

# PetroChemical Standards

- Widest 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.

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### Sulfur Standards Group

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## 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.

### AccuPetroCheck Consensus Value QC Standard

#### CARB Low Sulfur RFG QC Standard

ASTM-FUEL-QCS-01-PAK 5 x 15 mL

Parameter	Method	Value	Conc.
Total Aromatics	D1319	24.5	Vol.%
Total Olefins	D1319	5.3	Vol.%
Total Saturates	D1319	58.3	Vol.%
Sulfur	D2622	0.0057	Wt.%
Sulfur	D4294	0.0078	Wt.%
Sulfur	D5453	55.76	µg/g
Sulfur	DXXXX *	59.31	µg/g
Benzene	D5769	0.80	Vol.%
Toluene	D5769	4.92	Vol.%
Total Aromatics	D5769	23.42	Vol.%
Total Olefins	D6550	5.3	Vol.%

#### Conventional Gasoline QC Standard

ASTM-FUEL-QCS-02-PAK 5 x 15 mL

Parameter	Method	Value	Conc.
Total Aromatics	D1319	34.6	Vol.%
Total Olefins	D1319	12.4	Vol.%
Total Saturates	D1319	62.8	Vol.%
Sulfur	D2622	0.0338	Wt.%
Sulfur	D4294	0.0368	Wt.%
Sulfur	D5453	317.36	µg/g
Sulfur	DXXXX *	338.78	µg/g
Benzene	D5769	0.55	Vol.%
Toluene	D5769	5.53	Vol.%
Total Aromatics	D5769	32.51	Vol.%
Total Olefins	D6550	12.4	Vol.%

\* non-specific

### AccuPetroCheck QC Standards

Two of the fuels are available as **AccuPetroCheck Consensus Value QC Standards**. The **AccuPetroCheck** CARB and Conventional gasoline reference materials have all parameters listed on the certificate with the Consensus Values and the regression equations for reproducibility. Use of these Reference Materials improve the quality of laboratory results. The Consensus Values listed reflect initial statistical treatment of the data at the time the catalog was published. The actual certificate provided with the **AccuPetroCheck** QC standard will have the accepted Consensus Value based on statistical treatment of the data.

### 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

AccuStandard has 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	D6277	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

SBPT-OLEFIN-VAP 2 x 15 mL

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

SBPT-AROM-VAP 2 x 15 mL

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

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

### Sulfur QC Sample

SBPT-SGAS-VAP 2 x 15 mL

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

SBPT-BENZ-VAP 2 x 15 mL

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

### 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.

### 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

### 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 SAVE 20% 5 x 1 mL  
At stated conc. in MeOH 5 comps

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) TAAE (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



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	Note: nominal 250 mL fill
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	

### 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	Note: nominal 500 mL fill, or 250 mL fill
1, 2	Synthetic Distillation Standard	ASTM-P-126-01	500 mL	
1, 2	Synthetic Distillation Standard	ASTM-P-126-SET	2 x 500 mL	
4	Distillation Standard	ASTM-P-127-250ML	250 mL	
4	Distillation Standard	ASTM-P-127-500ML	500 mL	

### ASTM D445 Viscosity Calibration Standards

Viscosity @ 40°C	Cat. No.	Unit	Note: nominal 500 mL fill
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	

### 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)

Nominal Aniline Point	Cat. No.	Unit	Nominal Aniline Point	Cat. No.	Unit
Set include 5 Standards listed below	<b>D-611-SET</b>	<b>5 x 20 mL</b>	Set include 3 Standards listed below	<b>D-611E-SET</b>	<b>3 x 20 mL</b>
0°C	D-611-01	20 mL	43 °C	D-611E-01	20 mL
30°C	D-611-02	20 mL	62 °C	D-611E-02	20 mL
55°C	D-611-03	20 mL	77 °C	D-611E-03	20 mL
68°C	D-611-04	20 mL	<b>Pure Aniline</b>	ASTM-P-134-PAK	5 x 15 mL
94°C	D-611-05	20 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	Note: nominal 250 mL fill
- 50 °C	ASTM-P-129-01	250 mL	
- 45 °C	ASTM-P-129-02	250 mL	

### ASTM D1319 Calibration Standards by Fluorescent Indicator Adsorption FIA

#### Olefin FIA Calibration Curve

FIA-CAL-SET

Set of 7 x 1 mL

	Std. 1 Target Vol. %	Std. 2 Vol. %	Std. 3 Vol. %	Std. 4 Vol. %	Std. 5 Vol. %	Std. 6 Vol. %	Std. 7 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



#### 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.

	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

1 x 1 mL  
1 x 5 mL  
3 comps.

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

#### FIA Paraffin Standard

FIA-PAR

1 x 1 mL

FIA-PAR-5ML

1 x 5 mL

8 comps.

	Vol. %		Vol. %
<i>n</i> -Pentane	8	2,3-Dimethylpentane	14
<i>n</i> -Hexane	9	Isooctane	16
Cyclohexane	15	<i>n</i> -Octane	14
<i>n</i> -Heptane	14	<i>n</i> -Decane	7

#### FIA Aromatic Standard

FIA-ARO

1 x 1 mL

FIA-ARO-5ML

1 x 5 mL

10 comps.

	Vol. %		Vol. %
Benzene	4	<i>m</i> -Xylene	16
Toluene	32	1,2,4-Trimethylbenzene	8
Ethylbenzene	8	1,3,5-Trimethylbenzene	8
<i>p</i> -Xylene	8	1,2,4,5-Tetramethylbenzene	4
<i>o</i> -Xylene	8	Naphthalene	4

### 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 60 µg/g	KF-0.6X-5ML-VAP	10 x 5 mL
	KF-1X-2ML-VAP	10 x 2 mL
	KF-1X-5ML-VAP	10 x 5 mL
Water content 100 µg/g	KF-1X-20ML-PAK	5 x 20 mL
	KF-10X-2ML-VAP	10 x 2 mL
	KF-10X-5ML-VAP	10 x 5 mL
Water content 1000 µg/g	KF-10X-20ML-PAK	5 x 20 mL
	KF-50X-2ML-VAP	10 x 2 mL
	KF-50X-5ML-VAP	10 x 5 mL
Water content 5000 µg/g	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

AccuStandard stands for accuracy in Cloud Points.





# ASTM Sulfur

## 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. All 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		100 mL	PAK 5 x 20 mL
µg/g	Wt. %	Cat. No.	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 100 mL Bottle  
Standards 1 - 10 units  
10+ units

### Sulfur in Light Weight Mineral Oil (20 cSt)

Ready-to-Use

Concentration		100 mL	PAK 5 x 20 mL
µg/g	Wt. %	Cat. No.	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 100 mL Bottle  
Standards 1 - 10 units  
10+ units

### Sulfur in #2 Diesel Fuel

Ready-to-Use

Concentration		100 mL	PAK 5 x 20 mL
µg/g	Wt. %	Cat. No.	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 100 mL Bottle  
Standards 1 - 10 units  
10+ units

Hazardous Shipping Fees apply to  
100 mL Sulfur Standards in #2 Diesel Fuel.

### 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.



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

#### Sulfur in Light Distillate Kerosene

Ready-to-Use

Concentration µg/g	Wt. %	100 mL Cat. No.	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 Δ  
12 x 100 mL

At stated conc.  
5 x 20 mL

Individual Sulfur Standards 100 mL Bottle  
1 - 10 units  
10+ units

#### Technical Note

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

#### 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 Δ  
21 x 100 mL

Individual Sulfur Standards 100 mL Bottle  
1 - 10 units  
10+ units

#### Standards of Interest

For the mandatory real world QC samples stipulated in the Method, see beginning of this section.

#### Custom Concentrations

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

Δ Hazardous Shipping Fees apply to 100 mL Sulfur Standards in Kerosene.



Antek 900 Series Sulfur Analyzer



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

#### Standards can be mixed for quantity discounts

1 to 4 units	each
5 to 10 units	each
more than 10 units	each

Hazardous Shipping Fees apply to 100 mL Sulfur Standards in Isooctane.

#### 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.

### 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

#### Standards can be mixed for quantity discounts

1 to 4 units	each
5 to 10 units	each
more than 10 units	each

Hazardous Shipping Fees apply to 100 mL Sulfur Standards in Isooctane:Toluene.

#### Technical Note

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

#### Standards of Interest

For the mandatory real world QC samples stipulated in many ASTM Sulfur Methods, see beginning of this section.

### 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** 1 -10 units 10 +units  
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** 7 x 100 mL  
In Residual oil Set of 7 individual bottles

**Individual Sulfur** 1 -10 units 10 +units  
100 mL Bottle

### 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-SSTD-A/B-SET** 10 x 2 mL

Set contains the following 10 standards in isooctane

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



### 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 neat.

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:**

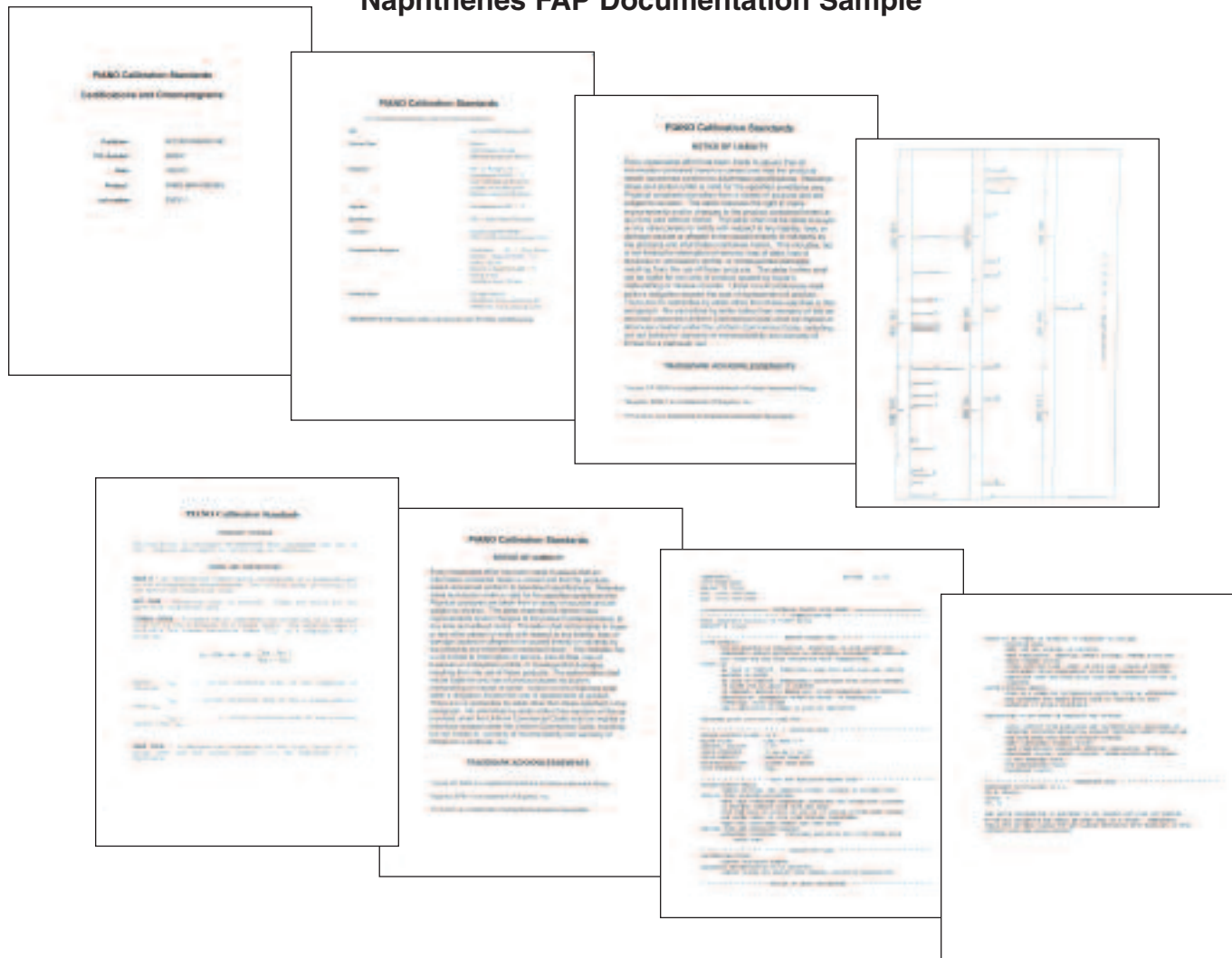
- Detailed analytical conditions
- Certification of all components
- Chromatograms all products

**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 ( $U(C_{95})$ ). 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



### 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

Set includes the following **ASTM-P-0030, ASTM-P-0031, ASTM-P-0032, ASTM-P-0033, ASTM-P-0034, ASTM-P-0035** 6 x 100 µL

### 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.

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

#### Technical Note

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

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

#### Hydrocarbon Window Defining Standard

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

Octane	Nonadecane
Nonane	Phytane
Decane	Eicosane
Undecane	Heneicosane
Dodecane	Docosane
Tridecane	Tricosane
Tetradecane	Tetracosane
Pentadecane	Pentacosane
Hexadecane	Hexacosane
Heptadecane	Heptacosane
Octadecane	Octacosane
Pristane	Nonacosane



1 x 1 mL  
5 x 1 mL  
35 comps.

Triacontane
n-Hentriacontane
Dotriacontane
Tritriacontane
Tetracontane
Pentatriacontane
Hexatriacontane
Heptatriacontane
Octatriacontane
Nonatriacontane
Tetracontane

#### Fuel Oil Degradation/Retention Time Mix for Quantification of C<sub>9</sub>/Pristane & C<sub>9</sub>/Phytane ratios

DRH-005S-10X 1 x 1 mL  
2.0 mg/mL each in CH<sub>2</sub>Cl<sub>2</sub>:CS<sub>2</sub> (1:1) 4 comps.  
DRH-005S-R1-10X 1 x 1 mL  
DRH-005S-R1-10X-PAK SAVE 5 x 1 mL  
2.0 mg/mL each in Chloroform 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 C<sub>9</sub> to C<sub>40</sub> odd and even alkanes. As an added benefit, pristane and phytane are included in the formulation. Use of this one standard measuring the C<sub>17</sub>/pristane and C<sub>18</sub>/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 C<sub>17</sub>/pristane and C<sub>9</sub>/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
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#### Reference Gas Oil Sample Lot #2

D-2887-REFOIL

1 x 1 mL

#### Calibration Solutions

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



SAVE

At stated conc. in Chloroform

1 x 1 mL  
5 x 1 mL  
17 comps.

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



Can be shipped by Air and Sea

DRH-002S-R2  
DRH-002S-R2-PAK



SAVE

0.1 % Wt./Wt. each in Chloroform

1 x 1 gm  
5 x 1 gm  
20 comps.

