Petroleum Hydrocarbons (EPH)

EPH Aromatic/PAH Standard

EPH-WA-10X		1 x 1 mL
EPH-WA-10X-PAK	SAVE	5 x 1 mL
1.0 µg/mL each in CH ₂ Cl ₂		18 comps.
Acenaphthene	Benzo[g,h,i]perylene	Indeno[1,2,3-cd]pyrene
Acenaphthylene	Benzo[k]fluoranthene	2-Methylnaphthalene
Anthracene	Chrysene	Naphthalene
Benz[a]anthracene	Dibenz[a,h]anthracene	Phenanthrene
Benzo[a]pyrene	Fluoranthene	Pyrene
Benzo[b]fluoranthene	Fluorene	1,2,3-Trimethylbenzene

Internal Standard

GRH-IS		1 x 1 mL
GRH-IS-PAK	SAVE	5 x 1 mL
1000 µg/mL in CH ₂ Cl ₂		
GRH-IS-10X		1 x 1 mL
10.0 mg/mL in CH ₂ Cl ₂		
5-alpha Androstane		

EPH Surrogate Spike

DRH-MA-SS		1 x 1 mL
20 µg/mL each in Acetone		2 comps.
DRH-MA-SS-10X		1 x 1 mL
200 µg/mL each in Acetone		2 comps.
DRH-MA-SS-100X		1 x 1 mL
DRH-MA-SS-100X-PAK	SAVE	5 x 1 mL
2,000 µg/mL each in Acetone		2 comps.
1-Chlorooctadecane	o-Terphenyl	

EPH Matrix Spike

EPH-WA-MS2-20ML		1 x 20 mL
EPH-WA-MS2-20ML-PAK	SAVE	5 x 20 mL
25 µg/mL each in Acetone		10 comps.
Acenaphthene	n-Decane	n-Heneicosane
Anthracene	n-Dodecane	Naphthalene
Benzo[g,h,i]perylene	n-Hexadecane	Pyrene
Benzo[a]pyrene		

EPH Aliphatic Check Mix

EPH-WA-ALI		1 x 1 mL
EPH-WA-ALI-PAK	SAVE	5 x 1 mL
1.0 mg/mL each in CH ₂ Cl ₂		5 comps.
n-Octane	n-Dodecane	n-Heneicosane
n-Decane	n-Hexadecane	

EPH Aromatic Check Mix

EPH-WA-ARO		1 x 1 mL
EPH-WA-ARO-PAK	SAVE	5 x 1 mL
1.0 mg/mL each in CH ₂ Cl ₂		5 comps.
Acenaphthene	Naphthalene	1,2,3-Trimethylbenzene
Benzo[g,h,i]perylene	Pyrene	

Revised EPH Aliphatic Check Mix

EPH-WA-ALI-R1		1 x 1 mL
EPH-WA-ALI-R1-PAK	SAVE	5 x 1 mL
1.0 mg/mL each in CH ₂ Cl ₂		6 comps.
n-Octane	n-Dodecane	n-Heneicosane
n-Decane	n-Hexadecane	n-Tetatriacontane

EPH Fractionation Check Standard

EPH-WA-FCS		1 x 1 mL
EPH-WA-FCS-PAK	SAVE	5 x 1 mL
25 µg/mL each in Hexane		24 comps.
Acenaphthene	Chrysene	Pyrene
Acenaphthylene	Dibenz[a,h]anthracene	n-Decane
Anthracene	Fluoranthene	n-Dodecane
Benz[a]anthracene	Fluorene	n-Tetradecane
Benzo[a]pyrene	Indeno[1,2,3-cd]pyrene	n-Hexadecane
Benzo[b]fluoranthene	2-Methylnaphthalene	n-Octadecane
Benzo[g,h,i]perylene	Naphthalene	n-Eicosane
Benzo[k]fluoranthene	Phenanthrene	n-Heneicosane

Revised EPH Fractionation Check Standard

EPH-WA-FCS-R1		1 x 1 mL
EPH-WA-FCS-R1-PAK	SAVE	5 x 1 mL
25 µg/mL each in Hexane		23 comps.
Acenaphthene	Chrysene	Pyrene
Acenaphthylene	Dibenz[a,h]anthracene	n-Octane
Anthracene	Fluoranthene	n-Decane
Benz[a]anthracene	Fluorene	n-Dodecane
Benzo[a]pyrene	Indeno[1,2,3-cd]pyrene	n-Hexadecane
Benzo[b]fluoranthene	2-Methylnaphthalene	n-Heneicosane
Benzo[g,h,i]perylene	Naphthalene	n-Tetatriacontane
Benzo[k]fluoranthene	Phenanthrene	

1,2,3-Trimethylbenzene Standard

V-028S-D-10X		1 x 1 mL
V-028S-D-10X-PAK	SAVE	5 x 1 mL
1000 µg/mL each in CH ₂ Cl ₂		
1,2,3-Trimethylbenzene		

Revised EPH Aromatic Check Mix

EPH-WA-ARO-R1		1 x 1 mL
EPH-WA-ARO-R1-PAK	SAVE	5 x 1 mL
1.0 mg/mL each in CH ₂ Cl ₂		6 comps.
Acenaphthene	Naphthalene	1,2,3-Trimethylbenzene
Benzo[g,h,i]perylene	Pyrene	Toluene

Aliphatic Surrogate

DRH-007-SS		1 x 1 mL
DRH-007-SS-PAK	SAVE	5 x 1 mL
1.0 mg/mL in Hexane		
1-Chlorooctadecane		

Aromatic Surrogate

DRH-006-SS		1 x 1 mL
DRH-006-SS-PAK	SAVE	5 x 1 mL
1.0 mg/mL in CH ₂ Cl ₂		
o-Terphenyl		

Wisconsin Method

Wisconsin DNR - Gasoline Range Hydrocarbons

GRH-003S		1 x 1 mL
GRH-003S-PAK	SAVE	5 x 1 mL
2.0 mg/mL each in MeOH		10 comps.
Benzene	Toluene	o-Xylene
Ethylbenzene	1,2,4-Trimethylbenzene	m-Xylene
MtBE	1,3,5-Trimethylbenzene	p-Xylene
Naphthalene		



LUFT/LUST Standards

Gasoline Range Hydrocarbon (GRH)

Gasoline Range Hydrocarbon Analysis

EPA Method - Gasoline Range Hydrocarbons

Gasoline Standard

GRH-002S 1 x 1 mL
GRH-002S-10X 1 x 1 mL
At stated conc. in MeOH 10 comps.

	GRH-002S	GRH-002-10X
2-Methylpentane	(1.5 mg/mL)	(15 mg/mL)
2,2,4-Trimethylpentane	(1.5 mg/mL)	(15 mg/mL)
Heptane	(0.5 mg/mL)	(5 mg/mL)
Benzene	(0.5 mg/mL)	(5 mg/mL)
Toluene	(1.5 mg/mL)	(15 mg/mL)
Ethylbenzene	(0.5 mg/mL)	(5 mg/mL)
m-Xylene	(1.0 mg/mL)	(10 mg/mL)
p-Xylene	(1.0 mg/mL)	(10 mg/mL)
o-Xylene	(1.0 mg/mL)	(10 mg/mL)
1,2,4-Trimethylbenzene	(1.0 mg/mL)	(10 mg/mL)

Internal Standard

GARH-IS 1 x 1 mL
1.0 mg/mL in CH₂Cl₂
Chloro-4-fluorobenzene

Surrogate Standard

GARH-SS 1 x 1 mL
2.5 mg/mL in Acetone
4-Bromofluorobenzene

Gasoline Additives

GAD-001 1 x 1 mL
GAD-001-PAK 5 x 1 mL
0.2 mg/mL each in MeOH 4 comps.
SAVE
Dibromomethane 1,2-Dichloroethane
1,2-Dibromoethane Methyl t-butyl ethera

Technical Note

Simultaneous BTEX / Gasoline QA/QC

We have certified the benzene, toluene, ethyl benzene and xylene concentrations in the unleaded gasoline standard (GA-001-20X-BTEX). This allows the use of a single injection to verify that the QA/QC requirements are being met for the BTEX analytes as well as for the gasoline.

Certified BTEX in Unleaded Gasoline

GA-001-20X-BTEX 1 x 1 mL
10.0 mg/mL in MeOH
Regular unleaded gasoline

Hexadecane Extraction Volatiles

CLP-BTEX 1 x 1 mL
CLP-BTEX-PAK 5 x 1 mL
0.2 mg/mL each in MeOH 6 comps.
CLP-BTEX-10X 1 x 1 mL
CLP-BTEX-10X-PAK 5 x 1 mL
2.0 mg/mL each in MeOH 6 comps.
SAVE
SAVE
Benzene o-Xylene
Ethyl benzene m-Xylene
Toluene p-Xylene

California - Gasoline Range Hydrocarbons

S-603A-10X 1 x 1 mL
S-603A-10X-PAK 5 x 1 mL
2.0 mg/mL each in MeOH 7 comps.
SAVE

Benzene	o-Xylene
Ethylbenzene	m-Xylene
Methyl t-butyl ether	p-Xylene
Toluene	

Los Angeles County Well Investigation and Monitoring Program

Purgeable Aromatics - Gasoline ID

M-602-GAS-10X 1 x 1 mL
2.0 mg/mL each in MeOH 11 comps.

