Petroleum Standards

AccuStandard®

PETROLEUM CRMs

AccuStandard's product portfolio for petroleum Certified Reference Materials (CRMs) offers high quality and cost effective standards for different petroleum testing applications, including: physical property testing, sulfur content in different petroleum matrices, oxygenates in gasoline, biofuel standards plus many other ASTM, EN and IP test methods.

These standards are made in accordance with our ISO17034 quality system which means they are subject to rigorous quality evaluation to provide reliability, quality compliance and accurate test results.

AccuStandard has been a long serving member of one of ASTM's largest committees D02, on Petroleum Products, Liquid Fuels, and Lubricants, and D16 on Aromatic, Industrial, Specialty and Related Chemicals. Serving on different technical subcommittees and working with fellow committee members has given us the opportunity to formulate products that meet the requirements of many of these test methods.

TIER 3 CRMs

The USEPA has developed a Tier 3 Standard as part of their effort to reduce vehicles emissions and improve air quality. This guideline requires federal gasoline to have no more than 10 ppm sulfur content down from 30 ppm. EPA has also required the use of specific ASTM methods to meet the Tier 3 testing and certification guidelines.

AccuStandard offers a wide selection of CRMs that are complaint with ASTM test methods for these required properties.

This includes testing for:

- Sulfur content
- Benzene and Aromatic content
- Olefins
- Oxygenates

ASTM TIER 3 Test Methods include:

- D86
- D1319
- D2622
- D3606
- D4815
- D5453
- D5769
- D5599
- D7039

CUSTOM FORMULATIONS

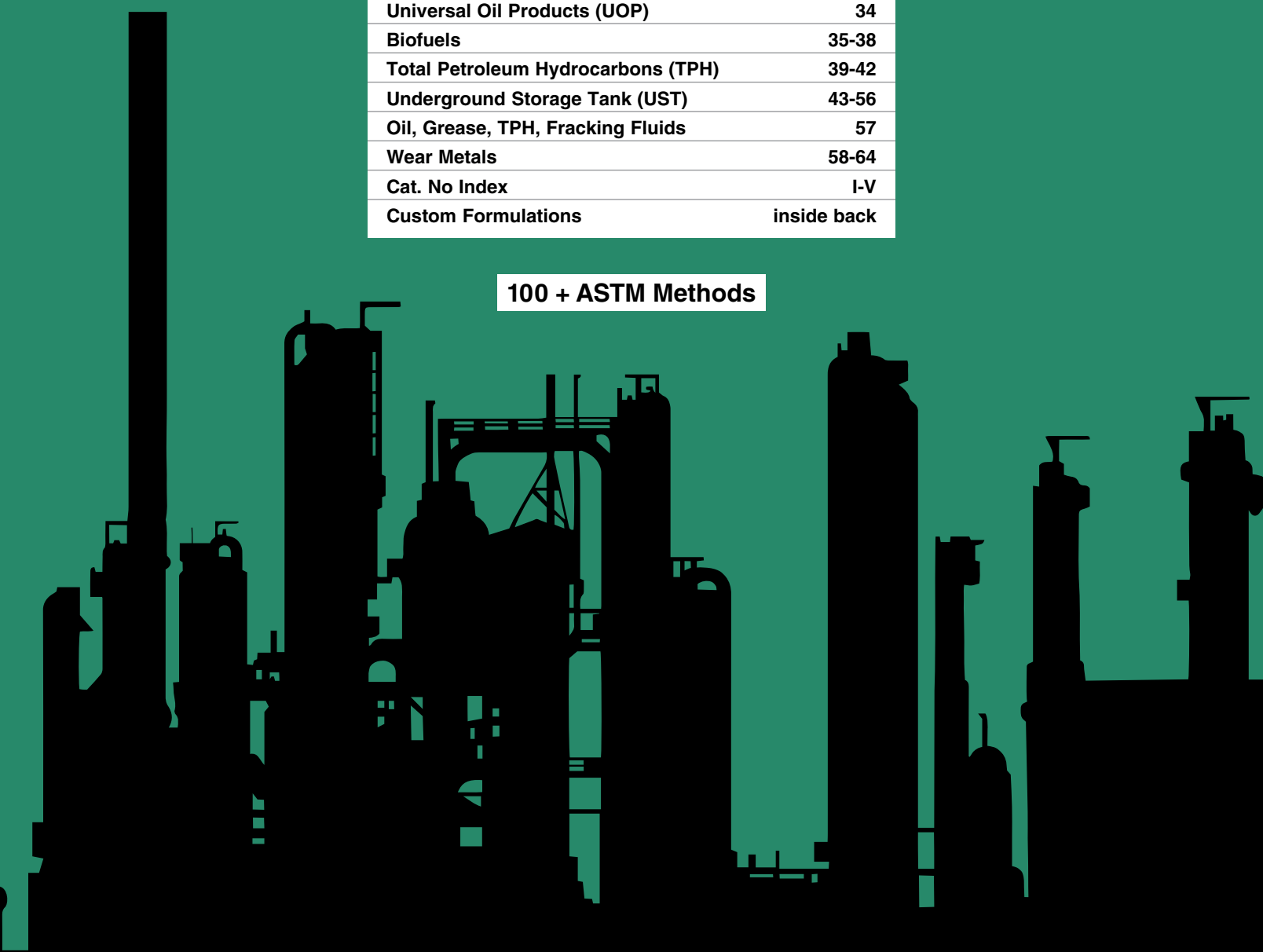
Custom Standards offer an efficient and economical option when our listed catalog products do not match your exact testing requirements. With decades of experience in manufacturing CRMs, AccuStandard can formulate quality custom standards that are uniquely made to meet your specific specifications. Our Custom CRMs follow our ISO17034 quality guidelines offering convenience but most importantly reliability and confidence. Our commitment to quality goes above and beyond by offering shelf life extension tests to custom CRMs included in our custom standard service.