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

### 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		1 x 1 mL	
ASTM-P-0052-PAK		5 x 1 mL	
At stated conc. in Carbon disulfide			
	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		

#### 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			set of 8 x 1 mL		
In Isooctane					
Sulfur Conc.	Sulfur Wt. %	Cat. No (1 mL)	Sulfur Conc.	Sulfur Wt. %	Cat. No (1 mL)
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.

### ASTM D3230 Determination of Salts in Crude Oil

see ASTM methods in Inorganic Table of Contents

### ASTM D3231 Determination of Phosphorus in Gasoline

see Single Element ICP standards in Inorganic Table of Contents

### ASTM D3237 Lead in Gasoline by AA Spectroscopy

see ASTM methods in Inorganic Table of Contents

### ASTM D3246 Sulfur in Petroleum Gas by Oxidative Microcoulometry

see Table of Contents for Sulfur Standards

### ASTM D3340 Li & Na in Lubricating Greases by Flame Photometer

see Single Element AA standards in Inorganic Table of Contents

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

#### Calibration Curve

D-3524-CAL-5ML-SET		6 x 5 mL	
D-3524-CAL-10ML-SET		6 x 10 mL	
Analyte	Std. 1	Std. 2	Std. 3
Target Wt. %	Target Wt. %	Target Wt. %	Target Wt. %
# 2 Diesel	10	7.5	5.0
30 W Motor oil	90	92.5	95

#### Internal Standard

D-3524-IS-10ML		1 x 10 mL	
D-3524-IS-10ML-PAK		5 x 10 mL	
At stated conc. in <i>n</i> -Heptane			
	Wt./Wt. %		Wt. / Wt. %
<i>n</i> -Decane	1.0	# 2 Diesel	5.0
<i>n</i> -Octadecane	0.2	30 W Motor oil	95.0

#### Mid Level Daily QC Solution

D-3524-QC-10ML		1 x 10 mL	
At stated conc.			
	Wt. / Wt. %		Wt. / Wt. %
# 2 Diesel	5.0		
30 W Motor oil	95.0		

#### Column Resolution Mix

D-3524-CR		1 x 1 mL	
D-3524-CR-PAK		5 x 1 mL	
At stated conc. in <i>n</i> -Heptane			
	Wt. / Wt. %		Wt. / Wt. %
<i>n</i> -Hexadecane	1.0		
<i>n</i> -Octadecane	1.0		

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

see ASTM methods in Inorganic T of C

## 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 Calibr. range	Std. 1 Target Vol. %	Std. 2 Vol. %	Std. 3 Vol. %	Std. 4 Vol. %	Std. 5 Vol. %	Std. 6 Vol. %	Std. 7 Vol. %
Benzene 0.06 - 5.0	5.00	2.50	1.25	0.67	0.33	0.12	0.06
Toluene 0.5 - 20	20.00	15.00	10.00	5.00	2.50	1.00	0.50
Isooctane	75.00	82.50	88.75	94.33	97.17	98.88	99.44



#### 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 Calibr. range	Std. 1 Target Vol. %	Std. 2 Vol. %	Std. 3 Vol. %	Std. 4 Vol. %	Std. 5 Vol. %	Std. 6 Vol. %	Std. 7 Vol. %
Benzene 0.06 - 5.0	4.8	2.4	1.2	0.6432	0.3168	0.1152	0.0576
Toluene 0.5 - 20	19.2	14.4	9.6	4.8000	2.4000	0.9600	0.4800
Isooctane	72.0	79.2	85.2	90.5568	93.2832	94.9248	95.4624
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 Calibr. range	Std. 1 Target Vol. %	Std. 2 Vol. %	Std. 3 Vol. %	Std. 4 Vol. %	Std. 5 Vol. %	Std. 6 Vol. %	Std. 7 Vol. %
Benzene 0.06 - 5.0	4.8	2.4	1.2	0.6432	0.3168	0.1152	0.0576
Toluene 0.5 - 20	19.2	14.4	9.6	4.8000	2.4000	0.9600	0.4800
Isooctane	72.0	79.2	85.2	90.5568	93.2832	94.9248	95.4624
sec Butanol (Internal Std.)	4.0	4.0	4.0	4.0	4.0	4.0	4.0

#### 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.

### Aromatics Quantitative Calibration Curve

D-3606/IS2-R1-SET

set of 7 x 1 mL



Analyte Calibr. range	Std. 1 Target Vol. %	Std. 2 Vol. %	Std. 3 Vol. %	Std. 4 Vol. %	Std. 5 Vol. %	Std. 6 Vol. %	Std. 7 Vol. %
Benzene 0.06 - 5.0	5	4.2	3.4	2.6	1.7	0.9	0.1
Toluene 0.5 - 20	20	17	14	11	8	5	2
Isooctane	75	78.8	82.6	86.4	90.3	94.1	97.9
sec Butanol (Internal Std.)	4	4	4	4	4	4	4

### 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.)	4.0
	<hr/> 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
	<hr/> 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
	<hr/> 100

## ASTM D3610 Total Cobalt in Alumina-Base Cobalt-Molybdenum Catalyst by Potentiometric Titration

### Cobalt Oxide Standard

D-3610-93-1

1 x 100 mL

Cobalt oxide @ 1500 µg/mL in Water



## 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		1 x 1 mL	
D-3710-QUAL-PAK		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		1 x 1 mL	
D-3710-PAK		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.

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						



Can be shipped by Air and Sea

## ASTM D3798 Analysis of *p*-Xylene by GC

### *p*-Xylene Impurity Standards

#### With Internal Standard

D-3798-IS		1 x 1 mL	
D-3798-IS-PAK		5 x 1 mL	
		11 comps.	
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		1 x 10 mL	
D-3798-10ML-PAK		5 x 10 mL	
		10 comps.	
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 ASTM methods in Inorganic Table of Contents

## ASTM D4059 Polychlorinated Biphenyls in Insulating Liquids by GC

### Solutions in PCB-Free Transformer Oil (Individuals, 2 Concentrations)

Aroclor #	Conc.	Individual	PAK SAVE	Aroclor #	Conc.	Individual	PAK SAVE
CAS No.	ppm w/w	Cat. No.	Cat. No.	CAS No.	ppm w/w	Cat. No.	Cat. No.
		1 mL	5 x 1 mL			1 mL	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	37324-23-5	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	<b>Neats (Individuals)</b>			
11141-16-5	500	C-232-ST-2	C-232-ST-2-PAK	Aroclor #	Cat. No.	Unit	
Aroclor 1242	50	C-242-ST-1	C-242-ST-1-PAK	Aroclor 1016	C-216N	50 mg	
53469-21-9	500	C-242-ST-2	C-242-ST-2-PAK	Aroclor 1221	C-221N-50MG	50 mg	
Aroclor 1248	50	C-248-ST-1	C-248-ST-1-PAK	Aroclor 1242	C-242N-50MG	50 mg	
12672-29-6	500	C-248-ST-2	C-248-ST-2-PAK	Aroclor 1248	C-248N-50MG	50 mg	
Aroclor 1254	50	C-254-ST-1	C-254-ST-1-PAK	Aroclor 1254	C-254N-50MG	50 mg	
11097-69-1	500	C-254-ST-2	C-254-ST-2-PAK	Aroclor 1260	C-260N-50MG	50 mg	
Aroclor 1260	50	C-260-ST-1	C-260-ST-1-PAK	Aroclor 1262	C-262N-50MG	50 mg	
11096-82-5	500	C-260-ST-2	C-260-ST-2-PAK				

### Aroclor-free Transformer Oil

T-W130 1 x 1 mL



## ASTM D4291 Trace Ethylene Glycol in Used Engine Oil

D-4291-93 5 x 1 mL  
 D-4291-93-PAK SAVE 5 x 1 mL  
 2000 µg/mL in water

Ethylene glycol

## ASTM D4294 Sulfur in Petroleum Products by ED-XRF Spectroscopy

See Table of Contents for Sulfur Standards

## ASTM D4377 Water in Crude oils by Potentiometric Karl Fischer Titration

See Table of Contents for Karl Fischer Water Standards

## ASTM D4420 Aromatics in Finished Gasoline by GC

### 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 Vol. %	Target Vol. %	Target Vol. %	Target Vol. %	Target Vol. %	Std. 6 Target Vol. %	Std. 7 Target 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 <sub>8</sub> aromatics)	5	10.00	15.00	20.00	25.00	1.00	3.00
n-Butylbenzene (C <sub>9</sub> + 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 SAVE 5 x 1 mL  
 5 comps.  
 Vol. %  
 Benzene 3.00  
 Toluene 10.00  
 Total Xylenes (C<sub>8</sub> aromatics) 15.00  
 n-Butylbenzene(C<sub>9</sub> + aromatics) 15.00  
 Isooctane 57.00

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

see ASTM methods in Inorganic Table of Contents

## 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 between 0.2 and 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 & C<sub>1</sub> to C<sub>4</sub> 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	0.10	5.70	8.55	11.40
<i>t</i> -Butanol	0.1 - 11.40	0.10	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	0.10
<i>t</i> -Pentanol	0.1 - 4.79	1.19	4.75	2.38	3.56	0.10
1,2-Dimethoxyethane ( <i>DME</i> ) (Internal Std.)		5.00	5.00	5.00	5.00	5.00
Isooctane/xylene (65:35)		71.86	73.05	71.72	70.54	72.0
<b>Total Oxygenates &amp; Internal Standard</b>		<b>28.14</b>	<b>26.95</b>	<b>28.28</b>	<b>29.46</b>	<b>28.00</b>

### Oxygenate Internal Standard

M-GRO-IS-5ML

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

1 x 5 mL

5 x 5 mL

1,2-Dimethoxyethane (neat)

### Oxygenate Free Refinery Gasoline Blank

RFA-BLNK-10ML

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

1 x 10 mL

5 x 10 mL

RFA Gasoline (neat)

### Quantitative Peak ID and Retention Time Mixture

D-4815-RT

D-4815-RT-PAK **SAVE**

1 x 1 mL

5 x 1 mL

16 comp. core mix

Compound	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

D-4815-VT-PAK **SAVE**

1 x 1 mL

5 x 1 mL

5 comps.

Compound	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 ASTM methods in Inorganic Table of Contents

## ASTM D4928 Water in Crude oils by Potentiometric Karl Fischer Titration

See Table of Contents for Karl Fischer Water Standards

## ASTM D4929 Organic Chloride Content in Crude Oil - Test Method B Combustion and Microcoulometry

### Working Level Chlorine Standard

D-4929-94

D-4929-94-PAK **SAVE**

1 x 5 mL

5 x 5 mL

10 µg/mL in Isooctane

Chlorine

### Stock Chlorine Standard

D-4929-94-100X

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

1 x 5 mL

5 x 5 mL

1000 µg/mL in Isooctane

Chlorine

### Standards of Interest

See catalog number index for ASTM-P-0092 - Chlorine in Lube Oil standard.

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

see ASTM methods in Inorganic Table of Contents

## ASTM D5056 Trace Metals in Petroleum Coke by AA

see Single Element AA standards in Inorganic Table of Contents



## 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

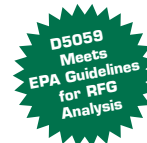
D-5059-IS-10ML-PAK

0.793 mg/mL in Mineral Oil

1 x 100 mL

5 x 10 mL ampules

Bismuth



### 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	

### 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.

## 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. %
Toluene	0.5	4-Methylheptane	1.0
n-Heptane	1.0	n-Octane	1.0
2,3,3-Trimethylpentane	1.0	2-Methylpentane	94.5
2-Methylheptane	1.0		

Benzene	2-Methylheptane
2,4-Dimethylheptane	2-Methylhexane
2,4-Dimethylhexane	n-Nonane
n-Heptane	n-Octane
n-Hexane	Toluene

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

see ICP misc. standards in Inorganic T of C

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

see ASTM methods in Inorganic Table of Contents

## 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. %	
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

## 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 & D-5482 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		

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

### 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



## 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 C<sub>4</sub> to C<sub>12</sub> olefins, methyl, isopropyl and tert-butyl alcohols, methyl sec-butyl & 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 n-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 n-Dodecane		29 comps.

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

### 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

<b>D-5442</b>		<b>1 x 1 mL</b>	
<b>D-5442-PAK</b>		<b>5 x 1 mL</b>	
At stated Wt. % in Cyclohexane			
16 comps.		16 comps.	
<b>SAVE</b>		<b>Wt./Wt. %</b>	
<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

<b>D-5442-CR-PAK</b>		<b>5 x 1 mL</b>	
At stated Wt. % in Cyclohexane			
2 comps.		2 comps.	
<b>Wt./Wt. %</b>		<b>Wt./Wt. %</b>	
<i>n</i> -Eicosane	0.05	<i>n</i> -Eicosane	0.05
<i>n</i> -Tetracontane	0.05	<i>n</i> -Tetracontane	0.05

### Hydrocarbon Standard Brownfield Regulation

<b>D-5442-R1</b>		<b>1 x 1 mL</b>	
100 µg/mL each in Cyclohexane			
18 comps.		18 comps.	
<i>n</i> -Decane	<i>n</i> -Octacosane	<i>n</i> -Decane	<i>n</i> -Octacosane
<i>n</i> -Dodecane	<i>n</i> -Triacontane	<i>n</i> -Dodecane	<i>n</i> -Triacontane
<i>n</i> -Tetradecane	<i>n</i> -Dotriacontane	<i>n</i> -Tetradecane	<i>n</i> -Dotriacontane
<i>n</i> -Hexadecane	<i>n</i> -Tetracontane	<i>n</i> -Hexadecane	<i>n</i> -Tetracontane
<i>n</i> -Octadecane	<i>n</i> -Hexatriacontane	<i>n</i> -Octadecane	<i>n</i> -Hexatriacontane
<i>n</i> -Eicosane	<i>n</i> -Octatriacontane	<i>n</i> -Eicosane	<i>n</i> -Octatriacontane
<i>n</i> -Docosane	<i>n</i> -Tetracontane	<i>n</i> -Docosane	<i>n</i> -Tetracontane
<i>n</i> -Tetracosane	<i>n</i> -Tetratetracontane	<i>n</i> -Tetracosane	<i>n</i> -Tetratetracontane
<i>n</i> -Hexacosane	<i>n</i> -Pentacontane	<i>n</i> -Hexacosane	<i>n</i> -Pentacontane