Benzene	Toluene
Chlorobenzene	o-Xylene
1,2-Dichlorobenzene	p-Xylene
1,3-Dichlorobenzene	m-Xylene
1,4-Dichlorobenzene	MtBE
Ethylbenzene	

Oxygenate Gasoline Additive Standard

OGAD-001 1 x 1 mL
OGAD-001-PAK 5 x 1 mL
At stated conc. in MeOH 5 comps.
SAVE

MtBE	(2000 µg/mL)	TAME	(2000 µg/mL)
ETBE	(2000 µg/mL)	t-Butanol	(10000 µg/mL)
Isopropyl ether	(2000 µg/mL)		

Ethanol

M-8015B/5031-11 1 x 1 mL
10 mg/mL in Water

Methanol

M-8015B/5031-17 1 x 1 mL
10 mg/mL in Water

Pennsylvania DER - Gasoline Range Hydrocarbons

GRH-001S 1 x 1 mL
GRH-001S-PAK 5 x 1 mL
1.0 mg/mL each in MeOH 10 comps.
SAVE

Benzene	1,2,4-Trimethylbenzene
Ethylbenzene	2,2,4-Trimethylpentane
Heptane	o-Xylene
2-Methyl pentane	m-Xylene
Toluene	p-Xylene

Wisconsin DNR - Gasoline Range Hydrocarbons

GRH-003S 1 x 1 mL
GRH-003S-PAK 5 x 1 mL
2.0 mg/mL each in MeOH 10 comps.
SAVE

Benzene	1,2,4-Trimethylbenzene
Ethylbenzene	1,3,5-Trimethylbenzene
MtBE	o-Xylene
Naphthalene	m-Xylene
Toluene	p-Xylene

LUFT/LUST Standards

Diesel Range Hydrocarbons (DRH)



Diesel Range Hydrocarbon Analysis

EPA Method - Diesel Range Hydrocarbons

DRH-001S	1 x 1 mL
0.2 mg/mL each in CH ₂ Cl ₂ : Hexane (1:1)	10 comps.
DRH-001S-10X	1 x 1 mL
2.0 mg/mL each in CH ₂ Cl ₂ : Hexane (1:1)	10 comps.

<i>n</i> -Decane	C ₁₀	<i>n</i> -Hexadecane	C ₁₆	<i>n</i> -Docosane	C ₂₂	<i>n</i> -Hexacosane	C ₂₆
<i>n</i> -Dodecane	C ₁₂	<i>n</i> -Octadecane	C ₁₈	<i>n</i> -Tetracosane	C ₂₄	<i>n</i> -Octacosane	C ₂₈
<i>n</i> -Tetradecane	C ₁₄	<i>n</i> -Eicosane	C ₂₀				

Surrogate Standard

GRH-SS	1 x 1 mL
GRH-SS-PAK	5 x 1 mL
2.0 mg/mL in Acetone	
<i>o</i> -Terphenyl (OTP)	

Internal Standard

GRH-IS	1 x 1 mL
GRH-IS-PAK	5 x 1 mL
1.0 mg/mL in CH ₂ Cl ₂	
5- α Androstane	

Calibration/Window Defining Hydrocarbon Standard

DRH-004S-R1-5X	1 x 1 mL
DRH-004S-R1-5X-PAK	5 x 1 mL
1.0 mg/mL each in Chloroform	17 comps.

Octane	C ₈	Octadecane	C ₁₈	Hexacosane	C ₂₆	Tetratriacontane	C ₃₄
Decane	C ₁₀	Eicosane	C ₂₀	Octacosane	C ₂₈	Hexatriacontane	C ₃₆
Dodecane	C ₁₂	Docosane	C ₂₂	Triacontane	C ₃₀	Octatriacontane	C ₃₈
Tetradecane	C ₁₄	Tetracosane	C ₂₄	Dotriacontane	C ₃₂	Tetracontane	C ₄₀
Hexadecane	C ₁₆						

Surrogate Standard

DRH-SS	1 x 1 mL
DRH-SS-PAK	5 x 1 mL
5.0 mg/mL in THF	
<i>n</i> -Triacontane-d ₃₂	

D-2887 Calibration Solution

Calibration Solution

DRH-002S	1 x 1 mL
At stated conc. in CS ₂	17 comps.

Hexane (600 μ g/mL)	Dodecane (1,200 μ g/mL)	Octacosane (100 μ g/mL)
Heptane (600 μ g/mL)	Tetradecane (1,200 μ g/mL)	Dotriacontane (100 μ g/mL)
Octane (800 μ g/mL)	Hexadecane (1,000 μ g/mL)	Hexatriacontane (100 μ g/mL)
Nonane (800 μ g/mL)	Octadecane (500 μ g/mL)	Tetracontane (100 μ g/mL)
Decane (1,200 μ g/mL)	Eicosane (200 μ g/mL)	Tetratetracontane (100 μ g/mL)
Undecane (1,200 μ g/mL)	Tetracosane (200 μ g/mL)	

Column Test Mixture

ASTM-D2887	1 x 1 mL
1% v/v in <i>n</i> -Octane	2 comps.
<i>n</i> -Hexadecane	<i>n</i> -Octadecane

Wisconsin Diesel Range Hydrocarbons

DRH-003S				1 x 1 mL	
0.2 mg/mL each in Hexane				11 comps.	
<i>n</i> -Decane	C ₁₀	<i>n</i> -Tetradecane	C ₁₄	<i>n</i> -Octadecane	C ₁₈
<i>n</i> -Undecane	C ₁₁	<i>n</i> -Pentadecane	C ₁₅	<i>n</i> -Nonadecane	C ₁₉
<i>n</i> -Dodecane	C ₁₂	<i>n</i> -Hexadecane	C ₁₆	<i>n</i> -Eicosane	C ₂₀
<i>n</i> -Tridecane	C ₁₃	<i>n</i> -Heptadecane	C ₁₇		

Complete Hydrocarbon Analysis

Multi-State Hydrocarbon Window Defining Standard

DRH-008S-R2	1 x 1 mL
DRH-008S-R2-PAK	5 x 1 mL
500 μ g/mL each in Chloroform	35 comps.

Octane	Heptadecane	Tetracosane	Tritriacontane
Nonane	Pristane	Pentacosane	Tetratriacontane
Decane	Octadecane	Hexacosane	Pentatriacontane
Undecane	Phytane	Heptacosane	Hexatriacontane
Dodecane	Nonadecane	Octacosane	Heptatriacontane
Tridecane	Eicosane	Nonacosane	Octatriacontane
Tetradecane	Heneicosane	Triacotane	Nonatriacontane
Pentadecane	Docosane	<i>n</i> -Hentriacontane	Tetracontane
Hexadecane	Tricosane	Dotriacontane	

Technical Note

We offer a hydrocarbon window defining standard with the C₉ to C₃₅ odd and even Alkanes. Use of this one standard should meet the numerous state to state variations for hydrocarbon validation and reporting. As an added benefit pristane and phytane are included in the formulation. This one standard can meet numerous LUFT/LUST programs requiring that the C₁₇/*i*-pristane and C₁₈/*i*-phytane ratio be used to estimate subsurface degradation of fuel oil spills.

A fuel oil degradation mixture containing just the four required analytes to determine the C₁₇/*i*-pristane and C₁₈/*i*-phytane ratio (DRH-005S-10X) is also available.

Fuel Oil Degradation/Retention Time Mixture for Quantification of C₁₇/*i*-Pristane and C₁₈/*i*-Phytane Ratios

DRH-005S-10X	1 x 1 mL
2.0 mg/mL each in CH ₂ Cl ₂ : CS ₂ (1:1)	4 comps.

Heptadecane	Phytane (2,6,10,14-Tetramethylhexadecane)
Octadecane	Pristane (2,6,10,14-Tetramethylpentadecane)

Hydrocarbon Window Defining Standard Set

DRH-FTRPH-SET	2 x 1 mL
(DRH-FTRPH, DRH-FTRPH2)	
DRH-FTRPH-SET-PAK	5 (2 x 1 mL)
500 μ g/mL each in Hexane	

FTRPH Calibration/Window Defining Standard

DRH-FTRPH	1 x 1 mL
DRH-FTRPH-PAK	5 x 1 mL
500 μ g/mL each in Hexane	17 comps.

<i>n</i> -Octane	<i>n</i> -Octadecane	<i>n</i> -Hexacosane	<i>n</i> -Tetratriacontane
<i>n</i> -Decane	<i>n</i> -Eicosane	<i>n</i> -Octacosane	<i>n</i> -Hexatriacontane
<i>n</i> -Dodecane	<i>n</i> -Docosane	<i>n</i> -Triacotane	<i>n</i> -Octatriacontane
<i>n</i> -Tetradecane	<i>n</i> -Tetracosane	<i>n</i> -Dotriacontane	<i>n</i> -Tetracontane
<i>n</i> -Hexadecane			

Hydrocarbon Window Defining Standard

DRH-FTRPH2	1 x 1 mL
DRH-FTRPH2-PAK	5 x 1 mL
500 μ g/mL each in Hexane	18 comps.