Why buy AccuStandard's Custom Standards?

- Fast and knowledgeable quotation service
- Experienced Technical support to answer your questions
- Formulation is carefully evaluated for stability and compatibility
- Balances used are verified daily against NIST traceable weights
- Certificate of Analysis (COA) provided showing analytes certified value

TABLE OF CONTENTS

100 + ASTM Methods



ISO 17034 • 17025 • 9001

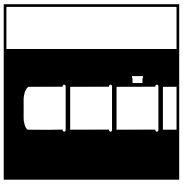
Visit our website for the latest petrochemical updates.
https://www.accustandard.com/petrochemical-standards

Methods Table of Contents

INSTRUMENT ABBREVIATIONS

Gas chromatography (GC)
Mass spectrometry (MS)
Gas Chromatography-Mass Spectrometry (GC-MS)
Gas Chromatography - Flame Ionization Detection (GC-FID)
Gas Chromatography - Oxygenate Flame Ionization Detector (GC-OFID)
Gas chromatography -Vacuum Ultraviolet Spectroscopy (GC-VUV)
Gas chromatography - Fourier Transform Infrared Spectroscopy (GC-FTIR)
High-Performance Liquid Chromatography (HPLC)
Wavelength Dispersive - X-Ray Fluorescence Spectroscopy (WD-XRF)
Energy Dispersive X-Ray Fluorescence (ED-XRF)
Supercritical Fluid Chromatography (SFC)
Atomic Absorption (AA)
Atomic Absorption Spectroscopy (AAS)
Inductively Coupled Plasma (ICP)
Inductively Coupled Plasma - Mass Spectrometry (ICP-MS)
Inductively Coupled Plasma - Atomic Emission Spectroscopy (ICP-AES)
Ultraviolet Fluorescence (UVF)

Methods Table of Contents



Custom Formulations

Available upon request
Please contact us

ASTM Index and Cross-Reference Methods

ASTM INDEX

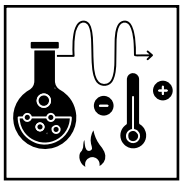
METHOD	PG	METHOD	PG
D56	1	D5453	35
D92	1	D5482	11
D93	1	D5501	13
D86	1	D5580	14
D97	2	D5599	15-17
D445	1	D5622	18
D611	1, 2	D5623	18
D1015	1	D5708	61
D1319	6	D5762	18
D2386	1	D5769	19-24
D2789	30	D5771	2
D2887	30-31	D5772	2
D3605	61	D5773	2
D3710	31	D5863	61
D1744	2	D5950	2
D2500	2	D5972	1
D4377	2	D5986	24
D4928	2	D6258	25
D6304	2	D6293	32
D2622	3-5	D6296	25
D3120	3-5	D6334	3-4
D3246	3-5	D6352	25
D4294	3-5	D6379	25
D5453	3-4	D6417	??
D7039	26	D6428	5
D3230	6	D6443	62,63,64
D3237	6	D6445	3-4
D3524	6	D6481	62,63,64
D3606	7	D6550	26
D3798	8-9	D6584	35-36
D3831	8	D6591	26
D4291	8	D6751	35, 38
D4420	8	D6729	29
D4628	62	D6730	29,31 32
D4629	8	D6733	26, 29
D4815	9	D6751	35
D4927	62,63	D6839	32
D4929	9	D7096	26
D4951	62	D7153	1
D5056	60	D7169	32
D5059	10	D7423	27
D5134	10	D7576	`27
D5184	10	D7751	63
D5186	10	D7900	27
D5188	11	D8071	28, 29
D5191	11	D8305	28
D5307	11	D8368	28
D5441	12	E1064	2
D5442	13	E1387	33
D5443	13	E1618	33