### Retention Time Standard Mix 1

<b>D-5442-RT1</b>		<b>500 mg</b>	
Equal parts by weight			
12 comps.		12 comps.	
<i>n</i> -Hexadecane (c16)	<i>n</i> -Octacosane (c28)	<i>n</i> -Hexadecane (c16)	<i>n</i> -Octacosane (c28)
<i>n</i> -Octadecane (c18)	<i>n</i> -Triacontane (c30)	<i>n</i> -Octadecane (c18)	<i>n</i> -Triacontane (c30)
<i>n</i> -Eicosane (c20)	<i>n</i> -Dotriacontane (c32)	<i>n</i> -Eicosane (c20)	<i>n</i> -Dotriacontane (c32)
<i>n</i> -Docosane (c22)	<i>n</i> -Hexatriacontane (c36)	<i>n</i> -Docosane (c22)	<i>n</i> -Hexatriacontane (c36)
<i>n</i> -Tetracosane (c24)	<i>n</i> -Tetracontane (c40)	<i>n</i> -Tetracosane (c24)	<i>n</i> -Tetracontane (c40)
<i>n</i> -Hexacosane (c26)	<i>n</i> -Tetratetracontane (c44)	<i>n</i> -Hexacosane (c26)	<i>n</i> -Tetratetracontane (c44)

### Retention Time Standard Mix 2

<b>D-5442-RT2</b>		<b>500 mg</b>	
Equal parts by weight			
16 comps.		16 comps.	
<i>n</i> -Dodecane (c12)	<i>n</i> -Octacosane (c28)	<i>n</i> -Dodecane (c12)	<i>n</i> -Octacosane (c28)
<i>n</i> -Tetradecane (c14)	<i>n</i> -Triacontane (c30)	<i>n</i> -Tetradecane (c14)	<i>n</i> -Triacontane (c30)
<i>n</i> -Hexadecane (c16)	<i>n</i> -Dotriacontane (c32)	<i>n</i> -Hexadecane (c16)	<i>n</i> -Dotriacontane (c32)
<i>n</i> -Octadecane (c18)	<i>n</i> -Hexatriacontane (c36)	<i>n</i> -Octadecane (c18)	<i>n</i> -Hexatriacontane (c36)
<i>n</i> -Eicosane (c20)	<i>n</i> -Tetracontane (c40)	<i>n</i> -Eicosane (c20)	<i>n</i> -Tetracontane (c40)
<i>n</i> -Docosane (c22)	<i>n</i> -Tetratetracontane (c44)	<i>n</i> -Docosane (c22)	<i>n</i> -Tetratetracontane (c44)
<i>n</i> -Tetracosane (c24)	<i>n</i> -Pentacontane (c50)	<i>n</i> -Tetracosane (c24)	<i>n</i> -Pentacontane (c50)
<i>n</i> -Hexacosane (c26)	<i>n</i> -Hexacontane (c60)	<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

<b>D-5443-93-HTM</b>		<b>1 x 1 mL</b>	
At stated Wt. %			
28 comps.		28 comps.	
<b>Wt./Wt. %</b>	<b>Wt./Wt. %</b>	<b>Wt./Wt. %</b>	<b>Wt./Wt. %</b>
Cyclopentane	1.00	1cis,2-Dimethylcyclohexane	5.00
<i>n</i> -Pentane	1.00	Isooctane	5.00
Cyclohexane	2.00	<i>n</i> -Octane	5.00
2,3-Dimethylbutane	2.00	1cis,2 cis,4-Trimethylcyclohexane	4.25
<i>n</i> -Hexane	2.00	<i>n</i> -Nonane	4.50
<i>n</i> -Hexene	1.50	<i>n</i> -Decane	4.25
Methylcyclohexane	4.25	<i>n</i> -Undecane	3.50
4-Methyl-1-hexene	1.50	<i>n</i> -Dodecane	3.25
<i>n</i> -Heptane	3.50	Benzene	2.25
		Toluene	2.25
		<i>trans</i> -Decahydronaphthelene	4.25
		<i>n</i> -Tetradecane	4.50
		Ethylbenzene	4.50
		<i>o</i> -Xylene	4.25
		<i>n</i> -Propylbenzene	5.00
		1,2,4-Trimethylbenzene	4.50
		1,2,3-Trimethylbenzene	5.00
		1,2,4,5-Tetramethylbenzene	5.00
		Pentamethylbenzene	5.00

## 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

## 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

### Tetracosane (Solution A)

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

*n*-Tetracosane

### Internal Standard Solution

**D-5480-IS-5ML** 1 x 5 mL  
**D-5480-IS-5ML-PAK** SAVE 5 x 5 mL  
 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, C<sub>9</sub> & 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	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	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

### 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 gasolines 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.

### 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. %	
n-Hexane	12	Toluene	9
n-Heptane	20	Ethylbenzene	2
n-Octane	15	p-Xylene	3
n-Decane	10	o-Xylene	2
n-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. %	
n-Hexane	12	Toluene	9
n-Heptane	20	Ethylbenzene	2
n-Octane	15	p-Xylene	3
n-Decane	10	o-Xylene	2
n-Triadecane	1	1,2,4-Trimethylbenzene	3
Isooctane	20	1,2,4,5-Tetramethylbenzene	1
Benzene	1	Naphthalene	1

## 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

Analyte 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	---
RFA Gasoline		70.2	68.8	68.7	68.5	68.5	68.8	68.4
<b>Total oxygenates &amp; ISTD</b>		<b>29.8</b>	<b>31.2</b>	<b>31.3</b>	<b>31.5</b>	<b>31.5</b>	<b>31.2</b>	<b>31.6</b>

#### 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

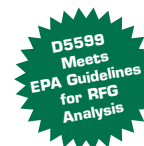
8 x 1 mL



M-GRO-CAL/IS Calibration range	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. %
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
<b>Total oxygenates &amp; ISTD</b>		<b>28.6</b>	<b>30.0</b>	<b>30.1</b>	<b>30.3</b>	<b>30.3</b>	<b>30.0</b>	<b>30.4</b>	<b>0</b>

#### 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

Analyte 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
<b>Total oxygenates</b>		<b>25.8</b>	<b>27.2</b>	<b>27.3</b>	<b>27.5</b>	<b>27.5</b>	<b>27.2</b>	<b>27.6</b>

## 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

### 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  
 15 comps.

Internal Standard 1,2-Dimethoxyethane is combined in a 4 to 100 weight ratio.

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

### 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 Gasoline Refinery Blank

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

RFA Gasoline (neat)

### 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

### 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  
 15 comps.

Internal Standard 1,2-Dimethoxyethane is combined in a 4 to 100 weight ratio.

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

### 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)



#### 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 D5599 EPA Gasoline Refinery Oxygenates Calibration Curves

### EPA O-FID Quantitative Calibration Mixes

#### Without Internal Standard

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

5 x 10 mL

5 comps.

Analyte 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

#### With Internal Standard

M-GRO-CAL-IS/EPA-SET

5 x 1 mL

6 comps.

Analyte 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

#### 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.

### EPA O-FID Quantitative Calibration Check Standard

#### Without Internal Standard

M-GRO-EPA-CC-10ML

1 x 10 mL

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

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

1 x 5 mL

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

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

1 x 5 mL

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

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

1 x 10 mL

RFA-BLNK-10ML-PAK

**SAVE**

5 x 10 mL

RFA Gasoline (neat)

### Internal Standard

M-GRO-IS-5ML

1 x 10 mL

M-GRO-IS-5ML-PAK

**SAVE**

5 x 10 mL

1,2-Dimethoxyethane (Internal Standard)

## ASTM D5600 Trace Metals in Petroleum Coke by ICP-AES

See ICP misc. standards in Inorganic Table of Contents

## 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 ASTM methods in Inorganic Table of Content

## 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 and 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 PhD Organic Chemists with many years of academic and industrial experience. This experienced team has developed hundreds of pure chemical compounds for companies and governmental agencies around the world. AccuStandard specializes in synthesizing chemicals of high purity to be used as reference standards, for milligram to kilogram batches. AccuStandard is the only company to synthesize all 209 individual PCB congeners as well as over 180 individual PBDE congeners.



### Synthesis Experience

- PCBs (all 209 congeners), PBBs, PCB Metabolites
- Explosives - TNT, RDX, HMX, TATP, HND, HMTD
- PBDEs (over 180 congeners)
- PBDE Metabolites
- FBDEs
- Halo-Dibenzodioxins
- Halo-Dibenzofurans
- PAHs, Nitro-PAHs
- Substituted Diphenylethers
- Pesticides and Metabolites
- Forensics
- Wear Metals
- Pharmaceuticals  
and  
Other Rare Chemicals

### Lab Resources

- Milligram to Kilogram Scale Glassware
- Equipment to work under N<sub>2</sub>/Ar
- Liquid Solid Phase Chrom. (mg to 2 kg)
- Flash Chrom. (mg to 2 kg) including Horizon High Performance Flash Chrom. System
- Microwave Synthesis System
- Preparative TLC
- Buchi Rotary Evaporators
- Vacuum Drying Oven
- Parr Pressure Reactor (high pressure reaction, hydrogenation)
- Distillation Equipment - High Vacuum Distillation, Molecular Distillation (Kugelrohr), and Spinning Band Columns

### Analytical Resources

- <sup>1</sup>H-NMR spectrometer - 400 MHZ
- GC/MS, GC/FID, GC/ECD, GC/NPD
- HPLC
- ICP
- ICP/MS
- Low Sulfur Analyzers (Antek, X-Ray Optical)
- LC/MS/MS
- Hg Analyzer

## Custom Formulations

With over 40,000 custom and catalog standards, there is a good chance that AccuStandard will have a catalog item 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 +/-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 listed on the following pages.**

### 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 <sub>6</sub>	2	2	2	2	2
Ethylbenzene-d <sub>10</sub>	2	2	2	2	2
Naphthalene-d <sub>8</sub>	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 <sub>6</sub>	2
Ethylbenzene-d <sub>10</sub>	2
Naphthalene-d <sub>8</sub>	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		1 x 10 mL	
M-GRA-QC-10ML-PAK		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-5ML		1 x 5 mL	
M-GRA-QC/IS-5ML-PAK		5 x 5 mL	
		16 comps.	
Wt. Ratio	Compound	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

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		1 x 1 mL
M-GRA-ST-PAK		5 x 1 mL
		Mix Ratio
100 µg/mL in Isooctane		
1,4-Diethylbenzene		

#### 3 Comp. Deuterated Internal Std. Mix

M-GRA-IS-5ML		1 x 5 mL	
M-GRA-IS-5ML-PAK		5 x 5 mL	
		3 comps.	
		Mix Ratio	
Benzene-d <sub>6</sub>	2 mL	Naphthalene-d <sub>8</sub>	1 gm
Ethylbenzene-d <sub>10</sub>	2 mL		

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

set of 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	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 <sub>6</sub>	(2 mL)	16.57	16.57	16.57	16.57
Ethylbenzene-d <sub>10</sub>	(2 mL)	16.76	16.76	16.76	16.76
Naphthalene-d <sub>8</sub>	(1 gm)	8.78	8.78	8.78	8.78
Toluene-d <sub>8</sub>	(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 <sub>6</sub>	(2 mL)	16.57
Ethylbenzene-d <sub>10</sub>	(2 mL)	16.76
Naphthalene-d <sub>8</sub>	(1 mL)	8.78
Toluene-d <sub>8</sub>	(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-d<sub>8</sub> 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

1 x 10 mL

M-GRA-QC-10ML-PAK

SAVE

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

1 x 5 mL

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

SAVE

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

1 x 10 mL

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

SAVE

5 x 10 mL

4 comps.

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

#### ASTM/EPA Sensitivity Test Solution

M-GRA-ST

1 x 1 mL

M-GRA-ST-PAK

SAVE

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 set of 5 x 5 mL  
D-5769-CAL-10ML-SET set of 5 x 10 mL

Core Calibr. Mix 23 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 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 <sub>6</sub>	2 mL	Naphthalene-d <sub>8</sub>	1 gm
Ethylbenzene-d <sub>10</sub>	2 mL	Toluene-d <sub>8</sub>	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	
Benzene-d <sub>6</sub>	2 mL
Ethylbenzene-d <sub>10</sub>	2 mL
Naphthalene-d <sub>8</sub>	1 gm

## 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.	5 x 1 mL				
	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

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 <sub>6</sub>	2 mL
Ethylbenzene-d <sub>10</sub>	2 mL
Naphthalene-d <sub>8</sub>	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

1 x 5 mL

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

SAVE

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

#### 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.

Compound	Mix Ratio
Benzene-d <sub>6</sub>	2 mL
Ethylbenzene-d <sub>10</sub>	2 mL
Naphthalene-d <sub>8</sub>	1 gm

#### Sensitivity Test Solution

M-GRA-ST

1 x 1 mL

M-GRA-ST-PAK

SAVE

5 x 1 mL

100 µg/mL in Isooctane

1,4-Diethyl benzene

#### Resolution Standard

M-GRA-RES

1 x 1 mL

M-GRA-RES-PAK

SAVE

5 x 1 mL

3 comps.

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

#### Fragmentation Pattern Standard

M-GRA-FP

1 x 1 mL

M-GRA-FP-PAK

SAVE

5 x 1 mL

3.0% w/w in Isooctane

1,2,3-Trimethylbenzene

#### Mass Scan Range Standard

M-GRA-MSR

1 x 1 mL

M-GRA-MSR-PAK

SAVE

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-d<sub>4</sub>)

### Calibration Curve with Deuterated Toluene With Internal Standard

D-5769-CAL/IS-R-SET

5 x 1 mL

Core Calibr. Mix 24 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 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 <sub>6</sub>	2 mL
Ethylbenzene-d <sub>10</sub>	2 mL
Naphthalene-d <sub>8</sub>	1 gm
Toluene-d <sub>8</sub>	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

1 x 5 mL

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

5 x 5 mL

18 comps.

Compound	Wt. Ratio	Compound	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

1 x 1 mL

M-GRA-ST-PAK

**SAVE**

5 x 1 mL

100 µg/mL in Isooctane

1,4-Diethyl benzene

### Resolution Standard

M-GRA-RES

1 x 1 mL

M-GRA-RES-PAK

**SAVE**

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

1 x 10 mL

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

**SAVE**

5 x 10 mL

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

### Fragmentation Pattern Standard

M-GRA-FP

1 x 1 mL

M-GRA-FP-PAK

**SAVE**

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.	5 x 1 mL				
	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-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**

Compound	Ratio	Compound	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-R2 added in 5 to 100 weight ratio.

#### Sensitivity Test Solution

M-GRA-ST

M-GRA-ST-PAK

100 µg/mL in Isooctane

**SAVE**

1 x 1 mL

5 x 1 mL

1,4-Diethyl benzene

#### Fragmentation Pattern Standard

M-GRA-FP

M-GRA-FP-PAK

3.0 w/w in Isooctane

**SAVE**

1 x 1 mL

5 x 1 mL

1,2,3-Trimethylbenzene

#### 3 comp. Chlorinated Internal Std. Mix

M-GRA-IS-R2-VAP

M-GRA-IS-R2-25ML

set of 25 x 1 mL

1 x 25 mL

3 comps.