<i>n</i> -Nonane	Pristane	<i>n</i> -Pentacosane	<i>n</i> -Tritriacontane
<i>n</i> -Undecane	Phytane	<i>n</i> -Heptacosane	<i>n</i> -Pentatriacontane
<i>n</i> -Tridecane	<i>n</i> -Nonadecane	<i>n</i> -Nonacosane	<i>n</i> -Heptatriacontane
<i>n</i> -Pentadecane	<i>n</i> -Heneicosane	<i>n</i> -Hentriacontane	<i>n</i> -Nonatriacontane
<i>n</i> -Heptadecane	<i>n</i> -Tricosane		



LUFT/LUST Standards

Oil, Grease & TPH (Method 1664, 413.2/418.1 & 8440) Weathered Fuel Sets

Method 1664 Oil, Grease & Total Petroleum Hydrocarbon Determination

Precision and Recovery (PAR) Spiking Solution

M-1664-5ML		1 x 5 mL
M-1664-5ML-PAK	SAVE	5 x 5 mL
4.0 mg/mL each in Acetone		
M-1664-20ML		1 x 20 mL
M-1664-20ML-PAK	SAVE	5 x 20 mL
4.0 mg/mL each in Acetone		
Hexadecane	Stearic acid	2 comps.

Technical Note

Precision and Recovery (PAR) Spiking Solution was developed for Method 1664. This performance based method was developed to replace previous gravimetric procedures which incorporated Freon-113 as the extraction solvent for the determination of Oil and Grease and Total Petroleum Hydrocarbons. Each standard is packaged in a flame sealed ampule conveniently sized for quality control of the analytical batch.

Silica Gel Hexane Extraction Material

SGT-HEM		1 x 1 mL
20 µg/mL each in Acetone		
Stearic acid	Hexadecane	2 comps.

Method 413.2 & 418.1 Total Petroleum Hydrocarbon Analysis by IR

Oil, Grease & Petroleum Hydrocarbon Concentrates Mix

M-418-CON		1 x 1 mL
% by volume		
Chlorobenzene (25.0)	Hexadecane (37.5)	3 comps.
Isooctane (37.5)		

Oil, Grease and Petroleum Hydrocarbon Total Recoverable (IR Method)

M-418		1 x 1 mL
M-418-PAK	SAVE	5 x 1 mL
Total 4.15 mg/mL in Freon 113, (Parts by volume)		
Chlorobenzene (10.0)	Isooctane (15.0)	3 comps.
n-Hexadecane (15.0)		

Method 8440 Total Petroleum Hydrocarbon Analysis

Total Recoverable Petroleum Hydrocarbon Mix

M-8440		1 x 1 mL
M-8440-PAK	SAVE	5 x 1 mL
At stated conc. in Tetrachloroethene		
Chlorobenzene (0.10 w/w %)	Isooctane (0.15 w/w %)	3 comps.
n-Hexadecane (0.15 w/w %)		

Leaking Underground Storage Tank Retention Time Standard

This product can be used to screen a sample to determine what type of petroleum spill that may have caused the contamination.

Retention Time Standard

DRH-010S		1 x 1 mL
DRH-010S-PAK	SAVE	5 x 1 mL
25 µg/mL each in CH ₂ Cl ₂		
n-Hexane	n-Tetracosane	n-Triacontane
n-Decane	n-Octacosane	n-Tetracontane
n-Dodecane		

Silica Gel Cleanup Calibration Solution

M-8440-SGC		1 x 1 mL
M-8440-SGC-PAK	SAVE	5 x 1 mL
10.0 mg/mL in Tetrachloroethene		
Corn Oil		

Total Petroleum Hydrocarbon Concentrate Mix

M-8440-CON		1 x 1 mL
M-8440-CON-PAK	SAVE	5 x 1 mL
Chlorobenzene (25.0 vol %)	Isooctane (37.5 vol %)	3 comps.
n-Hexadecane (37.5 vol %)		

Technical Note

A sample showing peaks in the C₆-C₁₀ range generally indicates a gasoline spill. Samples with the peaks in the C₁₂-C₂₄ range are indicative of a diesel spill while samples with the higher carbon numbers above C₂₄ are typically oils or lubricants. Once the initial screen is complete, more detailed work can be done to further identify the contaminant.

Standards of Interest

See our Weathered LUFT/LUST Fuel Set in the Fuel and Hydrocarbon Section - pages 318-319

Wear Metals

AA, ICP, DCP & XRF Analysis



These Standards were formulated for the analysis of metals in oils and other organic matrices. The curves generated provide a convenient way to analyze for metals (wear metals, additives and contaminants) in lubricating oils, gasolines, residual oils, crude oils, turbine fuels and environmental samples. All standards undergo rigorous quality assurance checks. Major constituents in the final Standard are typically analyzed by both plasma emission and rotochrome techniques. Organometallic Standards listed on this page may contain sulfur which can be introduced by possible sulfonate starting materials used to formulate the actual organometallic standard. We developed a Premium Organometallic line for chemists preferring to have organometallic standards with <1 ppm sulfur or phosphorous (see Table of Contents).

- Single & Multi Element Standards
- Formulated from Ultra High Purity Organometallic starting materials & matrices
- Prepared Calibration Curves
- Certificate of Analysis

Single Element Wear Metals

Organometallic ICP/XRF

Element	1000 µg/g in 75 cSt base oil Cat. No. (50 g)	5000 µg/g in 75 cSt base oil Cat. No. (50 g)
Al (Aluminum)	WM-75CST-01	WM-75CST-01-5X
Sb (Antimony)	WM-75CST-02	WM-75CST-02-5X
As (Arsenic)	WM-75CST-03	
Ba (Barium)	WM-75CST-04	WM-75CST-04-5X
Be (Beryllium)	WM-75CST-05	
Bi (Bismuth)	WM-75CST-06	WM-75CST-06-5X
B (Boron)	WM-75CST-07	WM-75CST-07-5X
Cd (Cadmium)	WM-75CST-08	WM-75CST-08-5X
Ca (Calcium)	WM-75CST-09	WM-75CST-09-5X
Cr (Chromium)	WM-75CST-13	WM-75CST-13-5X
Co (Cobalt)	WM-75CST-14	WM-75CST-14-5X
Cu (Copper)	WM-75CST-15	WM-75CST-15-5X
Fe (Iron)	WM-75CST-27	WM-75CST-27-5X
La (Lanthanum)	WM-75CST-28	
Pb (Lead)	WM-75CST-29	WM-75CST-29-5X
Li (Lithium)	WM-75CST-30	WM-75CST-30-5X
Mg (Magnesium)	WM-75CST-32	WM-75CST-32-5X
Mn (Manganese)	WM-75CST-33	WM-75CST-33-5X
Hg (Mercury)	WM-75CST-34	
Mo (Molybdenum)	WM-75CST-35	WM-75CST-35-5X
Ni (Nickel)	WM-75CST-37	WM-75CST-37-5X
P (Phosphorous)	WM-75CST-41	WM-75CST-41-5X
K (Potassium)	WM-75CST-43	WM-75CST-43-5X
Sc (Scandium)	WM-75CST-50	
Se (Selenium)	WM-75CST-51	
Si (Silicon)	WM-75CST-52	WM-75CST-52-5X
Ag (Silver)	WM-75CST-53	WM-75CST-53-5X
Na (Sodium)	WM-75CST-54	WM-75CST-54-5X
Sr (Strontium)	WM-75CST-55	
S (Sulfur)	WM-75CST-56	WM-75CST-56-5X
Tl (Thallium)	WM-75CST-60	
Sn (Tin)	WM-75CST-63	WM-75CST-63-5X
Ti (Titanium)	WM-75CST-64	WM-75CST-64-5X
V (Vanadium)	WM-75CST-67	WM-75CST-67-5X
Y (Yttrium)	WM-75CST-69	WM-75CST-69-5X
Zn (Zinc)	WM-75CST-70	WM-75CST-70-5X
Zr (Zirconium)	WM-75CST-71	WM-75CST-71-5X

Matrix Oil and Stabilizer

75 cSt Oil

MOSOL-75 500 mL

Stabilizer

WM-STAB 1 x 50 g

Technical Note

Used to improve the stability of Organometallic Standards when diluting into solvents such as Kerosene.

Metals Additives

Metals Additives Standard

MA-900-100G	100 g
MA-900-200G	200 g
900 µg/g each in Hydrocarbon oil	
MA-1000-100G	100 g
MA-1000-200G	200 g
1000 µg/g each in Hydrocarbon oil	
MA-3000-100G	100 g
MA-3000-200G	200 g
3000 µg/g each in Hydrocarbon oil	
MA-5000-100G	100 g
MA-5000-200G	200 g
5000 µg/g each in Hydrocarbon oil	5 comps.

Ba (Barium) P (Phosphorous)
Ca (Calcium) Zn (Zinc)
Mg (Magnesium)





Wear Metals

AA, ICP, DCP & XRF Analysis

12 Wear Metal Multi-Element

Conc.	Unit	Cat. No.
10 µg/g	100 g	WM-12-1X-100G
	200 g	WM-12-1X-200G
30 µg/g	100 g	WM-12-3X-100G
	200 g	WM-12-3X-200G
50 µg/g	100 g	WM-12-5X-100G
	200 g	WM-12-5X-200G
100 µg/g	100 g	WM-12-10X-100G
	200 g	WM-12-10X-200G
300 µg/g	100 g	WM-12-30X-100G
	200 g	WM-12-30X-200G
500 µg/g	100 g	WM-12-50X-100G
	200 g	WM-12-50X-200G
900 µg/g	100 g	WM-12-90X-100G
	200 g	WM-12-90X-200G
100 gram Set WM-12-100G-SET set of above 7 x 100 g		
200 gram Set WM-12-200G-SET set of above 7 x 200 g		

Each Wear Metal Standard contains 12 elements listed below in hydrocarbon oil at the stated concentration.