CROSS-REFERENCE PETROCHEMICAL METHODS

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		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
Sulfur by Ultra Violet Fluorescence	D5453					
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			

Physical Property
ASTM Methods

AccuStandard is ISO 17034 scope includes Physical Standard methods for Flash Point, Distillation, Cloud Point, Freeze Point, Viscosity, and Water Content in petroleum products by Karl Fischer Titration. As a Reference Material Producer we follow strict guidelines for producing, certifying, labeling, and reporting uncertainty for these standards. Requirements include verifying stability and homogeneity, which goes above and beyond our ISO/IEC 17025 and ISO 17034 requirements.



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ASTM D56, D92, D93 Flash Point

Flash Point is the lowest temperature at which a heated liquid will form sufficient vapor to ignite when exposed to a flame source. For heavy oils or light hydrocarbons, we offer multiple flash point CRMs for your daily and routine checks that are suitable for ASTM D56, D92 and D93. Flash point is important for the determination of different fuel properties such as density, viscosity, specific heat and ignition point.

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

ASTM D86 Distillation

TIER 3 STANDARDS

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

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

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

ASTM D445 Kinematic Viscosity Calibration

Kinematic Viscosity is the measurement of a liquid flow time using a calibrated viscometer tube in a controlled temperature bath. The Kinematic viscosity of petroleum products is important to determine the quality of the product, the applicability and the suitable storage conditions. AccuStandard is viscosity CRMs are made in accordance with ASTM Test Method D445 and cover a broad range of Viscosity values.

Viscosity @ 40°C	Cat. No.	Unit	Viscosity @ 40°C	Cat. No.	Unit
4 cSt	ASTM-P-128-01	500 mL	180 Cst	ASTM-P-128-05	500 mL
7 cSt	ASTM-P-128-02	500 mL	400 Cst	ASTM-P-128-07	500 mL
19 cSt	ASTM-P-128-03	500 mL	520 Cst	ASTM-P-128-06	500 mL
61 cSt	ASTM-P-128-04	500 mL			

ASTM D1015, D2386, D5972, D7153 Freezing Points for Aviation Fuel

Aviation fuel freezing point is the lowest temperature at which fuel remains free of solid hydrocarbon crystals.

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

Physical Standards continued on next page.

▲ Hazardous fee required for air shipments

Physical Property
ASTM Methods

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

The Karl Fischer Coulometric titration is used to determine water content in Petroleum, Pharmaceutical as well as Food products. ASTM D4377 Karl Fischer CRMs are available as low as 60 PPM with versatile fill sizes that meet all your lab needs.

Water Content	Cat. No.	Unit
60 µg/g in Anisole	KF-0.6X-5ML-VAP	10 x 5 mL
100 µg/g in Anisole	KF-1X-2ML-VAP	10 x 2 mL
	KF-1X-5ML-VAP	10 x 5 mL
	KF-1X-20ML-PAK	5 x 20 mL
1000 µg/g in Anisole	KF-10X-2ML-VAP	10 x 2 mL
	KF-10X-5ML-VAP	10 x 5 mL
	KF-10X-20ML-PAK	5 x 20 mL

Water Content	Cat. No.	Unit
5000 µg/g in Anisole : Isopropanol	KF-50X-2ML-VAP	10 x 2 mL
	KF-50X-5ML-VAP	10 x 5 mL
	KF-50X-20ML-PAK	5 x 20 mL

Value Added Pak (VAP)
Provide multiple single units packaged together for consistency and cost savings.