Compound	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

**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

## 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.
	<b>Wt. Ratio</b>	<b>Wt. Ratio</b>
<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

#### 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.
	<b>Mix Ratio</b>	
Benzene-d <sub>6</sub>	2 mL	
Ethylbenzene-d <sub>10</sub>	2 mL	
Naphthalene-d <sub>8</sub>	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.
	<b>Mix Ratio</b>	
Benzene-d <sub>6</sub>	2 mL	
Ethylbenzene-d <sub>10</sub>	2 mL	
Naphthalene-d <sub>8</sub>	1 gm	
Toluene-d <sub>8</sub>	7 mL	

#### 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.
	<b>Wt. Ratio</b>	<b>Wt. Ratio</b>
<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.

#### 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.
	<b>Wt. Ratio</b>	<b>Wt. Ratio</b>
<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

<b>M-GRA-K1-SET</b>		<b>Set</b>
<b>Set includes:</b>	<b>Units</b>	<b>Function</b>
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

#### Revision 5 F

<b>M-GRA-K2-SET</b>		<b>Set</b>
<b>Set includes:</b>	<b>Units</b>	<b>Function</b>
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

#### 4 Component Internal Standard Formulations

<b>M-GRA-K4-SET</b>		<b>Set</b>
<b>Set includes:</b>	<b>Units</b>	<b>Function</b>
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

#### Technical Note

Used to meet the Toluene-d<sub>8</sub> internal standard version recommended by a network of major petroleum refineries.

## Modifications to D5769

- Calibration standards when combined with internal standards are diluted into significantly more isooctane.
- The analytes in the Performance Standard have been expanded to better tune the GC/MS system for optimum performance.
- The number of components in the QA/QC mix has been reduced with new QA/QC tolerances.
- The number of analytes in the calibration mix has been reduced.
- Samples that exceed the linear range are to be diluted, reducing the number of extra calibration points required.

## ASTM D5769-XX Calibration Curve with No Internal Standard Added

ASTM-P-0140-SET

5 x 5 mL  
Level 1, 2, 3, 4, 5

Core Calibr. Mix Compound	Level 1 Target Mass %	Level 2 Mass %	Level 3 Mass %	Level 4 Mass %	Level 5 Mass %
Benzene	5	3	1	0.5	0.1
Toluene	12	9	6	3	0.5
Ethylbenzene	5	3.75	2.5	1.25	0.2
1,3-Dimethylbenzene	10	7.5	5	2.5	0.2
1,4-Dimethylbenzene	5	3.75	2.5	1.25	0.2
1,2-Dimethylbenzene	5	3.75	2.5	1.25	0.2
(1-Methylethyl)-benzene	3	2.25	1.5	0.75	0.2
1-Methyl-3-ethylbenzene	3	2.25	1.5	0.75	0.2
1-Methyl-4-ethylbenzene	3	2.25	1.5	0.75	0.2
1,3,5-Trimethylbenzene	3	2.25	1.5	0.75	0.2
1-Methyl-2-ethylbenzene	3	2.25	1.5	0.75	0.2
1,2,4-Trimethylbenzene	6	4.5	3	1.5	0.2
1,2,3-Trimethylbenzene	3	2.25	1.5	0.75	0.2
Indan	3	2.25	1.5	0.75	0.2
1,2-Diethylbenzene	2	1.5	1	0.5	0.2
Naphthalene <sup>A</sup>	2	1.5	1	0.5	0.1
2-Methylnaphthalene <sup>A</sup>	2	1.5	1	0.5	0.1
1-Methylnaphthalene <sup>A</sup>	2	1.5	1	0.5	0.1
Isooctane (solvent) *	balance	balance	balance	balance	balance

### 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.

Compound	Mass %	Compound	Mass %
Benzene-d <sub>6</sub>	2	Naphthalene-d <sub>8</sub>	1
Ethylbenzene-d <sub>10</sub>	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.

Compound	Mass %	Compound	Mass %
Benzene-d <sub>6</sub>	2	Naphthalene-d <sub>8</sub>	1
Ethylbenzene-d <sub>10</sub>	2	Toluene-d <sub>8</sub>	7
Isooctane *	balance		

### Performance Evaluation Standard

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

Compound	Target Mass %
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.

Compound	Target Mass %
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

<sup>A</sup> 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 Table of Contents for Cloud Point Standards](#)

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

[See Table of Contents for Cloud Point Standards](#)

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

[See Table of Contents for Cloud Point Standards](#)

## 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-5836-05-ML-VAP



Diisocyanate Storage - Refrig 0-5° C

### 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

### 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 ( <b>2,4-TDIP</b> )	D-5836-01-DER	2840 µg/mL in DMSO
N,N'-(2-Methyl-1,3-phenylene)bis[4-(2-pyridinyl)-1-piperazinecarboxamide] ( <b>2,6-TDIP</b> )	D-5836-02-DER	2840 µg/mL in DMSO
N,N'-(1,6-Hexanediy)bis[4-(2-pyridinyl)-1-piperazinecarboxamide] 72375-27-0 ( <b>1,6-HDIP</b> )	D-5836-03-DER	2900 µg/mL in DMSO
N,N'-(Methylenediphenylene)bis[4-(2-pyridinyl)-1-piperazinecarboxamide] 72375-24-7 ( <b>4,4'-MDIP</b> )	D-5836-04-DER	2280 µg/mL in DMSO

### Derivatizing Agents

1-(2-Pyridyl)piperazine  
 34803-66-2 D-5836-05-ML-VAP 4 x 5 mL  
 2 mg/mL in CH<sub>2</sub>Cl<sub>2</sub>

### Individual Derivatized Diisocyanates

N,N'-(4-Methyl-1,3-phenylene)bis[4-(2-pyridinyl)-1-piperazinecarboxamide] 72375-21-4 ( <b>2,4-TDIP</b> )	D-5836-01A-DER	1000 µg/mL in DMSO
N,N'-(2-Methyl-1,3-phenylene)bis[4-(2-pyridinyl)-1-piperazinecarboxamide] ( <b>2,6-TDIP</b> )	D-5836-02A-DER	1000 µg/mL in DMSO
N,N'-(1,6-Hexanediy)bis[4-(2-pyridinyl)-1-piperazinecarboxamide] 72375-27-0 ( <b>1,6-HDIP</b> )	D-5836-03A-DER	1000 µg/mL in DMSO
N,N'-(Methylenediphenylene)bis[4-(2-pyridinyl)-1-piperazinecarboxamide] 72375-24-7 ( <b>4,4'-MDIP</b> )	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 methods in Inorganic T of C

**ASTM D5901 Freezing Point Aviation Fuels (Automated Optical Method)** See Table of Contents for Cloud Freezing Point Standards

**ASTM D5972 Freezing Point Aviation Fuels (Automated Phase Transition Method)** See Table of Contents for Cloud Freezing Pt. Standards

## ASTM D5986 Oxygenates, Benzene, Toluene, C<sub>8</sub>-C<sub>12</sub>, Aromatics & Total Aromatics in Finished Gasolines by GC/FTIR

### Daily QC Standard Without Internal Standard

M-GRA-QC-10ML		1 x 10 mL	
M-GRA-QC-10ML-PAK		5 x 10 mL	
Compound	Ratio	Compound	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		35 µg/mL in MeOH		1000 µg/mL in Hexane	
	Cat. No.	1 mL	Cat. No.	1 mL	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 D6277 Benzene in Spark - Ignition Engine Fuels using Mid Infrared Spectroscopy See Table of Contents for Petro QC Standards

## 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

1 x 1 mL

ASTM-P-0080-PAK

SAVE

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

1 x 1 mL

ASTM-P-0081-PAK

5 x 1 mL

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

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

1 x 1 mL

ASTM-P-0082-PAK

5 x 1 mL

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

2 comps.

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

ASTM-P-0082-R1

1 x 1 mL

ASTM-P-0082-R1-PAK

5 x 1 mL

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

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)

D-6296-VER1	Wt. %	1 x 1 mL
MTBE	5%	2 comps.
Isooctane	95%	

D-6296-VER2	Wt. %	1 x 1 mL
ETBE	5%	2 comps.
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 Table of Contents for Karl Fischer Standards

## ASTM D6334 Sulfur in Gasoline by Wavelength Dispersive X-Ray Fluorescence See Table of Contents for Sulfur Calibration Standards

## 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> -Tetratriacontane	1
<i>n</i> -Hexadecane	10		

### Column Test Mixture

D-2887

1 x 1 mL

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

2 comps.

<i>n</i> -Hexadecane	<i>n</i> -Octadecane
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Can be shipped by Air and Sea

## ASTM D6378 Vapor Pressure (VPx) of Petroleum Products, Hydrocarbons, & Hydrocarbon-Oxygenate Mixtures (Triple Expansion Method) See Table of Contents for Vapor Pressure Standards

## 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 Table of Contents for Alkane and Polywax Standards

## 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

**Technical Note**  
 Sulfur introduced using di-n-butyl sulfide

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

## ASTM D6443 Ca, Cl, Cu, Mg, P, S, Zn in Unused Lubricating Oils & Additives by Wave-length Dispersive X-ray Fluorescence & Spectrometry see ASTM methods in Inorganic Table of Contents

## ASTM D6445 Sulfur in Gasoline by ED - XRF

See Table of Contents for Sulfur Standards

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

see ASTM methods in Inorganic Table of Contents

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

ASTM D6378-D6550

## 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
<b>Set of 7 above compounds</b>			<b>BF-D-6584-SET</b>	<b>7 units</b>
<b>Mix of above compounds, on right (MSTFA separate)</b>				
Biofuel 20	0.5 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	BF-FU-030-D	/ 2 mL
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	BF-FU-030-D-40X	/ 2 mL
Biofuel 100 Consumer grade	0.5 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	BF-FU-029-D	/ 2 mL
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	BF-FU-029-40X	/ 2 mL
Biofuel 100	0.5 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	BF-FU-032-D	/ 2 mL
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	BF-FU-032-D-40X	/ 2 mL

### ASTM D6584 Mixture

<b>BF-D-6584-MIX</b>	<b>1 x 5 mL</b>
<i>At stated conc. in Pyridine</i>	<b>6 comps.</b>
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 <b>SAVE</b>	5 x 5 mL
<i>At stated conc. (mg/mL) in n-Heptane</i>	4 comps.

Cyclohexane	10
o-Xylene	5.0
Dibenzothiophene	0.5
9-Methylantracene	0.5

### IP 391-95 Calibration Curve

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

Analyte	Std. 1	Std. 2	Std. 3	Std. 4
Cyclohexane	50	20	5	1
o-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%

ppm (µg/g)	% Wt.	Cat. No.	100 mL
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	

Note: 10,000 ppm = 1% Wt.

#### 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.

### Physical Standards

Compound	Conc.	Matrix	Cat. No.	Unit
<b>ASTM D2500</b>				
Cloud Point	TBD * °C	B5	BF-D-2500-B5	200 mL
	TBD * °C	B20	BF-D-2500-B20	200 mL
	TBD * °C	B100	BF-D-2500-B100	200 mL
<b>ASTM D93 / EN-ISO 3679</b>				
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
<b>ASTM D4951 / EN 14107</b>				
Phosphorus Content	0.001 % Wt.	B5	BF-D-4951-B5	50 g
	0.001 % Wt.	B20	BF-D-4951-B20	50 g
	0.001 % Wt.	B100	BF-D-4951-B100	50 g
<b>ASTM D6304 / EN ISO 12937</b>				
(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
<b>ASTM D6751 / UOP 391 / EN 14108 / EN 14109</b>				
Sodium / Potassium	100 ppm	B5	BF-UOP-391-B5	50 g
	100 ppm	B20	BF-UOP-391-B20	50 g
	100 ppm	B100	BF-UOP-391-B100	50 g
<b>EN 14538</b>				
Calcium / Magnesium	100 ppm	B5	BF-14538-B5	50 g
	100 ppm	B20	BF-14538-B20	50 g
	100 ppm	B100	BF-14538-B100	50 g

\* TBD - These values will be certified on the individual lots and may vary between lots.



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.

<b>UOP-M-543-PAK</b>	<b>5 x 1 mL</b>
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.

<b>UOP-M-551-PAK</b>	<b>5 x 1 mL</b>
Equal Mass %	7 comps.
n-Hexane	o-Xylene
Benzene	m-Xylene
Toluene	p-Xylene
Ethylbenzene	

## UOP Method 660 Standard

<b>UOP-M-660-PAK</b>	<b>5 x 1 mL</b>
1% in Water	
<b>UOP-M-660-10X-PAK</b>	<b>5 x 1 mL</b>
10% in Water	
<b>UOP-M-660-0.1X-PAK</b>	<b>5 x 1 mL</b>
1000 ppm in Water	

Tetramethylene sulfone

## UOP Method 720 Standard

Impurities in High Purity p-Xylene by GC.

<b>UOP-M-720-PAK</b>	<b>5 x 1 mL</b>
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.

<b>UOP-M-744-PAK</b>	<b>5 x 1 mL</b>
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** **5 x 1 mL**  
10 µg/g each in Sulfolane 5 comps.

Benzene	Isopropylbenzene
Toluene	n-Nonane
Ethylbenzene	



## UOP Method 868 Standard

Trace Saturates in High Purity Aromatics by GC.

<b>UOP-M-868-PAK</b>	<b>5 x 1 mL</b>
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.