Ag (Silver)	Fe (Iron)	Pb (Lead)
Al (Aluminum)	Mg (Magnesium)	Si (Silicon)
Cr (Chromium)	Na (Sodium)	Sn (Tin)
Cu (Copper)	Ni (Nickel)	Ti (Titanium)

21 Wear Metal Multi-Element

Conc.	Unit	Cat. No.
10 µg/g	100 g	WM-21-1X-100G
	200 g	WM-21-1X-200G
30 µg/g	100 g	WM-21-3X-100G
	200 g	WM-21-3X-200G
50 µg/g	100 g	WM-21-5X-100G
	200 g	WM-21-5X-200G
100 µg/g	100 g	WM-21-10X-100G
	200 g	WM-21-10X-200G
300 µg/g	100 g	WM-21-30X-100G
	200 g	WM-21-30X-200G
500 µg/g	100 g	WM-21-50X-100G
	200 g	WM-21-50X-200G
900 µg/g	100 g	WM-21-90X-100G
	200 g	WM-21-90X-200G
100 gram Set WM-21-100G-SET set of above 7 x 100 g		
200 gram Set WM-21-200G-SET set of above 7 x 200 g		

Each Wear Metal Standard contains 21 elements listed below in hydrocarbon oil at the stated concentration.

Ag (Silver)	Cu (Copper)	P (Phosphorus)
Al (Aluminum)	Fe (Iron)	Pb (Lead)
B (Boron)	Mg (Magnesium)	Si (Silicon)
Ba (Barium)	Mn (Manganese)	Sn (Tin)
Ca (Calcium)	Mo (Molybdenum)	Ti (Titanium)
Cd (Cadmium)	Na (Sodium)	V (Vanadium)
Cr (Chromium)	Ni (Nickel)	Zn (Zinc)

22 Wear Metal Multi-Element

Conc.	Unit	Cat. No.
10 µg/g	100 g	WM-22-1X-100G
	200 g	WM-22-1X-200G
30 µg/g	100 g	WM-22-3X-100G
	200 g	WM-22-3X-200G
50 µg/g	100 g	WM-22-5X-100G
	200 g	WM-22-5X-200G
100 µg/g	100 g	WM-22-10X-100G
	200 g	WM-22-10X-200G
300 µg/g	100 g	WM-22-30X-100G
	200 g	WM-22-30X-200G
500 µg/g	100 g	WM-22-50X-100G
	200 g	WM-22-50X-200G
900 µg/g	100 g	WM-22-90X-100G
	200 g	WM-22-90X-200G
100 gram Set WM-22-100G-SET set of above 7 x 100 g		
200 gram Set WM-22-200G-SET set of above 7 x 200 g		

Each Wear Metal Standard contains 22 elements listed below in hydrocarbon oil at the stated concentration.

Ag (Silver)	Fe (Iron)	P (Phosphorus)
Al (Aluminum)	K (Potassium)	Pb (Lead)
B (Boron)	Mg (Magnesium)	Si (Silicon)
Ba (Barium)	Mn (Manganese)	Sn (Tin)
Ca (Calcium)	Mo (Molybdenum)	Ti (Titanium)
Cd (Cadmium)	(Molybdenum)	V (Vanadium)
Cr (Chromium)	Na (Sodium)	Zn (Zinc)
Cu (Copper)	Ni (Nickel)	

23 Wear Metal Multi-Element

Conc.	Unit	Cat. No.
10 µg/g	100 g	WM-23-1X-100G
	200 g	WM-23-1X-200G
30 µg/g	100 g	WM-23-3X-100G
	200 g	WM-23-3X-200G
50 µg/g	100 g	WM-23-5X-100G
	200 g	WM-23-5X-200G
100 µg/g	100 g	WM-23-10X-100G
	200 g	WM-23-10X-200G
300 µg/g	100 g	WM-23-30X-100G
	200 g	WM-23-30X-200G
500 µg/g	100 g	WM-23-50X-100G
	200 g	WM-23-50X-200G
900 µg/g	100 g	WM-23-90X-100G
	200 g	WM-23-90X-200G
100 gram Set WM-23-100G-SET set of above 7 x 100 g		
200 gram Set WM-23-200G-SET set of above 7 x 200 g		

Each Wear Metal Standard contains 23 elements listed below in hydrocarbon oil at the stated concentration.

Ag (Silver)	Fe (Iron)	Pb (Lead)
Al (Aluminum)	K (Potassium)	Sb (Antimony)
B (Boron)	Mg (Magnesium)	Si (Silicon)
Ba (Barium)	Mn (Manganese)	Sn (Tin)
Ca (Calcium)	Mo (Molybdenum)	Ti (Titanium)
Cd (Cadmium)	Na (Sodium)	V (Vanadium)
Cr (Chromium)	Ni (Nickel)	Zn (Zinc)
Cu (Copper)	P (Phosphorus)	



Wear Metals

Premium Sulfur-Free



- Highly Concentrated Liquid Organometallic Standards
- Stabilized

- Sulfur/Phosphorous free (< 1 ppm)
- Ready for Use

Organometallic Single Element Stock Standards

Sulfur free Element	@ 1000 µg/g Cat. No.	50 mL	@ 5000 µg/g Cat. No.	50 mL
Al (Aluminum)	WM-NMS-01		WM-NMS-01-5X	
Sb (Antimony)	WM-NMS-02		WM-NMS-02-5X	
As (Arsenic)	WM-NMS-03		WM-NMS-03-5X	
Ba (Barium)	WM-NMS-04		WM-NMS-04-5X	
Be (Beryllium)	WM-NMS-05		WM-NMS-05-5X	
Cd (Cadmium)	WM-NMS-08		WM-NMS-08-5X	
Ca (Calcium)	WM-NMS-09		WM-NMS-09-5X	
Ce (Cerium)	WM-NMS-11		WM-NMS-11-5X	
Cr (Chromium)	WM-NMS-13		WM-NMS-13-5X	
Co (Cobalt)	WM-NMS-14		WM-NMS-14-5X	
Cu (Copper)	WM-NMS-15		WM-NMS-15-5X	
Ga (Gallium)	WM-NMS-20		WM-NMS-20-5X	
Au (Gold)	WM-NMS-22		-----	----
Fe (Iron)	WM-NMS-27		WM-NMS-27-5X	
Pb (Lead)	WM-NMS-29		WM-NMS-29-5X	
Li (Lithium)	WM-NMS-30		WM-NMS-30-5X	
Mg (Magnesium)	WM-NMS-32		WM-NMS-32-5X	
Mn (Manganese)	WM-NMS-33		WM-NMS-33-5X	
Hg (Mercury)	WM-NMS-34		WM-NMS-34-5X	
Mo (Molybdenum)	WM-NMS-35		WM-NMS-35-5X	
Ni (Nickel)	WM-NMS-37		WM-NMS-37-5X	
P (Phosphorous)	WM-NMS-41		WM-NMS-41-5X	
K (Potassium)	WM-NMS-43		WM-NMS-43-5X	
Se (Selenium)	WM-NMS-51		WM-NMS-51-5X	
Si (Silicon)	WM-NMS-52		WM-NMS-52-5X	
Ag (Silver)	WM-NMS-53		WM-NMS-53-5X	
Na (Sodium)	WM-NMS-54		WM-NMS-54-5X	
Sr (Strontium)	WM-NMS-55		WM-NMS-55-5X	
Tl (Thallium)	WM-NMS-60		WM-NMS-60-5X	
Sn (Tin)	WM-NMS-63		WM-NMS-63-5X	
Ti (Titanium)	WM-NMS-64		WM-NMS-64-5X	
V (Vanadium)	WM-NMS-67		WM-NMS-67-5X	
Y (Yttrium)	WM-NMS-69		WM-NMS-69-5X	
Zn (Zinc)	WM-NMS-70		WM-NMS-70-5X	
Zr (Zirconium)	WM-NMS-71		WM-NMS-71-5X	

Stabilization Solutions

The solutions were specifically designed for chelating & solubilizing our line of Sulfur-Free Organometallic Standards. Contact Tech Service for additional information.