ASTM D2500, D5771, D5772, D5773 — Cloud Point Calibration

Cloud Point is the lowest temperature when a petroleum product becomes cloudy and hydrocarbon crystals start forming. Cloud Point is an important parameter to measure in order to determine quality and performance of petroleum products. Cloud Point CRMs cover a range from -20 °C up to +5 °C. They are available for immediate dispatch to meet your application needs. ▲

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

Cloud Point, (Approx. Value)	Cat. No. ▲	Unit
- 15 °C	ASTM-P-131-04	250 mL
- 20 °C	ASTM-P-131-05	250 mL

ASTM D97, D5950 — Pour Point Calibration

The Pour Point of a liquid is defined as the lowest temperature at which a petroleum product can be poured under certain testing criteria. Pour Point is an important characteristic to measure for Refineries and Petroleum Testing Labs to ensure a fuel meets the desired specifications.

Pour Point, (Approx. Value)	Cat. No. ▲	Unit
- 50 °C	ASTM-P-135-01	250 mL
- 25 °C	ASTM-P-135-02	250 mL
- 5 °C	ASTM-P-135-03	250 mL

Pour Point, (Approx. Value)	Cat. No. ▲	Unit
- 15 °C	ASTM-P-135-04	250 mL
- 40 °C	ASTM-P-135-05	250 mL

ASTM D611 — Aniline Point (Not offered as CRMs under our 17034 and 170205 scope)

Method 611(A)

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

Method 611(E)

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

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

▲ Hazardous fee required for air shipments

Sulfur
ASTM Methods

These calibration standards are designed for the analysis of sulfur in a wide variety petroleum matrices. Sulfur standards are manufactured from the highest quality raw materials, including well characterized starting materials and the lowest sulfur matrices available. These standards are manufactured using balances that are calibrated by an outside ISO 17025 accrediated labortory 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.

ASTM D2622, D3120, D3246, D4294, D5453, D6334, D6445 | **Sulfur Analysis** | **TIER 3 STANDARDS**

Sulfur in Light Weight Mineral Oil (20 cSt)

Ready-to-Use

SWMO-LT-CAL-100ML-SET ▲ 19 x 100 mL

Concentration µg/g	Concentration Wt.%	Cat. No. 100 mL	Cat. No. 5 x 20 mL
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

Sulfur in Heavy Weight Mineral Oil (75 cSt)

Ready-to-Use

SWMO-CAL-100ML-SET ▲ 19 x 100 mL

Concentration µg/g	Concentration Wt.%	Cat. No. 100 mL	Cat. No. 5 x 20 mL
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

Sulfur in Light Distillate Kerosene

Ready-to-Use

SK-CAL-100ML-SET ▲ 12 x 100 mL

Concentration µg/g	Concentration Wt.%	Cat. No. ▲ 100 mL	Cat. No. 5 x 20 mL
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

Sulfur in #2 Diesel Fuel

Ready-to-Use

SETS	SDF-CAL-100ML-SET ▲ 19 x 100 mL	SDF-CAL-20ML-SET 19 x (5 x 20 mL)
Concentration µg/g / Wt.%	Cat. No. ▲ 100 mL	Cat. No. 5 x 20 mL
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

Sulfur in Renewable Diesel Fuel #2

Ready-to-Use

SRD-CAL-SET ▲ 21 x 100 mL

µg/g	Cat. No. ▲	Unit
Blank	SRD-BL-100ML	100 mL
5	SRD-0.05X-100ML	100 mL
10	SRD-0.1X-100ML	100 mL
25	SRD-0.25X-100ML	100 mL
50	SRD-0.5X-100ML	100 mL
100	SRD-1X-100ML	100 mL
250	SRD-2.5X-100ML	100 mL
300	SRD-3X-100ML	100 mL
500	SRD-5X-100ML	100 mL
700	SRD-7X-100ML	100 mL
750	SRD-7.5X-100ML	100 mL
1,000	SRD-10X-100ML	100 mL
2,500	SRD-25X-100ML	100 mL
3,000	SRD-30X-100ML	100 mL
5,000	SRD-50X-100ML	100 mL
10,000	SRD-100X-100ML	100 mL
15,000	SRD-150X-100ML	100 mL
20,000	SRD-200X-100ML	100 mL
30,000	SRD-300X-100ML	100 mL
40,000	SRD-400X-100ML	100 mL
50,000	SRD-500X-100ML	100 mL

Technical Note

Sulfur is introduced using di-n-butyl sulfide.

▲ Hazardous fee required for air shipments.

Sulfur in Heavy Distillate Kerosene continued on next page.