<b>UOP-M-931-PAK</b>	<b>5 x 1 mL</b>
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

# Miscellaneous Petroleum

## Skinner List for Refinery Waste

### Semi-Volatiles

#### Base/Neutral Extractables

<b>M-005B</b>		1 x 1 mL
<b>M-005B-PAK</b>	<b>SAVE</b>	5 x 1 mL
<i>0.2 mg/mL each in CH<sub>2</sub>Cl<sub>2</sub></i>		
<b>M-005B-10X</b>		1 x 1 mL
<b>M-005B-10X-PAK</b>	<b>SAVE</b>	5 x 1 mL
<i>2.0 mg/mL each in CH<sub>2</sub>Cl<sub>2</sub></i>		
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

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

### Volatiles

<b>M-005V</b>		1 x 1 mL
<b>M-005V-PAK</b>	<b>SAVE</b>	5 x 1 mL
<i>0.2 mg/mL each in MeOH</i>		
<b>M-005V-10X</b>		1 x 1 mL
<b>M-005V-10X-PAK</b>	<b>SAVE</b>	5 x 1 mL
<i>2.0 mg/mL each in MeOH</i>		
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

<b>ASTM-E1387</b>		1 x 1 mL
<b>ASTM-E1387-PAK</b>	<b>SAVE</b>	5 x 1 mL
<i>2.0 mg/mL each in CH<sub>2</sub>Cl<sub>2</sub></i>		
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

<b>ASTM-E1618</b>		1 x 1 mL
<b>ASTM-E1618-PAK</b>	<b>SAVE</b>	5 x 1 mL
<i>0.05% v/v (0.50 µL/mL) each in CH<sub>2</sub>Cl<sub>2</sub></i>		
<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
<b>Set of 7 above compounds</b>			<b>BF-D-6584-SET</b>	<b>7 units</b>
<b>Mix of above compounds, on right (MSTFA separate)</b>				
Biofuel 20	0.5 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	BF-FU-030-D	2 mL
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	BF-FU-030-D-40X	2 mL
Biofuel 100 Consumer grade	0.5 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	BF-FU-029-D	2 mL
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	BF-FU-029-40X	2 mL
Biofuel 100	0.5 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	BF-FU-032-D	2 mL
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	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
Trioctadecenoic (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

<b>BF-SOY-ME</b>	<b>100 mg</b>
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

<b>BF-PALM-ME</b>	<b>100 mg</b>
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)

<b>BF-MEOH-SET</b>	<b>5 x 1 mL</b>
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

<b>BF-RAP-ME</b>	<b>100 mg</b>
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

<b>BF-BT-ME</b>	<b>100 mg</b>
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

<b>BF-SOY-EE</b>	<b>100 mg</b>
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

<b>BF-PALM-EE</b>	<b>100 mg</b>
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

<b>BF-RAP-EE</b>	<b>100 mg</b>
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

<b>BF-BT-EE</b>	<b>100 mg</b>
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)	Solution (10 mg/mL in Hexane)	
	Cat. No.	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%

ppm (µg/g)	% Wt.	Cat. No.	100 mL
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	
<b>ASTM D2500</b>					
Cloud Point	TBD *	°C	B5	BF-D-2500-B5	200 mL
	TBD *	°C	B20	BF-D-2500-B20	200 mL
	TBD *	°C	B100	BF-D-2500-B100	200 mL
<b>ASTM D93 / EN-ISO 3679</b>					
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
<b>ASTM D4951 / EN 14107</b>					
Phosphorus Content	0.001	% Wt.	B5	BF-D-4951-B5	50 g
	0.001	% Wt.	B20	BF-D-4951-B20	50 g
	0.001	% Wt.	B100	BF-D-4951-B100	50 g
<b>ASTM D6304 / EN ISO 12937</b>					
(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
<b>ASTM D6751 / UOP 391 / EN 14108 / EN 14109</b>					
Sodium / Potassium	100	ppm	B5	BF-UOP-391-B5	50 g
	100	ppm	B20	BF-UOP-391-B20	50 g
	100	ppm	B100	BF-UOP-391-B100	50 g
<b>EN 14538</b>					
Calcium / Magnesium	100	ppm	B5	BF-14538-B5	50 g
	100	ppm	B20	BF-14538-B20	50 g
	100	ppm	B100	BF-14538-B100	50 g

\* TBD - These values will be certified on the individual lots and may vary between lots.



AccuStandard stands for accuracy in Cloud Points.

## EN 14214 Wear Metals

Each is 50 grams at 1000 µg/g concentration.

Compound	Matrix	Cat. No.	50 grams
Aluminum	B5	BF-WM-B5-01	
	B20	BF-WM-B20-01	
	B100	BF-WM-B100-01	
Chromium	B5	BF-WM-B5-13	
	B20	BF-WM-B20-13	
	B100	BF-WM-B100-13	
Copper	B5	BF-WM-B5-15	
	B20	BF-WM-B20-15	
	B100	BF-WM-B100-15	
Iron	B5	BF-WM-B5-27	
	B20	BF-WM-B20-27	
	B100	BF-WM-B100-27	
Lead	B5	BF-WM-B5-29	
	B20	BF-WM-B20-29	
	B100	BF-WM-B100-29	
Silicon	B5	BF-WM-B5-52	
	B20	BF-WM-B20-52	
	B100	BF-WM-B100-52	

## 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			
<b>5-alpha Androstane</b> 438-22-2	1 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	GRH-IS		<b>#6 Fuel Oil</b> 68553-00-4	0.5 mg/mL	Hexane	FU-008				
	10 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	GRH-IS-10X			20 mg/mL	Hexane	FU-008-40X				
<b>Arctic Diesel</b>	0.5 mg/mL	MeOH	FU-023			20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-008-D-40X				
	20 mg/mL	MeOH	FU-023-40X		<b>Gasoline</b> Regular, unleaded	0.5 mg/mL	MeOH	GA-001				
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-023-D-40X			5 mg/mL	MeOH	GA-001-10X				
<b>Aviation (gas)</b> (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 <sub>2</sub> Cl <sub>2</sub>	GA-001-D-40X				
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	GA-004-D-40X		<b>Gasoline</b> Premium	0.5 mg/mL	MeOH	GA-003				
<b>Biodiesel 20 NEW</b>	0.5 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-030-D			20 mg/mL	MeOH	GA-003-40X				
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-030-D-40X			20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	GA-003-D-40X				
<b>Biodiesel 100 NEW</b>	0.5 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-029-D		<b>Hydraulic Fluid</b> 64742-54-7	0.5 mg/mL	Hexane	FU-020-H				
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-029-D-40X			20 mg/mL	Hexane	FU-020-H-40X				
<b>Biodiesel 100 NEW</b> (refinery grade)	0.5 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-032-D			20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-020-D-40X				
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-032-D-40X		<b>Jet Reference Fuel</b> Type I	0.5 mg/mL	MeOH	FU-011				
	<b>p-Bromofluorobenzene</b> 460-00-4	2.5 mg/mL	Acetone	GARH-SS			20 mg/mL	MeOH	FU-011-40X			
<b>1-Chloro-4-fluorobenzene</b> 352-33-0		2 mg/mL	MeOH	AK-101.0-IS-10X			20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-011-D-40X			
	<b>1-Chlorooctadecane</b> 3386-33-2	1 mg/mL	Hexane	DRH-007-SS		<b>JP-4 Jet Fuel</b>	0.5 mg/mL	MeOH	FU-010			
		<b>1-Chloro-4-fluorobenzene</b> 352-33-0	1 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	GARH-IS			20 mg/mL	MeOH	FU-010-40X		
20 mg/mL			CH <sub>2</sub> Cl <sub>2</sub>	FU-010-D-40X			<b>JP-5 Fuel</b>	0.5 mg/mL	MeOH	FU-012		
<b>2,5-Dibromotoluene</b> 615-59-8	50 µg/mL	MeOH	GRH-004-SS		20 mg/mL	MeOH		FU-012-40X				
	500 µg/mL	MeOH	GRH-004-SS-10X		20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>		FU-012-D-40X				
	5 mg/mL	MeOH	GRH-004-SS-100X		<b>JP-7 Fuel</b>	0.5 mg/mL	MeOH	FU-014				
<b>Diesel</b>	0.5 mg/mL	MeOH	FU-009			20 mg/mL	MeOH	FU-014-40X				
	5 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-009-D-10X			20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-014-D-40X				
	20 mg/mL	MeOH	FU-009-40X		<b>JP-8 Fuel</b>	0.5 mg/mL	MeOH	FU-015				
20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-009-D-40X		20 mg/mL		MeOH	FU-015-40X					
20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-009-D-40X		20 mg/mL		CH <sub>2</sub> Cl <sub>2</sub>	FU-015-D-40X					
<b>#1 Diesel - Low Sulfur</b>	0.5 mg/mL	MeOH	FU-013		<b>JP-TS Aviation Fuel</b> 64742-47-8	0.5 mg/mL	MeOH	FU-016				
	20 mg/mL	MeOH	FU-013-40X			20 mg/mL	MeOH	FU-016-40X				
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-013-D-40X			20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-016-D-40X				
<b>#2 Diesel</b> 68334-30-5	50 mg/mL	Acetone	AK-102-LCS-R1-10X		<b>JP-10 Aviation Fuel</b> 2825-82-3	0.5 mg/mL	MeOH	FU-022				
	<b>#2 Diesel</b> (Extra Low Sulfur) 68476-43-6	0.5 mg/mL	MeOH	FU-017			20 mg/mL	MeOH	FU-022-40X			
5 mg/mL		CH <sub>2</sub> Cl <sub>2</sub>	FU-017-D-10X			20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-022-D-40X				
5 mg/mL		Acetone	AK-102.0-LCS		5 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FK-W25-10X					
50 mg/mL	Acetone	AK-102.0-LCS-10X		<b>Kerosene</b> 25% Weathered	<b>Kerosene</b> 50% Weathered	5 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FK-W50-10X				
20 mg/mL	MeOH	FU-017-40X							<b>Kerosene</b> 75% Weathered	5 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FK-W75-10X
20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-017-D-40X										
<b>#2 Diesel (Low Sulfur)</b> 25% Weathered	5 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FD2-W25-10X		20 mg/mL	MeOH	FU-005-40X					
	<b>#2 Diesel (Low Sulfur)</b> 50% Weathered	5 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FD2-W50-10X		5 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-005-D-10X				
		5 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FD2-W75-10X		20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-005-D-40X				
<b>#2 Diesel (Low Sulfur)</b> 75% Weathered	5 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FD2-W75-10X		<b>Lacquer Thinner</b>	1 gram	Neat	HS-001N				
<b>#2 Diesel</b> 25% Weathered	5 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FD2-W25-R1-10X			0.5 mg/mL	MeOH	HS-001S				
	<b>#2 Diesel</b> 50% Weathered	5 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FD2-W50-R1-10X			20 mg/mL	MeOH	HS-001S-40X			
5 mg/mL		CH <sub>2</sub> Cl <sub>2</sub>	FD2-W75-R1-10X			20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	HS-001S-D-40X				
<b>#2 Diesel</b> 75% Weathered	5 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FD2-W50-R1-10X		<b>Mineral Spirits</b> 8030-30-6	1 gram	Neat	HS-002N				
	<b>#2 Diesel</b> 25% Weathered	5 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FD2-W75-R1-10X			0.5 mg/mL	MeOH	HS-002S			
		<b>Docosane</b> 629-97-0	50 % w/w	Toluene		D-5186-91-PM		20 mg/mL	MeOH	HS-002S-40X		
<b>n-Dodecane</b> 112-40-3	5 mg/mL		MeOH	AS-E0238			20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	HS-002S-D-40X			
	1.5 % w/w	Isocetane	M-GRA-SCS-AS		<b>Naphtha</b> 64742-89-8	1 gram	Neat	HS-003N				
<b>#1 Fuel oil</b> 70892-10-3	0.5 mg/mL	MeOH	FU-001			0.5 mg/mL	MeOH	HS-003S				
	20 mg/mL	MeOH	FU-001-40X			20 mg/mL	MeOH	HS-003S-40X				
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-001-D-40X			20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	HS-003S-D-40X				
<b>#2 Fuel oil</b> 68476-30-2	0.5 mg/mL	MeOH	FU-002		<b>Nonatriacontane</b> 7194-86-7	750 µg/mL	Chloroform	DRH-FL-SS-R1				
	20 mg/mL	MeOH	FU-002-40X			1 mg/mL	CS <sub>2</sub>	DRH-FL-SS				
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-002-D-40X			3 mg/mL	CS <sub>2</sub>	DRH-FL-SS-3X				
<b>#3 Fuel oil</b>	0.5 mg/mL	Hexane	FU-003		<b>n-Pentadecane</b> 629-62-9	5 mg/mL	MeOH	AS-E0241				
	20 mg/mL	Hexane	FU-003-40X			<b>RFA Gasoline</b> (oxygenate-free)	0.5 mg/mL	MeOH	GA-005			
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-003-D-40X		20 mg/mL		MeOH	GA-005-40X				
<b>#4 Fuel oil</b> 68476-31-3	0.5 mg/mL	Hexane	FU-004		20 mg/mL		CH <sub>2</sub> Cl <sub>2</sub>	GA-005-D-40X				
	20 mg/mL	Hexane	FU-004-40X		<b>Regular Leaded Gasoline</b>		0.5 mg/mL	MeOH	GA-002			
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-004-D-40X			20 mg/mL	MeOH	GA-002-40X				
20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-004-D-40X		20 mg/mL		CH <sub>2</sub> Cl <sub>2</sub>	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						
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-025-D-40X						
SAE 10W30 Motor Oil	0.5 mg/mL	Hexane	FU-026-H		n-Tetradecane 629-59-4	5 mg/mL	MeOH	AS-E0240	
	20 mg/mL	Hexane	FU-026-H-40X						
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	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 <sub>2</sub>	D-5480-C40-5ML	
	20 mg/mL	Hexane	FU-027-H-40X						
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-027-D-40X						
SAE 20W50 Motor Oil	0.5 mg/mL	Hexane	FU-028-H		n-Tridecane 629-50-5	5 mg/mL	MeOH	AS-E0239	
	20 mg/mL	Hexane	FU-028-H-40X						
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-028-D-40X						
SAE 30W Motor Oil	0.5 mg/mL	Hexane	FU-018-H		1,2,3-Trimethylbenzene 526-73-8	1 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	V-028S-D-10X	
	20 mg/mL	Hexane	FU-018-H-40X						
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-018-D-40X						
SAE 40W Motor Oil	0.5 mg/mL	Hexane	FU-019-H		n-Triacontane-d <sub>62</sub> 93952-07-9	500 µg/mL	Acetone	AK-103.0-SS	
	5 mg/mL	Acetone	AK-103.0-LCS						
	20 mg/mL	Hexane	FU-019-H-40X						
SAE 50W Motor Oil Stoddard solvent 8052-41-3	0.5 mg/mL	MeOH	HS-005S		Turbine (Jet) fuel	0.5 mg/mL	MeOH	FU-006	
	5 mg/mL	MeOH	HS-005S-10X						
	20 mg/mL	MeOH	HS-005S-40X						
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	HS-005S-D-40X						
	25 mg/mL	Acetone:CH <sub>2</sub> Cl <sub>2</sub>	AK-103.0-LCS-5X						
SAE 50W Motor Oil Stoddard solvent 8052-41-3	1 gram	Neat	HS-005N		Turpentine 8006-64-2	1 gram	Neat	HS-004N	
	0.5 mg/mL	MeOH	HS-005S						
	5 mg/mL	MeOH	HS-005S-10X						
	20 mg/mL	MeOH	HS-005S-40X						
	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	HS-005S-D-40X						
SAE 50W Motor Oil Stoddard solvent 8052-41-3	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-021-D-40X		Unleaded Gasoline 25% Weathered	5 mg/mL	MeOH	GA-W25-10X	
	0.5 mg/mL	MeOH	HS-005S						
	5 mg/mL	MeOH	HS-005S-10X						
SAE 50W Motor Oil Stoddard solvent 8052-41-3	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-021-D-40X		Unleaded Gasoline 50% Weathered	5 mg/mL	MeOH	GA-W50-10X	
	0.5 mg/mL	MeOH	HS-005S						
	5 mg/mL	MeOH	HS-005S-10X						
SAE 50W Motor Oil Stoddard solvent 8052-41-3	20 mg/mL	CH <sub>2</sub> Cl <sub>2</sub>	FU-021-D-40X		Unleaded Gasoline 75% Weathered	5 mg/mL	MeOH	GA-W75-10X	
	0.5 mg/mL	MeOH	HS-005S						
	5 mg/mL	MeOH	HS-005S-10X						