Stabilizer Solution A

ASTM-P-0122-0.5	50 mL
ASTM-P-0122-1	100 mL

Stabilizer Solution B

ASTM-P-0123-0.5	50 mL
ASTM-P-0123-1	100 mL

Stabilizer Solution C

ASTM-P-0124-0.5	50 mL
ASTM-P-0124-1	100 mL

Stabilizer Solution D

ASTM-P-0125-0.5	50 mL
ASTM-P-0125-1	100 mL

Premium Sulfur-Free
Sulfur below detection limits

Contains No Metallic Sulfonates

These highly concentrated stabilized solutions can be used for customer specific formulations of additive elements in lubricating oils, iron, nickel and vanadium in residual oil, and wear metals in oils. These organometallic solutions can also be used to prepare single element or multi-element standards for plasma emission (ICP or DCP), rotating disk (rotrode), or atomic absorption spectroscopy (AA). The starting materials are PURE REAGENTS and have been certified against NIST SRM's whenever available. **THEY DO NOT CONTAIN PHOSPHORUS OR SULFUR.**

Organometallic Single Element Concentrates

Element	Conc. (Wt. %)	Cat. No.	25 grams	Cat. No.	50 grams
Al (Aluminum)	3	WM-NMS-01-30X-25G		WM-NMS-01-30X-50G	
Sb (Antimony)	2	WM-NMS-02-20X-25G		WM-NMS-02-20X-50G	
Ba (Barium)	12.5	WM-NMS-04-125X-25G		WM-NMS-04-125X-50G	
Cd (Cadmium)	10	WM-NMS-08-100X-25G		WM-NMS-08-100X-50G	
Ca (Calcium)	5	WM-NMS-09-50X-25G		WM-NMS-09-50X-50G	
Ce (Cerium)	5	WM-NMS-11-50X-25G		WM-NMS-11-50X-50G	
Cr (Chromium)	3.5	WM-NMS-13-35X-25G		WM-NMS-13-35X-50G	
Co (Cobalt)	7.5	WM-NMS-14-75X-25G		WM-NMS-14-75X-50G	
Cu (Copper)	6	WM-NMS-15-60X-25G		WM-NMS-15-60X-50G	
Fe (Iron)	4	WM-NMS-27-40X-25G		WM-NMS-27-40X-50G	
Pb (Lead)	20	WM-NMS-29-200X-25G		WM-NMS-29-200X-50G	
Li (Lithium)	1.5	WM-NMS-30-15X-25G		WM-NMS-30-15X-50G	
Mg (Magnesium422)	3	WM-NMS-32-30X-25G		WM-NMS-32-30X-50G	
Mn (Manganese)	6	WM-NMS-33-60X-25G		WM-NMS-33-60X-50G	
Mo (Molybdenum)	5	WM-NMS-35-50X-25G		WM-NMS-35-50X-50G	
Ni (Nickel)	5	WM-NMS-37-50X-25G		WM-NMS-37-50X-50G	
P (Phosphorus)	5	WM-NMS-41-50X-25G		WM-NMS-41-50X-50G	
K (Potassium)	7.5	WM-NMS-43-75X-25G		WM-NMS-43-75X-50G	
Pr (Praseodymium)	3	WM-NMS-44-30X-25G		WM-NMS-44-30X-50G	
Se (Selenium)	3.5	WM-NMS-51-35X-25G		WM-NMS-51-35X-50G	
Si (Silicon)	7.5	WM-NMS-52-75X-25G		WM-NMS-52-75X-50G	
Na (Sodium)	2.5	WM-NMS-54-25X-25G		WM-NMS-54-25X-50G	
Sr (Strontium)	10	WM-NMS-55-100X-25G		WM-NMS-55-100X-50G	
Tl (Thallium)	5	WM-NMS-60-50X-25G		WM-NMS-60-50X-50G	
Sn (Tin)	7.5	WM-NMS-63-75X-25G		WM-NMS-63-75X-50G	
Ti (Titanium)	5	WM-NMS-64-50X-25G		WM-NMS-64-50X-50G	
V (Vanadium)	4	WM-NMS-67-40X-25G		WM-NMS-67-40X-50G	
Y (Yttrium)	2.5	WM-NMS-69-25X-25G		WM-NMS-69-25X-50G	
Zn (Zinc)	6	WM-NMS-70-60X-25G		WM-NMS-70-60X-50G	
Zr (Zirconium)	5	WM-NMS-71-50X-25G		WM-NMS-71-50X-50G	

Technical Note

These standards are **sulfur free** (below detection limits) **organometallic standards** for X-ray Fluorescence (XRF), plasma emission (ICP or DCP), rotating disk (rotrode), or atomic absorption (AA). They are stabilized for blending together with other Analytes to prepare multi-element standards.



Wear Metals

Premium Sulfur-Free

11 Wear Metal Multi-Element

Conc.	Unit	Cat. No.
10 µg/g	100 mL	WM-11-NMS-1X-1
30 µg/g	100 mL	WM-11-NMS-3X-1
50 µg/g	100 mL	WM-11-NMS-5X-1
100 µg/g	100 mL	WM-11-NMS-10X-1
300 µg/g	100 mL	WM-11-NMS-30X-1
500 µg/g	100 mL	WM-11-NMS-50X-1
900 µg/g	100 mL	WM-11-NMS-90X-1
100 mL Set WM-11-NMS-1-SET		
set of above 7 x 100 mL		

Each Wear Metal Standard contains 11 elements listed below in hydrocarbon oil at the stated concentration.

Al (Aluminum)	Mg (Magnesium)	Si (Silicon)
Cr (Chromium)	Na (Sodium)	Sn (Tin)
Cu (Copper)	Ni (Nickel)	Ti (Titanium)
Fe (Iron)	Pb (Lead)	

12 Wear Metal Multi-Element

Conc.	Unit	Cat. No.
10 µg/g	100 mL	WM-12-NMS-1X-1
30 µg/g	100 mL	WM-12-NMS-3X-1
50 µg/g	100 mL	WM-12-NMS-5X-1
100 µg/g	100 mL	WM-12-NMS-10X-1
300 µg/g	100 mL	WM-12-NMS-30X-1
500 µg/g	100 mL	WM-12-NMS-50X-1
900 µg/g	100 mL	WM-12-NMS-90X-1
100 mL Set WM-12-NMS-1-SET		
set of above 7 x 100 mL		

Each Wear Metal Standard contains 12 elements listed below in hydrocarbon oil at the stated concentration.

Ag (Silver)	Fe (Iron)	Pb (Lead)
Al (Aluminum)	Mg (Magnesium)	Si (Silicon)
Cr (Chromium)	Na (Sodium)	Sn (Tin)
Cu (Copper)	Ni (Nickel)	Ti (Titanium)

Contains
No Metallic
Sulfonates

Premium
Sulfur-Free

Sulfur below
detection limits

20 Wear Metal Multi-Element

Conc.	Unit	Cat. No.
10 µg/g	100 mL	WM-20-NMS-1X-1
30 µg/g	100 mL	WM-20-NMS-3X-1
50 µg/g	100 mL	WM-20-NMS-5X-1
100 µg/g	100 mL	WM-20-NMS-10X-1
300 µg/g	100 mL	WM-20-NMS-30X-1
500 µg/g	100 mL	WM-20-NMS-50X-1
900 µg/g	100 mL	WM-20-NMS-90X-1
100 mL Set WM-20-NMS-1-SET		
set of above 7 x 100 mL		

Each Wear Metal Standard contains 20 elements listed below in hydrocarbon oil at the stated concentration.

Al (Aluminum)	Fe (Iron)	Pb (Lead)
B (Boron)	Mg (Magnesium)	Si (Silicon)
Ba (Barium)	Mn (Manganese)	Sn (Tin)
Ca (Calcium)	Mo (Molybdenum)	Ti (Titanium)
Cd (Cadmium)	Na (Sodium)	V (Vanadium)
Cr (Chromium)	Ni (Nickel)	Zn (Zinc)
Cu (Copper)	P (Phosphorus)	

21 Wear Metal Multi-Element

Conc.	Unit	Cat. No.
10 µg/g	100 mL	WM-21-NMS-1X-1
30 µg/g	100 mL	WM-21-NMS-3X-1
50 µg/g	100 mL	WM-21-NMS-5X-1
100 µg/g	100 mL	WM-21-NMS-10X-1
300 µg/g	100 mL	WM-21-NMS-30X-1
500 µg/g	100 mL	WM-21-NMS-50X-1
900 µg/g	100 mL	WM-21-NMS-90X-1
100 mL Set WM-21-NMS-1-SET		
set of above 7 x 100 mL		

Each Wear Metal Standard contains 21 elements listed below in hydrocarbon oil at the stated concentration.

Ag (Silver)	Cu (Copper)	P (Phosphorus)
Al (Aluminum)	Fe (Iron)	Pb (Lead)
B (Boron)	Mg (Magnesium)	Si (Silicon)
Ba (Barium)	Mn (Manganese)	Sn (Tin)
Ca (Calcium)	Mo (Molybdenum)	Ti (Titanium)
Cd (Cadmium)	Na (Sodium)	V (Vanadium)
Cr (Chromium)	Ni (Nickel)	Zn (Zinc)

Recommended
Internal Standard

Organometallic (Internal Standard) Sulfur free

	Conc.	Cat. No.	50 mL
Cobalt	1000 µg/g	WM-NMS-14	
	5000 µg/g	WM-NMS-14-5X	

Wear Metals

AA, ICP, DCP & XRF Analysis



Sulfur and Metals in Oil

Sulfur and Metals in Mineral Oil

ASTM-P-0100-SET				12 x 100 mL
Cat. No.	Sulfur (Wt. %)	Nickel (µg/g)	Vanadium (µg/g)	100 mL
ASTM-P-0100-01	0.00	0	0	
ASTM-P-0100-02	0.50	10	500	
ASTM-P-0100-03	1.00	100	25	
ASTM-P-0100-04	1.50	80	250	
ASTM-P-0100-05	2.00	40	100	
ASTM-P-0100-06	2.50	5	400	
ASTM-P-0100-07	3.00	60	300	
ASTM-P-0100-08	3.50	0	200	
ASTM-P-0100-09	4.00	100	0	
ASTM-P-0100-10	4.50	50	250	
ASTM-P-0100-11	5.00	20	500	
ASTM-P-0100-12	5.50	100	50	