Sulfur
ASTM Methods

ASTM D2622, D3120, D3246, D4294, D5453, D6334, D6445 | **Sulfur Analysis (continued)** | **TIER 3 STANDARDS**

Sulfur in Heavy Distillate Kerosene
SK-HD-CAL-100ML-SET ▲ — **21 x 100 mL**

Concentration µg/g	Wt.%	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

Concentration µg/g	Wt.%	Cat. No. ▲
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

Technical Note

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

ASTM D2622, D6334, D6445 | **Sulfur Calibration** | **TIER 3 STANDARDS**

Sulfur Calibration Standards used on XRF Energy Dispersive or Wavelength Instruments
D-2622-LL-CAL-100ML-SET ▲ — **10 x 100 mL**

Individual bottles in Isooctane:Toluene (75:25)

Low Level

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

Mid Level Additions

Sulfur Conc.	Sulfur Wt.%	Cat. No. ▲	Unit
200 µg/g	0.020	D-2622-LL-200X-100ML	100 mL
400 µg/g	0.040	D-2622-LL-400X-100ML	100 mL
600 µg/g	0.060	D-2622-LL-600X-100ML	100 mL
700 µg/g	0.070	D-2622-LL-700X-100ML	100 mL
800 µg/g	0.080	D-2622-LL-800X-100ML	100 mL
900 µg/g	0.090	D-2622-LL-900X-100ML	100 mL
1100 µg/g	0.110	D-2622-LL-1100X-100ML	100 mL
1200 µg/g	0.120	D-2622-LL-1200X-100ML	100 mL

Technical Note

Thiophene and 2-Methylthiophene are used as starting material.

ASTM D2622, D4294 | **Sulfur Calibration** | **TIER 3 STANDARDS**

Sulfur Calibration Standards for Gasoline and Reformulated Gasoline Analysis
STP-CAL-100ML-SET ▲ — **13 x 100 mL**

Individual bottles in Isooctane

Sulfur Conc.	Sulfur Wt.%	Cat. No. ▲	Unit
Blank	0.0	STP-BL-100ML	100 mL
10 µg/g	0.001	STP-1X-100ML	100 mL
20 µg/g	0.002	STP-2X-100ML	100 mL
30 µg/g	0.003	STP-3X-100ML	100 mL
50 µg/g	0.005	STP-5X-100ML	100 mL
100 µg/g	0.010	STP-10X-100ML	100 mL
200 µg/g	0.020	STP-20X-100ML	100 mL

Sulfur Conc.	Sulfur Wt.%	Cat. No. ▲	Unit
300 µg/g	0.030	STP-30X-100ML	100 mL
400 µg/g	0.040	STP-40X-100ML	100 mL
600 µg/g	0.060	STP-60X-100ML	100 mL
1000 µg/g	0.10	STP-100X-100ML	100 mL
2000 µg/g	0.20	STP-200X-100ML	100 mL
3000 µg/g	0.30	STP-300X-100ML	100 mL

Technical Note

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

ASTM D5453 | **Total Sulfur in Light Hydrocarbons, Motor Fuels & Oils by Ultraviolet Fluorescence** | **TIER 3 STANDARDS**

Low Level Sulfur Set
D-5453-LL-SET — **5 x 2 mL**

At stated in Isooctane

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**

At stated in Isooctane

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**

At stated in Isooctane

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

▲ Hazardous fee required for air shipments.

As the matrix may contain some native sulfur, we encourage purchasing sulfur blanks for calibration.

Sulfur
ASTM Methods

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

Each in Isooctane

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

D-6428-R2-100ML-SET — 6 x 100 mL

D-6428-R2-SET — 6 x 1 mL

Each in Isooctane

	D-6428-R2-100ML-SET	D-6428-R2-SET
Sulfur Blank	D-6428-BL-100ML	D-6428-BL
Sulfur @ 10 µg/g	D-6428-10X-100ML	D-6428-10X
Sulfur @ 25 µg/g	D-6428-25X-100ML	D-6428-25X
Sulfur @ 50 µg/g	D-6428-50X-100ML	D-6428-50X
Sulfur @ 75 µg/g	D-6428-75X-100ML	D-6428-75X
Sulfur @ 100 µg/g	D-6428-100X-100ML	D-6428-100X

Technical Note

Standards are prepared by adding well characterized sulfur compounds gravimetrically to the matrix. Since the matrix may contain some native sulfur, a blank must be used for background correction and should be purchased with the standard.