## 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 <sub>2</sub> Cl <sub>2</sub>	FU-009-D-40X
#1 Diesel (low sulfur)	20	CH <sub>2</sub> Cl <sub>2</sub>	FU-013-D-40X
#2 Diesel (extra low sulfur)	20	CH <sub>2</sub> Cl <sub>2</sub>	FU-017-D-40X
Arctic Diesel	20	CH <sub>2</sub> Cl <sub>2</sub>	FU-023-D-40X
SAE 30 W motor oil	20	CH <sub>2</sub> Cl <sub>2</sub>	FU-018-D-40X
SAE 40 W motor oil	20	CH <sub>2</sub> Cl <sub>2</sub>	FU-019-D-40X
SAE 50 W motor oil	20	CH <sub>2</sub> Cl <sub>2</sub>	FU-021-D-40X
Biodiesel 20 <b>NEW</b>	20	CH <sub>2</sub> Cl <sub>2</sub>	FU-030-D-40X
Biodiesel 100 (consumer grade) <b>NEW</b>	20	CH <sub>2</sub> Cl <sub>2</sub>	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 <sub>2</sub> Cl <sub>2</sub>	FU-001-D-40X
#2 Fuel oil	20	CH <sub>2</sub> Cl <sub>2</sub>	FU-002-D-40X
#3 Fuel oil	20	CH <sub>2</sub> Cl <sub>2</sub>	FU-003-D-40X
#4 Fuel oil	20	CH <sub>2</sub> Cl <sub>2</sub>	FU-004-D-40X
#6 Fuel oil	20	CH <sub>2</sub> Cl <sub>2</sub>	FU-008-D-40X
Kerosene	20	CH <sub>2</sub> Cl <sub>2</sub>	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 <sub>2</sub> Cl <sub>2</sub>	GA-004-D-40X
JP-4 Fuel	20	CH <sub>2</sub> Cl <sub>2</sub>	FU-010-D-40X
JP-5 Fuel	20	CH <sub>2</sub> Cl <sub>2</sub>	FU-012-D-40X
JP-7 Fuel	20	CH <sub>2</sub> Cl <sub>2</sub>	FU-014-D-40X
JP-8 Fuel	20	CH <sub>2</sub> Cl <sub>2</sub>	FU-015-D-40X
JP-10 Fuel (Cruise Missile)	20	CH <sub>2</sub> Cl <sub>2</sub>	FU-022-D-40X
JP-TS	20	CH <sub>2</sub> Cl <sub>2</sub>	FU-016-D-40X
Jet Fuel (type 1)	20	CH <sub>2</sub> Cl <sub>2</sub>	FU-011-D-40X
Turbine (Jet A) Fuel	20	CH <sub>2</sub> Cl <sub>2</sub>	FU-006-D-40X
Hydraulic oil	20	CH <sub>2</sub> Cl <sub>2</sub>	FU-020-D-40X

## Household & Industrial Solvent Set

TPH-004-SET

5 x 1 mL

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

## Motor Oil Standards

	mg/mL	Solv.	Cat. No.
SAE 5W 30 Motor Oil	0.5	Hexane	FU-025-H
	20.0	Hexane	FU-025-H-40X
	20.0	CH <sub>2</sub> Cl <sub>2</sub>	FU-025-D-40X
SAE 10W 30 Motor Oil	0.5	Hexane	FU-026-H
	20.0	Hexane	FU-026-H-40X
	20.0	CH <sub>2</sub> Cl <sub>2</sub>	FU-026-D-40X
SAE 10W 40 Motor Oil	0.5	Hexane	FU-027-H
	20.0	Hexane	FU-027-H-40X
	20.0	CH <sub>2</sub> Cl <sub>2</sub>	FU-027-D-40X

	mg/mL	Solv.	Cat. No.
SAE 20W 50 Motor Oil	0.5	Hexane	FU-028-H
	20.0	Hexane	FU-028-H-40X
	20.0	CH <sub>2</sub> Cl <sub>2</sub>	FU-028-D-40X
Composite Standard	20.0	CH <sub>2</sub> Cl <sub>2</sub>	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 <sub>2</sub> Cl <sub>2</sub>		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 <sub>2</sub> Cl <sub>2</sub>		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 <sub>2</sub> Cl <sub>2</sub>		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

AccuStandard, Inc.

### 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





### 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

5 x 1 mL  
8 comps.

#### Hydrocarbon Standard

##### D-5442-R1

100 µg/mL each in Cyclohexane

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

1 x 1 mL  
18 comps.

#### 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-Tetracontane	40	200	400

3 x 1 mL  
3 comps.

#### 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

#### 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

### ISO/DIS 9377 Hydrocarbon Oil Index

#### Diesel #2/Mineral Oil Standard

##### ENISO9377-2-1

1 x 1 mL

1000 µg/mL total hydrocarbons in Hexane

2 comps.

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

#### Florisil Cartridge QC Standard 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)

#### 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)

#### System Performance Standard of n-alkanes

##### ENISO9377-2-2

1 x 1 mL

50 µg/mL each in Hexane

16 comps.

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

#### Extraction Solvent Stock Solution

##### ENISO9377-2-3

1 x 5 mL

At stated conc. in Hexane

2 comps.

n-Decane (20 µ/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

#### 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.

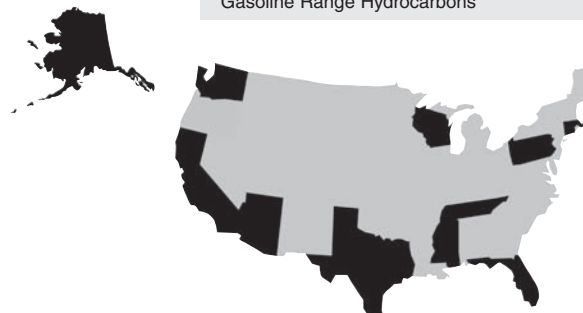
From 1988 through March of 2008 there have been 478,457 confirmed releases reported, 453,065 cleanups have been initiated, and 371,880 cleanups have been completed.

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



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

### Technical Note

We offer a hydrocarbon window defining standard with the C<sub>8</sub> to C<sub>40</sub> 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 C<sub>17</sub> (Pristane) and C<sub>18</sub> (Phytane) ratio be used to estimate subsurface degradation of fuel oil spills.

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



### 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 5 x 1 mL  
 2.0 mg/mL each in MeOH SAVE 5 comps.

*n*-Hexane *n*-Nonane  
*n*-Heptane *n*-Decane  
*n*-Octane

#### Laboratory Control Standard

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

Gasoline (Regular Unleaded)

#### Internal Standard

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

1-Chloro-4-fluorobenzene

#### Surrogate Control Standard

GRO-AK-101-SS 1 x 1 mL  
 GRO-AK-101-SS-PAK 5 x 1 mL  
 50 µg/mL each in MeOH SAVE  
 GRO-AK-101-SS-10X 1 x 1 mL  
 GRO-AK-101-SS-10X-PAK 5 x 1 mL  
 500 µg/mL each in MeOH SAVE  
 GRO-AK-101-SS-100X 1 x 1 mL  
 GRO-AK-101-SS-100X-PAK 5 x 1 mL  
 5,000 µg/mL each in MeOH SAVE 2 comps.

*p*-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 5 x 1 mL  
 2000 µg/mL each in MeOH SAVE 14 comps.

Benzene 1,2,4-Trimethylbenzene  
 Toluene 1,3,5-Trimethylbenzene  
 Ethylbenzene Isopropylbenzene  
*m*-Xylene *m*-Ethyltoluene  
*p*-Xylene *p*-Ethyltoluene  
*o*-Xylene *o*-Ethyltoluene  
 1,2,3-Trimethylbenzene *n*-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 5 x 1 mL  
 Total 5.0 mg/mL in MeOH SAVE 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 5 x 1 mL  
 Equal parts by weight of each SAVE

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

	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
<i>Total 50.0 mg/mL in CH<sub>2</sub>Cl<sub>2</sub></i>		

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

#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
<i>50.0 mg/mL in Acetone</i>		

#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
<i>2.0 mg/mL each in CH<sub>2</sub>Cl<sub>2</sub></i>		

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

#### Surrogate Standards

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

*o*-Terphenyl

#### Internal Standard

DRO-AK-102-IS		1 x 1 mL
DRO-AK-102-IS-PAK	SAVE	5 x 1 mL
<i>1.0 mg/mL in CH<sub>2</sub>Cl<sub>2</sub></i>		

5- $\alpha$  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
<i>2000 µg/mL each in CH<sub>2</sub>Cl<sub>2</sub></i>		

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

#### Surrogate Standard

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

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
<i>50 µg/mL each in CH<sub>2</sub>Cl<sub>2</sub></i>		

<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

<b>RRO-AK-103-RCS</b>		1 x 1 mL
<b>RRO-AK-103-RCS-PAK</b>	<b>SAVE</b>	5 x 1 mL
<i>Total 5.0 mg/mL in CH<sub>2</sub>Cl<sub>2</sub></i>		
SAE 30W Motor Oil (1.66 mg)	SAE 50W Motor Oil (1.67 mg)	3 comps.
SAE 40W Motor Oil (1.67 mg)		

<b>RRO-AK-103-RCS-10X</b>		1 x 1 mL
<b>RRO-AK-103-RCS-10X-PAK</b>	<b>SAVE</b>	5 x 1 mL
<i>Total 50.0 mg/mL in CH<sub>2</sub>Cl<sub>2</sub></i>		
SAE 30W Motor Oil (16.6 mg)	SAE 50W Motor Oil (16.7 mg)	
SAE 40W Motor Oil (16.7 mg)		

#### Laboratory Control Standard

<b>RRO-AK-103-LCS</b>		1 x 1 mL
<b>RRO-AK-103-LCS-PAK</b>	<b>SAVE</b>	5 x 1 mL
<i>5.0 mg/mL in Acetone</i>		
<b>RRO-AK-103-LCS-5X</b>		1 x 1 mL
<b>RRO-AK-103-LCS-5X-PAK</b>	<b>SAVE</b>	5 x 1 mL
<i>25.0 mg/mL in Acetone: CH<sub>2</sub>Cl<sub>2</sub>(1:1)</i>		
SAE 40W Motor Oil		

#### Surrogate Control Standard

<b>RRO-AK-103-SS</b>		1 x 1 mL
<b>RRO-AK-103-SS-PAK</b>	<b>SAVE</b>	5 x 1 mL
<i>500 µg/mL in Acetone:THF (9:1)</i>		
<b>RRO-AK-103-SS2</b>		1 x 1 mL
<b>RRO-AK-103-SS2-PAK</b>	<b>SAVE</b>	5 x 1 mL
<i>5.0 mg/mL in THF:Acetone (3:1)</i>		
<i>n</i> -Triacontane-d <sub>32</sub>		

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

#### Residual Standard

<b>RRO-AK-103AA</b>		1 x 1 mL
<b>RRO-AK-103AA-PAK</b>	<b>SAVE</b>	5 x 1 mL
<i>2000 µg/mL each in CH<sub>2</sub>Cl<sub>2</sub></i>		
<i>n</i> -Hexacosane	Benzo[b]fluoranthene	
<i>n</i> -Octacosane	Benzo[a]pyrene	
<i>n</i> -Triacontane	Benzo[g,h,i]perylene	
<i>n</i> -Dotriacontane	Dibenz[a,h]anthracene	
<i>n</i> -Tetracontane		

#### Surrogate Standard

<b>DRO-AK-102/103AA-SS</b>		1 x 1 mL
<b>DRO-AK-102/103AA-SS-PAK</b>	<b>SAVE</b>	5 x 1 mL
<i>1000 µg/mL each in CH<sub>2</sub>Cl<sub>2</sub></i>		
Squalane	5,6,7,8-Tetrahydro-1-naphthol	
<i>o</i> -Terphenyl		

#### Retention Time Marker Standard

<b>DRO-AK-102/103AA-RT</b>		1 x 1 mL
<b>DRO-AK-102/103AA-RT-PAK</b>	<b>SAVE</b>	5 x 1 mL
<i>50 µg/mL each in CH<sub>2</sub>Cl<sub>2</sub></i>		
<i>n</i> -Decane	<i>n</i> -Hexatriacontane	
<i>n</i> -Pentacosane		



# 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<sub>2</sub>Cl<sub>2</sub> 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

#### 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<sub>2</sub>Cl<sub>2</sub> 3 comps.

<i>n</i> -Decane	<i>n</i> -Dotriacontane
<i>n</i> -Docosane	

#### 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

*o*-Terphenyl

#### 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<sub>2</sub>Cl<sub>2</sub> 2 comps.

#2 Diesel	10W 30 Motor Oil
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### 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 DNP 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	DNP 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-DNP 1 x 1 mL  
 At stated conc. in AcCN as DNP derivatives 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 DNP 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

<b>DRH-009S</b>		<b>1 x 1 mL</b>
<b>DRH-009S-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>
1000 µg/mL in CH <sub>2</sub> Cl <sub>2</sub>		15 comps.
<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> -Triacosane	
<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

<b>GRH-IS</b>		<b>1 x 1 mL</b>
<b>GRH-IS-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>
1.0 mg/mL in CH <sub>2</sub> Cl <sub>2</sub>		
5-alpha Androstane		

#### Surrogate Standard

<b>GRH-SS</b>		<b>1 x 1 mL</b>
<b>GRH-SS-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>
2.0 mg/mL in Acetone		
<i>o</i> -Terphenyl (OTP)		

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

#### Calibration/Window Defining Hydrocarbon Standard

<b>DRH-004S-R1-5X</b>		<b>1 x 1 mL</b>			
<b>DRH-004S-5X-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>			
1.0 mg/mL each in Chloroform		17 comps.			
Octane	C <sub>9</sub>	Eicosane	C <sub>20</sub>	Dotriacontane	C <sub>32</sub>
Decane	C <sub>10</sub>	Docosane	C <sub>22</sub>	Tetraatriacontane	C <sub>34</sub>
Dodecane	C <sub>12</sub>	Tetracosane	C <sub>24</sub>	Hexatriacontane	C <sub>36</sub>
Tetradecane	C <sub>14</sub>	Hexacosane	C <sub>26</sub>	Octatriacontane	C <sub>38</sub>
Hexadecane	C <sub>16</sub>	Octacosane	C <sub>28</sub>	Tetracontane	C <sub>40</sub>
Octadecane	C <sub>18</sub>	Triacosane	C <sub>30</sub>		