Sulfur and Metals in Residual Fuel Oil

ASTM-P-0101-SET				12 x 100 mL
Cat. No.	Sulfur (Wt. %)	Nickel (µg/g)	Vanadium (µg/g)	100 mL
ASTM-P-0101-01	0.00	0	0	
ASTM-P-0101-02	0.50	10	500	
ASTM-P-0101-03	1.00	100	25	
ASTM-P-0101-04	1.50	80	250	
ASTM-P-0101-05	2.00	40	100	
ASTM-P-0101-06	2.50	5	400	
ASTM-P-0101-07	3.00	60	300	
ASTM-P-0101-08	3.50	0	200	
ASTM-P-0101-09	4.00	100	0	
ASTM-P-0101-10	4.50	50	250	
ASTM-P-0101-11	5.00	20	500	
ASTM-P-0101-12	5.50	100	50	

Test Method A - ICP with an Organic Solvent Specimen Solution

Sulfur and Metals in Mineral Oil

ASTM-P-0102-SET				12 x 100 mL
Cat. No.	Sulfur (Wt. %)	Iron (µg/g)	Nickel (µg/g)	Vanadium (µg/g)
ASTM-P-0102-01	0.00	0	0	0
ASTM-P-0102-02	0.50	300	10	500
ASTM-P-0102-03	1.00	500	100	25
ASTM-P-0102-04	-----	100	80	250
ASTM-P-0102-05	2.00	200	40	100
ASTM-P-0102-06	2.50	400	5	400
ASTM-P-0102-07	3.00	0	60	300
ASTM-P-0102-08	3.50	500	0	200
ASTM-P-0102-09	-----	100	100	0
ASTM-P-0102-10	4.50	300	50	250
ASTM-P-0102-11	5.00	200	20	500
ASTM-P-0102-12	5.50	50	100	50

Designed for ASTM D5708

Sulfur and Metals in Residual Fuel Oil

ASTM-P-0103-SET				12 x 100 mL
Cat. No.	Sulfur (Wt. %)	Iron (µg/g)	Nickel (µg/g)	Vanadium (µg/g)
ASTM-P-0103-01	0.00	0	0	0
ASTM-P-0103-02	0.50	300	10	500
ASTM-P-0103-03	1.00	500	100	25
ASTM-P-0103-04	-----	100	80	250
ASTM-P-0103-05	2.00	200	40	100
ASTM-P-0103-06	2.50	400	5	400
ASTM-P-0103-07	3.00	0	60	300
ASTM-P-0103-08	3.50	500	0	200
ASTM-P-0103-09	-----	100	100	0
ASTM-P-0103-10	4.50	300	50	250
ASTM-P-0103-11	5.00	200	20	500
ASTM-P-0103-12	5.50	50	100	50

Designed for ASTM D5708

After Acid Decomposition of Sample

Stock Multi-Element in Mineral Oil

D-5708-A-10X 100 mL
100 µg/g in 20 cSt mineral oil 3 comps.
Iron Vanadium
Nickel

Working Level Multi-Element Aqueous Standard

D-5708-B-5 ▲ 500 mL
10 µg/mL each in 2-5% HNO₃ 3 comps.
Iron Vanadium
Nickel

Stock Multi-Element Aqueous Standard

D-5863-95A-10X-1 ▲ 1 x 100 mL
2-5% HNO₃ 3 comps.
Iron 100 Vanadium 200
Nickel 200

Nitric Acid Blank

CLP-BLN-5 ▲ 500 mL
CLP-BLN-L-VAP ▲ 1 L (2 x 500 mL)
5% HNO₃ in ASTM Type I Water

Stock Multi-Element Aqueous Standard

D-5708-B-10X-1 ▲ 100 mL
D-5708-B-10X-5 ▲ 500 mL
100 µg/mL each in 2-5% HNO₃ 3 comps.
Iron Vanadium
Nickel

Stock Multi-Element Standard in Mineral Oil

D-5863-95B-10X 1 x 100 g
At stated conc. (µg/g) in 20 cst Mineral Oil 3 comps.
Sodium 50 Vanadium 150
Nickel 200

ISO/CD 14597 Vanadium and Nickel Standards with Manganese (Internal Standard)

Vanadium Standards - Low Range for ISO/CD 14597 with 0.05% Manganese Internal Standard in Xylene-Mineral Oil

ASTM-P-0104-SET			9 x 100 mL
Cat. No.	Vanadium Conc. (Wt.%)	100 mL	
ASTM-P-0104-01	0.0005		
ASTM-P-0104-02	0.0025		
ASTM-P-0104-03	0.0050		
ASTM-P-0104-04	0.0075		
ASTM-P-0104-05	0.0100		
ASTM-P-0104-06	0.0125		
ASTM-P-0104-07	0.0150		
ASTM-P-0104-08	0.0175		
ASTM-P-0104-09	0.0200		

Vanadium Standards - High Range for ISO/CD 14597 with 0.05% Manganese Internal Standard in Xylene-Mineral Oil

ASTM-P-0105-SET			7 x 100 mL
Cat. No.	Vanadium Conc. (Wt.%)	100 mL	
ASTM-P-0105-01	0.0000		
ASTM-P-0105-02	0.0300		
ASTM-P-0105-03	0.0400		
ASTM-P-0105-04	0.0500		
ASTM-P-0105-05	0.0600		
ASTM-P-0105-06	0.0800		
ASTM-P-0105-07	0.1000		

Nickel Standards for ISO/CD 14597 with 0.05% Manganese Internal Standard in Xylene-Mineral Oil

ASTM-P-0106-SET			7 x 100 mL
Cat. No.	Nickel Conc. (Wt.%)	100 mL	
ASTM-P-0106-01	0.0000		
ASTM-P-0106-02	0.0005		
ASTM-P-0106-03	0.0010		
ASTM-P-0106-04	0.0025		
ASTM-P-0106-05	0.0050		
ASTM-P-0106-06	0.0075		
ASTM-P-0106-07	0.0100		

Internal Standard

ASTM-P-0107-5 500 mL
Manganese @ 0.05 Wt. % in Xylene-Mineral Oil

▲ Hazardous fee required.



Wear Metals

AA, ICP, DCP & XRF Analysis

Lubricating Oil Standards

ASTM-P-0108-SET

17 x 100 mL

Designed for ASTM D6481

Cat. No.	Ca	P	S	Zn
Nominal Value	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)
ASTM-P-0108-01	0.600	0.005	0.175	0.060
ASTM-P-0108-02	0.500	0.200	0.050	0.080
ASTM-P-0108-03	0.400	0.150	0.300	0.180
ASTM-P-0108-04	0.260	0.250	0.150	0.120
ASTM-P-0108-05	0.005	0.005	0.450	0.070
ASTM-P-0108-06	0.400	0.025	0.350	0.100
ASTM-P-0108-07	0.300	0.060	0.250	0.120
ASTM-P-0108-08	0.200	0.100	0.450	0.100
ASTM-P-0108-09	0.060	0.080	0.300	0.130
ASTM-P-0108-10	0.060	0.050	0.200	0.050
ASTM-P-0108-11	0.050	0.120	0.100	0.075
ASTM-P-0108-12	0.025	0.150	0.200	0.130
ASTM-P-0108-13	0.005	0.200	0.400	0.150
ASTM-P-0108-14	0.170	0.250	0.550	0.110
ASTM-P-0108-15	0.100	0.100	0.200	0.200
ASTM-P-0108-16	0.010	0.010	0.600	0.250
ASTM-P-0108-17	0.000	0.000	0.000	0.000

ASTM-P-0109-SET

17 x 100 mL

Cat. No.	Ca	Cl	P	S	Zn
Nominal Value	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)
ASTM-P-0109-01	0.600	0.100	0.005	0.175	0.060
ASTM-P-0109-02	0.500	0.000	0.200	0.050	0.080
ASTM-P-0109-03	0.400	0.010	0.150	0.300	0.180
ASTM-P-0109-04	0.260	0.500	0.250	0.150	0.120
ASTM-P-0109-05	0.005	1.000	0.005	0.450	0.070
ASTM-P-0109-06	0.400	0.400	0.025	0.350	0.100
ASTM-P-0109-07	0.300	0.100	0.060	0.250	0.120
ASTM-P-0109-08	0.200	0.010	0.100	0.450	0.100
ASTM-P-0109-09	0.060	0.050	0.080	0.300	0.130
ASTM-P-0109-10	0.060	0.200	0.050	0.200	0.050
ASTM-P-0109-11	0.050	0.500	0.120	0.100	0.075
ASTM-P-0109-12	0.025	0.800	0.150	0.200	0.130
ASTM-P-0109-13	0.005	1.000	0.200	0.400	0.150
ASTM-P-0109-14	0.170	0.600	0.250	0.550	0.110
ASTM-P-0109-15	0.100	0.200	0.100	0.200	0.200
ASTM-P-0109-16	0.010	0.400	0.010	0.600	0.250
ASTM-P-0109-17	0.000	0.000	0.000	0.000	0.000