#### FTRPH Surrogate Standard

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

#### FTRPH Combined Surrogate Standard

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

#### FTRPH Calibration / Window Defining Standard

<b>DRH-FTRPH</b>		<b>1 x 1 mL</b>
<b>DRH-FTRPH-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>
500 µg/mL each in Hexane		17 comps.
<b>DRH-FTRPH-0.1X NEW</b>		<b>1 x 1 mL</b>
50 µg/mL each in Hexane		17 comps.
<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> -Triacosane	

#### 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

<b>GRH-IS</b>		<b>1 x 1 mL</b>
<b>GRH-IS-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>
1.0 mg/mL in CH <sub>2</sub> Cl <sub>2</sub>		
5-alpha Androstane		

#### Surrogate Standards

<b>DRH-SS</b>		<b>1 x 1 mL</b>
<b>DRH-SS-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>
5.0 mg/mL in THF		
<i>n</i> -Triacosane-d <sub>62</sub>		
<b>GRH-SS</b>		<b>1 x 1 mL</b>
<b>GRH-SS-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>
2.0 mg/mL in Acetone		
<i>o</i> -Terphenyl (OTP)		



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

Components (units in µg/mL)	5 x 1 mL 18 comps.				
	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

#### Aliphatic Hydrocarbons Calibration Set

Components (units in µg/mL)	5 x 1 mL 15 comps.				
	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		1 x 1 mL
DRH-MS-ASL-PAK		5 x 1 mL
25 µg/mL each in Hexane		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	40 µg/mL in Hexane	1 x 10 mL
DRH-MA-FSS-50X	2.0 mg/mL in Hexane	1 x 1 mL
DRH-MA-FSS-50X-PAK	2.0 mg/mL in Hexane	5 x 1 mL
		2 comps.
2-Fluorobiphenyl	2-Bromonaphthalene	

#### Aromatic Surrogate

DRH-006-SS		1 x 1 mL
DRH-006-SS-PAK		5 x 1 mL
1.0 mg/mL in CH <sub>2</sub> Cl <sub>2</sub>		
o-Terphenyl		

#### DEP (MA) - Aromatic Hydrocarbons

DRH-006S		1 x 1 mL
DRH-006S-PAK	SAVE	5 x 1 mL
1.0 mg/mL each in CH <sub>2</sub> Cl <sub>2</sub>		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		1 x 1 mL
DRH-007S-PAK	SAVE	5 x 1 mL
1.0 mg/mL each in CH <sub>2</sub> Cl <sub>2</sub> : Hexane (1:1)		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		1 x 1 mL
DRH-007-SS-PAK	SAVE	5 x 1 mL
1.0 mg/mL in Hexane		
1-Chlorooctadecane		

#### EPH Surrogate Spike

DRH-MA-SS	20 µg/mL each in Acetone	1 x 1 mL
DRH-MA-SS-10X	200 µg/mL each in Acetone	1 x 1 mL
DRH-MA-SS-100X	2,000 µg/mL each in Acetone	1 x 1 mL
DRH-MA-SS-100X-PAK	2,000 µg/mL each in Acetone	5 x 1 mL
		2 comps.
1-Chlorooctadecane	o-Terphenyl	

#### EPH Matrix Spike

DRH-MA-MS	25 µg/mL in Acetone	1 x 1 mL
DRH-MA-MS-PAK	25 µg/mL in Acetone	5 x 1 mL
DRH-MA-MS-10X	250 µg/mL in Acetone	1 x 1 mL
DRH-MA-MS-10X-PAK	250 µg/mL in Acetone	5 x 1 mL
DRH-MA-MS-40X	1,000 µg/mL in Acetone	1 x 1 mL
DRH-MA-MS-40X-PAK	1,000 µg/mL in Acetone	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	1,000 µg/mL in CH <sub>2</sub> Cl <sub>2</sub>	1 x 1 mL
GRH-IS-PAK	1,000 µg/mL in CH <sub>2</sub> Cl <sub>2</sub>	5 x 1 mL
GRH-IS-10X	10.0 mg/mL in CH <sub>2</sub> Cl <sub>2</sub>	1 x 1 mL

5-alpha Androstane



### Massachusetts Method Determination of Volatile Petroleum Hydrocarbons (VPH)

#### Stock Concentrate

##### Volatile Petroleum Hydrocarbon Mix

<b>GRH-004S-10X</b>			<b>1 x 1 mL</b>
<b>GRH-004S-10X-PAK</b>	<b>SAVE</b>		<b>5 x 1 mL</b>
<i>At stated conc. (mg/mL) in MeOH</i>			
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

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

2,5-Dibromotoluene

#### MA VPH Matrix Spike Mix with Surrogate

<b>GRH-004-MS/SS</b>		<b>1 x 1 mL</b>
<i>50 µg/mL each in MeOH</i>		
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

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

#### Certified BTEX in Unleaded Gasoline

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

#### 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.

#### Volatile Petroleum Hydrocarbon without Surrogate

<b>GRH-004S-R1-10X</b>		<b>1 x 1 mL</b>	
<i>At stated conc. (mg/mL) in MeOH</i>			
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)		

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

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

<b>GRH-004S/SS</b>		<b>1 x 1 mL</b>	
<b>GRH-004S/SS-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>	
<i>At stated conc. (µg/mL) in MeOH</i>			
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)

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

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)

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

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



# LUFT/LUST Standards

## Mississippi / Tennessee 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<sub>2</sub>Cl<sub>2</sub>

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

### 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<sub>2</sub>Cl<sub>2</sub>

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)

MS, PA & TN LUFT/LUST





### Texas Method 1005 & 1006 Petroleum Storage Tanks (PST)

#### Stock Hydrocarbon Calibration Standard

<b>DRH-TX-001-10X</b>		<b>1 x 1 mL</b>
<b>DRH-TX-001-10X-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>
2000 µg/mL each in <i>n</i> -Pentane		
<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<sub>2</sub>Cl<sub>2</sub> 2 comps.

Regular Unleaded Gasoline #2 Diesel Fuel

Each set contains 8 concentrations:

5 µg/mL	50 µg/mL	200 µg/mL	1000 µg/mL
20 µg/mL	100 µg/mL	500 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<sub>2</sub>Cl<sub>2</sub> 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** **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** **5 x 1 mL**  
20,000 µg/mL each in CH<sub>2</sub>Cl<sub>2</sub> 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	5000 µg/mL
100 µg/mL	500 µg/mL	1000 µg/mL	10,000 µg/mL

#### Gasoline and Diesel Standard

**DRH-TX-003-20X** **1 x 5 mL**  
**DRH-TX-003-20X-PAK** **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** **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** **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** **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
Benzo[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

<b>VPH-WA</b>			<b>1 x 1 mL</b>
<b>VPH-WA-PAK</b>	<b>SAVE</b>		<b>5 x 1 mL</b>
200 µg/mL each in MeOH			
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 Matrix Spike

<b>VPH-WA-MS</b>			<b>1 x 1 mL</b>
<b>VPH-WA-MS-PAK</b>	<b>SAVE</b>		<b>5 x 1 mL</b>
Varied conc. in MeOH			
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 Primary Dilution Standard with Surrogate

<b>VPH-WA-SS-10X</b>			<b>1 x 1 mL</b>
<b>VPH-WA-SS-10X-PAK</b>	<b>SAVE 20%</b>		<b>5 x 1 mL</b>
2,000 µg/mL each in MeOH			
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			

#### VPH Surrogate Standard

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

#### Stock Concentrate VPH Standards

<b>VPH-WA-10X</b>			<b>1 x 1 mL</b>
<b>VPH-WA-10X-PAK</b>	<b>SAVE</b>		<b>5 x 1 mL</b>
2,000 µg/mL each in MeOH			
<b>VPH-WA-100X</b>			<b>1 x 1 mL</b>
<b>VPH-WA-100X-PAK</b>	<b>SAVE</b>		<b>5 x 1 mL</b>
20.0 mg/mL each in MeOH			
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 Retention Time Marker

<b>VPH-WA-RT</b>			<b>1 x 1 mL</b>
<b>VPH-WA-RT-PAK</b>	<b>SAVE</b>		<b>5 x 1 mL</b>
2,000 µg/mL each in MeOH			
<i>n</i> -Pentane		<i>n</i> -Decane	
<i>n</i> -Hexane		<i>n</i> -Dodecane	
<i>n</i> -Octane		<i>n</i> -Tridecane	

#### 1,2,3-Trimethylbenzene Standard

<b>V-028S-D-10X</b>			<b>1 x 1 mL</b>
<b>V-028S-D-10X-PAK</b>	<b>SAVE</b>		<b>5 x 1 mL</b>
1000 µg/mL each in CH <sub>2</sub> Cl <sub>2</sub>			
1,2,3-Trimethylbenzene			

#### Certified BTEX in Unleaded Gasoline (Single Source)

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

#### Certified BTEX in Gasoline Composite (Multi Source)

<b>GRO-AK-101-GCS-BTEX</b>	<b>1 x 1 mL</b>
5 mg/mL in MeOH	
	<b>Wt. Vol.</b>
Gasoline (Premium)	1.66 mg/mL
Gasoline (Regular Leaded)	1.67 mg/mL
Gasoline (Regular Unleaded)	1.67 mg/mL

#### 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

<b>EPH-WA-10X</b>		<b>1 x 1 mL</b>
<b>EPH-WA-10X-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>
1.0 mg/mL each in CH <sub>2</sub> Cl <sub>2</sub>		
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

<b>GRH-IS</b>		<b>1 x 1 mL</b>
<b>GRH-IS-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>
1000 µg/mL in CH <sub>2</sub> Cl <sub>2</sub>		
<b>GRH-IS-10X</b>		<b>1 x 1 mL</b>
10.0 mg/mL in CH <sub>2</sub> Cl <sub>2</sub>		
5-alpha Androstane		

#### EPH Surrogate Spike

<b>DRH-MA-SS</b>		<b>1 x 1 mL</b>
20 µg/mL each in Acetone		
<b>DRH-MA-SS-10X</b>		<b>1 x 1 mL</b>
200 µg/mL each in Acetone		
<b>DRH-MA-SS-100X</b>		<b>1 x 1 mL</b>
<b>DRH-MA-SS-100X-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>
2,000 µg/mL each in Acetone		
1-Chlorooctadecane	o-Terphenyl	2 comps.

#### EPH Matrix Spike

<b>EPH-WA-MS2-20ML</b>		<b>1 x 20 mL</b>
<b>EPH-WA-MS2-20ML-PAK</b>	<b>SAVE</b>	<b>5 x 20 mL</b>
25 µg/mL each in Acetone		
Acenaphthene	n-Decane	n-Heneicosane
Anthracene	n-Dodecane	Naphthalene
Benzo[g,h,i]perylene	n-Hexadecane	Pyrene
Benzo[a]pyrene		

#### EPH Aliphatic Check Mix

<b>EPH-WA-ALI</b>		<b>1 x 1 mL</b>
<b>EPH-WA-ALI-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>
1.0 mg/mL each in CH <sub>2</sub> Cl <sub>2</sub>		
n-Octane	n-Hexadecane	
n-Decane	n-Heneicosane	
n-Dodecane		

#### EPH Aromatic Check Mix

<b>EPH-WA-ARO</b>		<b>1 x 1 mL</b>
<b>EPH-WA-ARO-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>
1.0 mg/mL each in CH <sub>2</sub> Cl <sub>2</sub>		
Acenaphthene	Pyrene	
Benzo[g,h,i]perylene	1,2,3-Trimethylbenzene	
Naphthalene		

#### Revised EPH Aliphatic Check Mix

<b>EPH-WA-ALI-R1</b>		<b>1 x 1 mL</b>
<b>EPH-WA-ALI-R1-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>
1.0 mg/mL each in CH <sub>2</sub> Cl <sub>2</sub>		
n-Octane	n-Hexadecane	
n-Decane	n-Heneicosane	
n-Dodecane	n-Tetatriacontane	

#### EPH Fractionation Check Standard

<b>EPH-WA-FCS</b>		<b>1 x 1 mL</b>
<b>EPH-WA-FCS-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>
25 µg/mL each in Hexane		
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

<b>EPH-WA-FCS-R1</b>		<b>1 x 1 mL</b>
<b>EPH-WA-FCS-R1-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>
25 µg/mL each in Hexane		
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

<b>V-028S-D-10X</b>		<b>1 x 1 mL</b>
<b>V-028S-D-10X-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>
1000 µg/mL each in CH <sub>2</sub> Cl <sub>2</sub>		
1,2,3-Trimethylbenzene		

#### Revised EPH Aromatic Check Mix

<b>EPH-WA-ARO-R1</b>		<b>1 x 1 mL</b>
<b>EPH-WA-ARO-R1-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>
1.0 mg/mL each in CH <sub>2</sub> Cl <sub>2</sub>		
Acenaphthene	Pyrene	
Benzo[g,h,i]perylene	1,2,3-Trimethylbenzene	
Naphthalene	Toluene	

#### Aliphatic Surrogate

<b>DRH-007-SS</b>		<b>1 x 1 mL</b>
<b>DRH-007-SS-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>
1.0 mg/mL in Hexane		
1-Chlorooctadecane		

#### Aromatic Surrogate

<b>DRH-006-SS</b>		<b>1 x 1 mL</b>
<b>DRH-006-SS-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>
1.0 mg/mL in CH <sub>2</sub> Cl <sub>2</sub>		
o-Terphenyl		

### Wisconsin Method

#### Wisconsin DNR - Gasoline Range Hydrocarbons

<b>GRH-003S</b>		<b>1 x 1 mL</b>
<b>GRH-003S-PAK</b>	<b>SAVE</b>	<b>5 x 1 mL</b>
2.0 mg/mL each in MeOH		
Benzene	1,2,4-Trimethylbenzene	
Ethylbenzene	1,3,5-Trimethylbenzene	
MtBE	o-Xylene	
Naphthalene	m-Xylene	
Toluene	p-Xylene	



# 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)
<i>m</i> -Xylene	(1.0 mg/mL)	(10 mg/mL)
<i>p</i> -Xylene	(1.0 mg/mL)	(10 mg/mL)
<i>o</i> -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 CH<sub>2</sub>Cl<sub>2</sub>

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 ether

#### Technical Note

##### 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.

##### 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. **SAVE**  
**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**

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<sub>2</sub>Cl<sub>2</sub>: Hexane (1:1) 10 comps.  
**DRH-001S-10X** 1 x 1 mL  
2.0 mg/mL each in CH<sub>2</sub>Cl<sub>2</sub>: Hexane (1:1) 10 comps.

*n*-Decane C<sub>10</sub> *n*-Hexadecane C<sub>16</sub> *n*-Docosane C<sub>22</sub> *n*-Hexacosane C<sub>26</sub>  
*n*-Dodecane C<sub>12</sub> *n*-Octadecane C<sub>18</sub> *n*-Tetracosane C<sub>24</sub> *n*-Octacosane C<sub>28</sub>  
*n*-Tetradecane C<sub>14</sub> *n*-Eicosane C<sub>20</sub>

#### Surrogate Standard

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

#### Internal Standard

**GRH-IS** 1 x 1 mL  
**GRH-IS-PAK** SAVE 5 x 1 mL  
1.0 mg/mL in CH<sub>2</sub>Cl<sub>2</sub>  
5- $\alpha$  Androstane

#### Calibration/Window Defining Hydrocarbon Standard

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

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

#### Surrogate Standard

**DRH-SS** 1 x 1 mL  
**DRH-SS-PAK** SAVE 5 x 1 mL  
5.0 mg/mL in THF  
*n*-Triacontane-d<sub>62</sub>

### D-2887 Calibration Solution

#### Calibration Solution

**DRH-002S** 1 x 1 mL  
At stated conc. in CS<sub>2</sub> 17 comps.  
Hexane (600  $\mu$ g/mL) Dodecane (1,200  $\mu$ g/mL) Octacosane (100  $\mu$ g/mL)  
Heptane (600  $\mu$ g/mL) Tetradecane (1,200  $\mu$ g/mL) Dotriacontane (100  $\mu$ g/mL)  
Octane (800  $\mu$ g/mL) Hexadecane (1,000  $\mu$ g/mL) Hexatriacontane (100  $\mu$ g/mL)  
Nonane (800  $\mu$ g/mL) Octadecane (500  $\mu$ g/mL) Tetracontane (100  $\mu$ g/mL)  
Decane (1,200  $\mu$ g/mL) Eicosane (200  $\mu$ g/mL) Tetratetracontane (100  $\mu$ g/mL)  
Undecane (1,200  $\mu$ g/mL) Tetracosane (200  $\mu$ g/mL)

#### Column Test Mixture

**ASTM-D2887** 1 x 1 mL  
1% v/v in *n*-Octane 2 comps.  
*n*-Hexadecane *n*-Octadecane

### Wisconsin Diesel Range Hydrocarbons

**DRH-003S** 1 x 1 mL  
0.2 mg/mL each in Hexane 11 comps.  
*n*-Decane C<sub>10</sub> *n*-Tetradecane C<sub>14</sub> *n*-Octadecane C<sub>18</sub>  
*n*-Undecane C<sub>11</sub> *n*-Pentadecane C<sub>15</sub> *n*-Nonadecane C<sub>19</sub>  
*n*-Dodecane C<sub>12</sub> *n*-Hexadecane C<sub>16</sub> *n*-Eicosane C<sub>20</sub>  
*n*-Tridecane C<sub>13</sub> *n*-Heptadecane C<sub>17</sub>

### Complete Hydrocarbon Analysis

#### Multi-State Hydrocarbon Window Defining Standard

**DRH-008S-R2** 1 x 1 mL  
**DRH-008S-R2-PAK** SAVE 5 x 1 mL  
500  $\mu$ g/mL each in Chloroform 35 comps.

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

#### Technical Note

We offer a hydrocarbon window defining standard with the C<sub>8</sub> to C<sub>40</sub> 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 C<sub>17</sub>/pristane and C<sub>18</sub>/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 C<sub>17</sub>/pristane and C<sub>18</sub>/phytane ratio (DRH-005S-10X) is also available.

#### Fuel Oil Degradation/Retention Time Mixture for Quantification of C<sub>17</sub>/Pristane and C<sub>18</sub>/Phytane Ratios

**DRH-005S-10X** 1 x 1 mL  
2.0 mg/mL each in CH<sub>2</sub>Cl<sub>2</sub> : CS<sub>2</sub> (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** SAVE 5 (2 x 1 mL)  
500  $\mu$ g/mL each in Hexane

#### FTRPH Calibration/Window Defining Standard

**DRH-FTRPH** 1 x 1 mL  
**DRH-FTRPH-PAK** SAVE 5 x 1 mL  
500  $\mu$ 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> -Triacontane	<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** SAVE 5 x 1 mL  
500  $\mu$ g/mL each in Hexane 18 comps.

<i>n</i> -Nonane	Pristane	<i>n</i> -Pentacosane	<i>n</i> -Trtriacontane
<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
<i>4.0 mg/mL each in Acetone</i>		
M-1664-20ML		1 x 20 mL
M-1664-20ML-PAK	SAVE	5 x 20 mL
<i>4.0 mg/mL each in Acetone</i>		
Hexadecane	Stearic acid	

#### 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
<i>20 µg/mL each in Acetone</i>		
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
<i>% by volume</i>		
Chlorobenzene	(25.0)	Hexadecane (37.5)
Isooctane	(37.5)	
		3 comps.

#### Oil, Grease and Petroleum Hydrocarbon Total Recoverable (IR Method)

M-418		1 x 1 mL
M-418-PAK	SAVE	5 x 1 mL
<i>Total 4.15 mg/mL in Freon 113, (Parts by volume)</i>		
Chlorobenzene	(10.0)	Isooctane (15.0)
n-Hexadecane	(15.0)	
		3 comps.

### 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
<i>At stated conc. in Tetrachloroethene</i>		
Chlorobenzene	(0.10 w/w %)	Isooctane (0.15 w/w %)
n-Hexadecane	(0.15 w/w %)	
		3 comps.

#### 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
<i>25 µg/mL each in CH<sub>2</sub>Cl<sub>2</sub></i>		
n-Hexane	n-Tetracosane	n-Triacontane
n-Decane	n-Octacosane	n-Tetracontane
n-Dodecane		
		7 comps.

#### Silica Gel Cleanup Calibration Solution

M-8440-SGC		1 x 1 mL
M-8440-SGC-PAK	SAVE	5 x 1 mL
<i>10.0 mg/mL in Tetrachloroethene</i>		
Corn Oil		

#### Total Petroleum Hydrocarbon Concentrate Mix

M-8440-CON		1 x 1 mL
M-8440-CON-PAK	SAVE	5 x 1 mL
<i>3 comps.</i>		
Chlorobenzene	(25.0 vol %)	Isooctane (37.5 vol %)
n-Hexadecane	(37.5 vol %)	

#### Technical Note

A sample showing peaks in the C<sub>6</sub>-C<sub>10</sub> range generally indicates a gasoline spill. Samples with the peaks in the C<sub>24</sub>-C<sub>12</sub> range are indicative of a diesel spill while samples with the higher carbon numbers above C<sub>24</sub> 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.

# Wear Metals

## AA, ICP, DCP & XRF Analysis



These Standards were formulated for the analysis of metals in oils and other organic matrices. These Standards and curves 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 rotdro 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 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) <b>NEW</b>	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) <b>NEW</b>	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) <b>NEW</b>	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) <b>NEW</b>	WM-75CST-51	WM-75CST-51-5X
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) <b>NEW</b>	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) <b>NEW</b>	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-75 400 g

#### 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	

Ba (Barium) P (Phosphorous)  
Ca (Calcium) Zn (Zinc)  
Mg (Magnesium)



These products do not require Hazardous Shipping Fee at this time.



# 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
<b>100 gram Set</b>		WM-12-100G-SET set of above 7 x 100 g
<b>200 gram Set</b>		WM-12-200G-SET set of above 7 x 200 g

Each Wear Metal Standard contains 12 elements listed below of hydrocarbon oil at the stated concentration.

Ag (Silver)	Na (Sodium)
Al (Aluminum)	Ni (Nickel)
Cr (Chromium)	Pb (Lead)
Cu (Copper)	Si (Silicon)
Fe (Iron)	Sn (Tin)
Mg (Magnesium)	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
<b>100 gram Set</b>		WM-21-100G-SET set of above 7 x 100 g
<b>200 gram Set</b>		WM-21-200G-SET set of above 7 x 200 g

Each Wear Metal Standard contains 21 elements listed below of 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
<b>100 gram Set</b>		WM-22-100G-SET set of above 7 x 100 g
<b>200 gram Set</b>		WM-22-200G-SET set of above 7 x 200 g

Each Wear Metal Standard contains 22 elements listed below of 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)	Na (Sodium)	V (Vanadium)
Cr (Chromium)	Ni (Nickel)	Zn (Zinc)
Cu (Copper)		

### 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
<b>100 gram Set</b>		WM-23-100G-SET set of above 7 x 100 g
<b>200 gram Set</b>		WM-23-200G-SET set of above 7 x 200 g

Each Wear Metal Standard contains 23 elements listed below of 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)	

See our BioFuel Standards in the Petrochemical Section of this Catalog for Wear Metals in BioFuels.

These products do not require Hazardous Shipping fee at this time.



# 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) <b>NEW</b>	WM-NMS-03		WM-NMS-03-5X	
Ba (Barium)	WM-NMS-04		WM-NMS-04-5X	
Be (Beryllium) <b>NEW</b>	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) <b>NEW</b>	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) <b>NEW</b>	WM-NMS-20		WM-NMS-20-5X	
Au (Gold) <b>NEW</b>	WM-NMS-22		-----	----
Fe (Iron)	WM-NMS-27		WM-NMS-27-5X	
Pb (Lead)	WM-NMS-29		WM-NMS-29-5X	
Li (Lithium) <b>NEW</b>	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) <b>NEW</b>	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) <b>NEW</b>	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) <b>NEW</b>	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.

**Premium Sulfur-Free**  
**Sulfur below detection limits**

#### 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

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) <b>NEW</b>		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) <b>NEW</b>		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) <b>NEW</b>	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) <b>NEW</b>		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) <b>NEW</b>	7.5	WM-NMS-52-75X-25G		WM-NMS-52-75X-50G	
Na (Sodium) <b>NEW</b>	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) <b>NEW</b>		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) <b>NEW</b>	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 of 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 of 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 of 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 of 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	

These products do not require Hazardous Shipping fee at this time.



# Wear Metals

## AA, ICP, DCP & XRF Analysis



### Sulfur and Metals in Oil

#### Sulfur and Metals in Mineral Oil

Cat. No.	12 x 100 mL		
	Sulfur (Wt. %)	Nickel (µg/g)	Vanadium (µg/g)
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

Cat. No.	12 x 100 mL		
	Sulfur (Wt. %)	Nickel (µg/g)	Vanadium (µg/g)
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

Designed for ASTM D5708

Cat. No.	12 x 100 mL			
	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

#### Sulfur and Metals in Residual Fuel Oil

Designed for ASTM D5708

Cat. No.	12 x 100 mL			
	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

#### 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

#### After Acid Decomposition of Sample

#### Working Level Multi-Element Aqueous Standard

D-5708-B-5 Δ 500 mL  
10 µg/mL each in 2-5% HNO<sub>3</sub> 3 comps.

Iron Vanadium  
Nickel

#### Stock Multi-Element Aqueous Standard

D-5863-95A-10X-1 Δ 1 x 100 mL  
2-5% HNO<sub>3</sub> 3 comps.

Iron 100 Vanadium 200  
Nickel 200

#### Nitric Acid Blank

CLP-BLN-5 Δ 500 mL  
CLP-BLN-L-VAP Δ 1 L (2 x 500 mL)

5% HNO<sub>3</sub> in ASTM Type I Water

#### Stock Multi-Element Aqueous Standard

D-5708-B-10X-1 Δ 100 mL  
D-5708-B-10X-5 Δ 500 mL  
100 µg/mL each in 2-5% HNO<sub>3</sub> 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

Cat. No.	9 x 100 mL	
	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

Cat. No.	7 x 100 mL	
	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	

#### Internal Standard

ASTM-P-0107-5 500 mL

Manganese @ 0.05 Wt. % in Xylene-Mineral Oil

Nickel Standards for ISO/CD 14597 with 0.05% Manganese Internal Standard in Xylene-Mineral Oil

Cat. No.	7 x 100 mL	
	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	

Δ Requires a Hazardous Shipping Fee

# Wear Metals

## AA, ICP, DCP & XRF Analysis

### Lubricating Oil Standards

**ASTM-P-0108-SET**
**17 x 100 mL**
**Designed for ASTM D6481**

Cat. No. Nominal Value	Ca (Wt.%)	P (Wt.%)	S (Wt.%)	Zn (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. Nominal Value	Ca (Wt.%)	Cl (Wt.%)	P (Wt.%)	S (Wt.%)	Zn (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. Nominal Value	Ba (Wt.%)	Ca (Wt.%)	P (Wt.%)	S (Wt.%)	Zn (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. Nominal Value	Ba (Wt.%)	Ca (Wt.%)	Cl (Wt.%)	P (Wt.%)	S (Wt.%)	Zn (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. Nominal Value	Ca (Wt.%)	Mg (Wt.%)	P (Wt.%)	S (Wt.%)	Zn (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. Nominal Value	Ba (Wt.%)	Ca (Wt.%)	Mg (Wt.%)	P (Wt.%)	S (Wt.%)	Zn (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

These products do not require Hazardous Shipping Fees at this time.

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AccuStandard is accredited to ISO/IEC 17025 and certified to ISO 9001

**Wear Metals**

# Wear Metals

## AA, ICP, DCP & XRF Analysis



### Lubricating Oil Standards (Continued)

ASTM-P-0114-SET 17 x 100 mL

Designed for ASTM D6481

EDXRF ASTM Method

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

Designed for ASTM D6481

Additives

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

Lubricating Oil Standards continued on next page



# 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. Nominal Value	Ca (Wt.%)	Cl (Wt.%)	Cu (Wt.%)	Mg (Wt.%)	P (Wt.%)	S (Wt.%)	Zn (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 346-348 are targets. Actual production lots may vary.

These products do not require Hazardous Shipping charges at this time.

ASTM-P-0120-SET

23 x 100 mL

Cat. No. Nominal Value	Ba (Wt.%)	Ca (Wt.%)	Cl (Wt.%)	Cu (Wt.%)	Mg (Wt.%)	P (Wt.%)	S (Wt.%)	Zn (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. Nominal Value	Cl (Wt.%)	P (Wt.%)	S (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 50 mL  
ASTM-P-0122-1 100 mL

#### Stabilizer Solution C

ASTM-P-0124-0.5 50 mL  
ASTM-P-0124-1 100 mL

#### Stabilizer Solution B

ASTM-P-0123-0.5 50 mL  
ASTM-P-0123-1 100 mL

#### Stabilizer Solution D

ASTM-P-0125-0.5 50 mL  
ASTM-P-0125-1 100 mL