ASTM-P-0110-SET

17 x 100 mL

Designed for ASTM D4927

Cat. No.	Ba	Ca	P	S	Zn
Nominal Value	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)
ASTM-P-0110-01	0.100	0.600	0.005	0.175	0.060
ASTM-P-0110-02	0.175	0.500	0.200	0.050	0.080
ASTM-P-0110-03	0.000	0.400	0.150	0.300	0.180
ASTM-P-0110-04	0.025	0.260	0.250	0.150	0.120
ASTM-P-0110-05	0.150	0.005	0.005	0.450	0.070
ASTM-P-0110-06	0.000	0.400	0.025	0.350	0.100
ASTM-P-0110-07	0.200	0.300	0.060	0.250	0.120
ASTM-P-0110-08	0.000	0.200	0.100	0.450	0.100
ASTM-P-0110-09	0.100	0.060	0.080	0.300	0.130
ASTM-P-0110-10	0.050	0.060	0.050	0.200	0.050
ASTM-P-0110-11	0.075	0.050	0.120	0.100	0.075
ASTM-P-0110-12	0.010	0.025	0.150	0.200	0.130
ASTM-P-0110-13	0.005	0.005	0.200	0.400	0.150
ASTM-P-0110-14	0.000	0.170	0.250	0.550	0.110
ASTM-P-0110-15	0.000	0.100	0.100	0.200	0.200
ASTM-P-0110-16	0.005	0.010	0.010	0.600	0.250
ASTM-P-0110-17	0.000	0.000	0.000	0.000	0.000

ASTM-P-0111-SET

17 x 100 mL

Designed for ASTM D4927

Cat. No.	Ba	Ca	Cl	P	S	Zn
Nominal Value	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)
ASTM-P-0111-01	0.100	0.600	0.100	0.005	0.175	0.060
ASTM-P-0111-02	0.175	0.500	0.000	0.200	0.050	0.080
ASTM-P-0111-03	0.000	0.400	0.010	0.150	0.300	0.180
ASTM-P-0111-04	0.025	0.260	0.500	0.250	0.150	0.120
ASTM-P-0111-05	0.150	0.005	1.000	0.005	0.450	0.070
ASTM-P-0111-06	0.000	0.400	0.400	0.025	0.350	0.100
ASTM-P-0111-07	0.200	0.300	0.100	0.060	0.250	0.120
ASTM-P-0111-08	0.000	0.200	0.010	0.100	0.450	0.100
ASTM-P-0111-09	0.100	0.060	0.050	0.080	0.300	0.130
ASTM-P-0111-10	0.050	0.060	0.200	0.050	0.200	0.050
ASTM-P-0111-11	0.075	0.050	0.500	0.120	0.100	0.075
ASTM-P-0111-12	0.010	0.025	0.800	0.150	0.200	0.130
ASTM-P-0111-13	0.005	0.005	1.000	0.200	0.400	0.150
ASTM-P-0111-14	0.000	0.170	0.600	0.250	0.550	0.110
ASTM-P-0111-15	0.000	0.100	0.200	0.100	0.200	0.200
ASTM-P-0111-16	0.005	0.010	0.400	0.010	0.600	0.250
ASTM-P-0111-17	0.000	0.000	0.000	0.000	0.000	0.000

ASTM-P-0112-SET

17 x 100 mL

Cat. No.	Ca	Mg	P	S	Zn
Nominal Value	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)
ASTM-P-0112-01	0.600	0.100	0.005	0.175	0.060
ASTM-P-0112-02	0.500	0.150	0.200	0.050	0.080
ASTM-P-0112-03	0.400	0.350	0.150	0.300	0.180
ASTM-P-0112-04	0.260	0.225	0.250	0.150	0.120
ASTM-P-0112-05	0.005	0.450	0.005	0.450	0.070
ASTM-P-0112-06	0.400	0.500	0.025	0.350	0.100
ASTM-P-0112-07	0.300	0.325	0.060	0.250	0.120
ASTM-P-0112-08	0.200	0.250	0.100	0.450	0.100
ASTM-P-0112-09	0.060	0.100	0.080	0.300	0.130
ASTM-P-0112-10	0.060	0.400	0.050	0.200	0.050
ASTM-P-0112-11	0.050	0.300	0.120	0.100	0.075
ASTM-P-0112-12	0.025	0.200	0.150	0.200	0.130
ASTM-P-0112-13	0.005	0.375	0.200	0.400	0.150
ASTM-P-0112-14	0.170	0.175	0.250	0.550	0.110
ASTM-P-0112-15	0.100	0.425	0.100	0.200	0.200
ASTM-P-0112-16	0.010	0.275	0.010	0.600	0.250
ASTM-P-0112-17	0.000	0.000	0.000	0.000	0.000

ASTM-P-0113-SET

17 x 100 mL

Designed for ASTM D4628 & D4927

Cat. No.	Ba	Ca	Mg	P	S	Zn
Nominal Value	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)
ASTM-P-0113-01	0.025	0.600	0.100	0.005	0.175	0.060
ASTM-P-0113-02	0.000	0.500	0.150	0.200	0.050	0.080
ASTM-P-0113-03	0.100	0.400	0.350	0.150	0.300	0.180
ASTM-P-0113-04	0.175	0.260	0.225	0.250	0.150	0.120
ASTM-P-0113-05	0.150	0.005	0.450	0.005	0.450	0.070
ASTM-P-0113-06	0.000	0.400	0.500	0.025	0.350	0.100
ASTM-P-0113-07	0.100	0.300	0.325	0.060	0.250	0.120
ASTM-P-0113-08	0.200	0.200	0.250	0.100	0.450	0.100
ASTM-P-0113-09	0.050	0.060	0.100	0.080	0.300	0.130
ASTM-P-0113-10	0.075	0.060	0.400	0.050	0.200	0.050
ASTM-P-0113-11	0.010	0.050	0.300	0.120	0.100	0.075
ASTM-P-0113-12	0.000	0.025	0.200	0.150	0.200	0.130
ASTM-P-0113-13	0.175	0.005	0.375	0.200	0.400	0.150
ASTM-P-0113-14	0.005	0.170	0.175	0.250	0.550	0.110
ASTM-P-0113-15	0.000	0.100	0.425	0.100	0.200	0.200
ASTM-P-0113-16	0.005	0.010	0.275	0.010	0.600	0.250
ASTM-P-0113-17	0.000	0.000	0.000	0.000	0.000	0.000



Lubricating Oil Standards (Continued)

ASTM-P-0114-SET

17 x 100 mL

EDXRF ASTM Method

Designed for ASTM D6481

Cat. No.	Ca	P	S	Zn
Nominal Value	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)
ASTM-P-0114-01	0.005	0.005	0.050	0.050
ASTM-P-0114-02	0.600	0.000	0.000	0.000
ASTM-P-0114-03	0.000	0.300	0.000	0.000
ASTM-P-0114-04	1.000	0.000	1.000	0.000
ASTM-P-0114-05	0.000	0.000	0.000	0.300
ASTM-P-0114-06	0.005	0.250	0.800	0.300
ASTM-P-0114-07	0.500	0.150	0.500	0.150
ASTM-P-0114-08	0.010	0.200	0.100	0.250
ASTM-P-0114-09	0.050	0.010	0.400	0.075
ASTM-P-0114-10	0.100	0.150	0.200	0.200
ASTM-P-0114-11	0.200	0.200	0.800	0.100
ASTM-P-0114-12	0.400	0.005	0.800	0.300
ASTM-P-0114-13	0.600	0.100	0.500	0.050
ASTM-P-0114-14	0.800	0.010	0.050	0.100
ASTM-P-0114-15	1.000	0.300	1.000	0.150
ASTM-P-0114-16	0.400	0.050	0.600	0.250
ASTM-P-0114-17	0.000	0.000	0.000	0.000

ASTM-P-0115-SET

17 x 100 mL

Cat. No.	Ca	P	S	Zn	Mg
Nominal Value	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)
ASTM-P-0115-01	0.005	0.005	0.050	0.050	0.100
ASTM-P-0115-02	0.600	0.000	0.000	0.000	0.150
ASTM-P-0115-03	0.000	0.300	0.000	0.000	0.350
ASTM-P-0115-04	1.000	0.000	1.000	0.000	0.225
ASTM-P-0115-05	0.000	0.000	0.000	0.300	0.450
ASTM-P-0115-06	0.005	0.250	0.800	0.300	0.500
ASTM-P-0115-07	0.500	0.150	0.500	0.150	0.325
ASTM-P-0115-08	0.010	0.200	0.100	0.250	0.250
ASTM-P-0115-09	0.050	0.010	0.400	0.075	0.050
ASTM-P-0115-10	0.100	0.150	0.200	0.200	0.400
ASTM-P-0115-11	0.200	0.200	0.800	0.100	0.300
ASTM-P-0115-12	0.400	0.005	0.800	0.300	0.200
ASTM-P-0115-13	0.600	0.100	0.500	0.050	0.375
ASTM-P-0115-14	0.800	0.010	0.050	0.100	0.175
ASTM-P-0115-15	1.000	0.300	1.000	0.150	0.425
ASTM-P-0115-16	0.400	0.050	0.600	0.250	0.275
ASTM-P-0115-17	0.000	0.000	0.000	0.000	0.000

ASTM-P-0116-SET

11 x 100 mL

Additives

Designed for ASTM D6481

Cat. No.	Ca	P	S	Zn
Nominal Value	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)
ASTM-P-0116-01	0.500	1.000	0.500	0.500
ASTM-P-0116-02	3.000	1.000	3.000	2.000
ASTM-P-0116-03	2.000	1.250	1.000	1.500
ASTM-P-0116-04	5.000	1.500	0.500	1.200
ASTM-P-0116-05	4.000	0.500	1.500	0.750
ASTM-P-0116-06	2.500	0.750	4.000	1.000
ASTM-P-0116-07	4.000	0.500	2.000	1.250
ASTM-P-0116-08	0.500	2.000	5.000	1.000
ASTM-P-0116-09	1.000	0.750	2.000	1.500
ASTM-P-0116-10	2.500	1.200	3.000	0.500
ASTM-P-0116-11	0.000	0.000	0.000	0.000

ASTM-P-0117-SET

10 x 100 mL

WLXRF ASTM Method

Designed for ASTM D6443

Cat. No.	Ca	Cl	Cu	Mg	P	S	Zn
Nominal Value	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)
ASTM-P-0117-01	0.020	0.030	0.010	0.200	0.250	1.000	0.020
ASTM-P-0117-02	0.020	0.020	0.050	0.200	0.020	0.020	0.250
ASTM-P-0117-03	0.020	0.200	0.010	0.040	0.250	0.150	0.250
ASTM-P-0117-04	0.020	0.200	0.050	0.040	0.020	1.000	0.020
ASTM-P-0117-05	0.400	0.020	0.010	0.040	0.020	1.000	0.250
ASTM-P-0117-06	0.400	0.020	0.050	0.040	0.250	0.020	0.020
ASTM-P-0117-07	0.400	0.200	0.010	0.200	0.020	0.020	0.050
ASTM-P-0117-08	0.400	0.200	0.050	0.200	0.250	1.000	0.250
ASTM-P-0117-09	0.200	0.100	0.025	0.080	0.150	0.500	0.100
ASTM-P-0117-10	0.000	0.000	0.000	0.000	0.000	0.000	0.000

ASTM-P-0118-SET

10 x 100 mL

WLXRF ASTM Method

Designed for ASTM D4628, D4927, D4951, D6443

Cat. No.	Ba	Ca	Cl	Cu	Mg	P	S	Zn
Nominal Value	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)
ASTM-P-0118-01	0.020	0.020	0.030	0.010	0.200	0.250	1.000	0.020
ASTM-P-0118-02	0.250	0.020	0.020	0.050	0.200	0.020	0.020	0.250
ASTM-P-0118-03	0.020	0.020	0.200	0.010	0.040	0.250	0.150	0.250
ASTM-P-0118-04	0.250	0.020	0.200	0.050	0.040	0.020	1.000	0.020
ASTM-P-0118-05	0.020	0.400	0.020	0.010	0.040	0.020	1.000	0.250
ASTM-P-0118-06	0.250	0.400	0.020	0.050	0.040	0.250	0.020	0.020
ASTM-P-0118-07	0.020	0.400	0.200	0.010	0.200	0.020	0.020	0.050
ASTM-P-0118-08	0.250	0.400	0.200	0.050	0.200	0.250	1.000	0.250
ASTM-P-0118-09	0.130	0.200	0.100	0.025	0.080	0.150	0.500	0.100
ASTM-P-0118-10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000



Wear Metals

AA, ICP, DCP & XRF Analysis

Lubricating Oil Standards (Continued)

ASTM-P-0119-SET

22 x 100 mL

Designed for ASTM D4628, D4927, D4951, D6443

Cat. No.	Ca	Cl	Cu	Mg	P	S	Zn
Nominal Value	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)
ASTM-P-0119-01	0.300	0.080	0.030	0.060	0.060	0.275	0.060
ASTM-P-0119-02	0.250	0.100	0.000	0.010	0.150	0.000	0.150
ASTM-P-0119-03	0.500	0.000	0.035	0.160	0.150	0.000	0.020
ASTM-P-0119-04	0.350	0.010	0.000	0.120	0.080	0.200	0.000
ASTM-P-0119-05	0.110	0.000	0.015	0.100	0.100	0.300	0.050
ASTM-P-0119-06	0.200	0.100	0.000	0.200	0.050	0.250	0.150
ASTM-P-0119-07	0.000	0.050	0.025	0.000	0.000	0.450	0.020
ASTM-P-0119-08	0.150	0.030	0.000	0.100	0.030	0.400	0.040
ASTM-P-0119-09	0.250	0.150	0.010	0.160	0.000	0.350	0.080
ASTM-P-0119-10	0.110	0.150	0.040	0.005	0.030	0.750	0.150
ASTM-P-0119-11	0.260	0.050	0.000	0.000	0.000	0.750	0.000
ASTM-P-0119-12	0.200	0.000	0.005	0.140	0.080	0.500	0.080
ASTM-P-0119-13	0.000	0.000	0.005	0.020	0.020	0.200	0.020
ASTM-P-0119-14	0.070	0.150	0.020	0.080	0.140	0.650	0.150
ASTM-P-0119-15	0.050	0.000	0.000	0.000	0.150	0.000	0.000
ASTM-P-0119-16	0.400	0.000	0.001	0.080	0.000	0.500	0.020
ASTM-P-0119-17	0.180	0.020	0.020	0.000	0.020	0.600	0.060
ASTM-P-0119-18	0.400	0.010	0.001	0.010	0.020	0.000	0.000
ASTM-P-0119-19	0.010	0.020	0.040	0.010	0.020	0.200	0.100
ASTM-P-0119-20	0.050	0.005	0.050	0.000	0.008	0.000	0.120
ASTM-P-0119-21	0.200	0.050	0.020	0.080	0.050	0.275	0.050
ASTM-P-0119-22	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Standards of Interest

Concentration for the sets on pages 342-344 are targets. Actual production lots may vary.

ASTM-P-0120-SET

23 x 100 mL

Cat. No.	Ba	Ca	Cl	Cu	Mg	P	S	Zn
Nominal Value	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)	(Wt.%)
ASTM-P-0120-01	0.100	0.300	0.080	0.030	0.060	0.060	0.275	0.060
ASTM-P-0120-02	0.175	0.250	0.100	0.000	0.010	0.150	0.000	0.150
ASTM-P-0120-03	0.040	0.500	0.000	0.035	0.160	0.150	0.000	0.020
ASTM-P-0120-04	0.020	0.350	0.010	0.000	0.120	0.080	0.200	0.000
ASTM-P-0120-05	0.150	0.110	0.000	0.015	0.100	0.100	0.300	0.050
ASTM-P-0120-06	0.000	0.200	0.100	0.000	0.200	0.050	0.250	0.150
ASTM-P-0120-07	0.200	0.000	0.050	0.025	0.000	0.000	0.450	0.020
ASTM-P-0120-08	0.000	0.150	0.030	0.000	0.100	0.030	0.400	0.040
ASTM-P-0120-09	0.000	0.250	0.150	0.010	0.160	0.000	0.350	0.080
ASTM-P-0120-10	0.000	0.110	0.150	0.040	0.005	0.030	0.750	0.150
ASTM-P-0120-11	0.100	0.260	0.050	0.000	0.000	0.000	0.750	0.000
ASTM-P-0120-12	0.050	0.200	0.000	0.005	0.140	0.080	0.500	0.080
ASTM-P-0120-13	0.000	0.000	0.000	0.005	0.020	0.020	0.200	0.020
ASTM-P-0120-14	0.080	0.070	0.150	0.020	0.080	0.140	0.650	0.150
ASTM-P-0120-15	0.010	0.050	0.000	0.000	0.000	0.150	0.000	0.000
ASTM-P-0120-16	0.000	0.400	0.000	0.001	0.080	0.000	0.500	0.020
ASTM-P-0120-17	0.000	0.180	0.020	0.020	0.000	0.020	0.600	0.060
ASTM-P-0120-18	0.000	0.400	0.010	0.001	0.010	0.020	0.000	0.000
ASTM-P-0120-19	0.150	0.010	0.020	0.040	0.010	0.020	0.200	0.100
ASTM-P-0120-20	0.005	0.050	0.005	0.050	0.000	0.008	0.000	0.120
ASTM-P-0120-21	0.100	0.200	0.050	0.020	0.080	0.050	0.275	0.050
ASTM-P-0120-22	0.120	0.200	0.000	0.000	0.000	0.000	0.750	0.000
ASTM-P-0120-23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Metal Working Fluids

ASTM-P-0121-SET

13 x 100 mL

Cat. No.	Cl	P	S
Nominal Value	(Wt.%)	(Wt.%)	(Wt.%)
ASTM-P-0121-01	0.000	0.000	0.000
ASTM-P-0121-02	0.750	0.025	0.500
ASTM-P-0121-03	0.050	0.100	3.000
ASTM-P-0121-04	1.000	0.500	2.500
ASTM-P-0121-05	0.100	0.005	2.000
ASTM-P-0121-06	1.500	0.200	1.000
ASTM-P-0121-07	2.000	0.005	3.000
ASTM-P-0121-08	1.000	0.050	0.100
ASTM-P-0121-09	0.500	0.400	0.000
ASTM-P-0121-10	2.000	0.200	1.500
ASTM-P-0121-11	0.000	0.500	1.500
ASTM-P-0121-12	1.250	0.010	0.050
ASTM-P-0121-13	0.050	0.300	0.050

Stabilization Solutions

The solutions were specifically designed for chelating & solubilizing our line of Sulfur-Free Organometallic Standards. Contact Tech Service for additional information.

Stabilizer Solution A

ASTM-P-0122-0.5

ASTM-P-0122-1

50 mL
100 mL

Stabilizer Solution C

ASTM-P-0124-0.5

ASTM-P-0124-1

50 mL
100 mL

Stabilizer Solution B

ASTM-P-0123-0.5

ASTM-P-0123-1

50 mL
100 mL

Stabilizer Solution D

ASTM-P-0125-0.5

ASTM-P-0125-1

50 mL
100 mL