Available only as a sets

ASTM D3120 & D3246 — Sulfur Calibration — TIER 3 STANDARDS

Sulfur Calibration Set

D-3120-92-CAL-SET — 8 x 1 mL

Individual bottles in Isooctane

Available only as a set

Sulfur Conc.	Sulfur Wt.%	Cat. No.	Unit	Sulfur Conc.	Sulfur Wt.%	Cat. No.	Unit
Blank	0.0	D-3120-92-BL	1 mL	30 µg/g	0.0030	D-3120-92-30X	1 mL
1 µg/g	0.0001	D-3120-92-1X	1 mL	50 µg/g	0.0050	D-3120-92-50X	1 mL
3 µg/g	0.0003	D-3120-92-3X	1 mL	75 µg/g	0.0075	D-3120-92-75X	1 mL
10 µg/g	0.0010	D-3120-92-10X	1 mL	100 µg/g	0.010	D-3120-92-100X	1 mL

ASTM D2622 & D4294 — Sulfur Petroleum Products

Sulfur in Crude Oil Standards

SCO-CAL-100ML-SET ▲ — 8 x 100 mL

Individual bottles in Crude oil

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

Sulfur in Residual Oil Standards

SRO-CAL-100ML-SET — 7 x 100 mL

Individual bottles Residual oil

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

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)

Low Level Sulfur Calibration Set

ASTM-SSTDA-B-SET — 10 x 2 mL

At stated conc. in Isooctane

µg/g	Cat. No.	Unit	µg/g	Cat. No.	Unit
Blank	ASTM-SSTDA-BL	2 mL	Blank	ASTM-SSTDB-BL	2 mL
0.5	ASTM-SSTDA-01	2 mL	5.0	ASTM-SSTDB-04	2 mL
1.0	ASTM-SSTDA-02	2 mL	10.0	ASTM-SSTDB-05	2 mL
2.5	ASTM-SSTDA-03	2 mL	25.0	ASTM-SSTDB-06	2 mL
5.0	ASTM-SSTDA-04	2 mL	50.0	ASTM-SSTDB-07	2 mL

Available only as a set

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

Sulfur Calibration Set

D-3120-92-CAL-SET — 8 x 1 mL

In Isooctane

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

▲ Hazardous fee required for air shipments.

Technical Note

Prepared by adding well characterized sulfur compounds gravimetrically to the matrix. Since the matrix may contain some native sulfur, a blank must be used for background correction and is recommended that it be purchased with the standard.

ASTM Methods

ASTM D1319 — Calibration Standards by Fluorescent Indicator Adsorption (FIA)

Olefin FIA Calibration Curve

FIA-CAL-SET — **7 x 1 mL**

	Target	Level 1 Vol.%	Level 2 Vol.%	Level 3 Vol.%	Level 4 Vol.%	Level 5 Vol.%	Level 6 Vol.%	Level 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

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

FIA Olefin Standard

FIA-OLE — **1 x 1 mL**
FIA-OLE-5ML — **1 x 5 mL**
At stated Vol. % — 3 comps.

1-Pentene	33.3
2,3-Dimethyl-2-butene	33.3
1-Heptene	33.3

Technical Note

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

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

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

FIA Paraffin Standard

FIA-PAR — **1 x 1 mL**
FIA-PAR-5ML — **1 x 5 mL**
At stated Vol. % — 8 comps.

n-Pentane	8	2,3-Dimethylpentane	14
n-Hexane	9	Isooctane	19
Cyclohexane	15	*n*-Octane	14
n-Heptane	14	*n*-Decane	7

FIA Aromatic Standard

FIA-ARO — **1 x 1 mL**
FIA-ARO-5ML — **1 x 5 mL**
At stated Vol. % — 10 comps.

Benzene	4	*m*-Xylene	16
Toluene	32	1,2,4-Trimethylbenzene	8
Ethylbenzene	8	1,3,5-Trimethylbenzene	8
p-Xylene	8	1,2,4,5-Tetramethylbenzene	4
o-Xylene	8	Naphthalene	4

D1319 Meets EPA Guidlines for RFG Analysis

ASTM D3230 — Determination of Salts in Crude Oil

Mixed Salt Solution

D-3230-89-1 — **100 mL**
D-3230-89-5 — **500 mL**
At stated conc. (µg/mL) in Alcohol Solution (1-butanol : MeOH) (ratio 63:37) — 3 comps.

Calcium chloride	10	Sodium chloride	70
Magnesium chloride	20		

ASTM D3237 — Lead in Gasoline by AA Spectroscopy

Lead Standard Calibration Curve

D-3237-CAL-SET — **4 x 100 mL**
Set includes the following Catalog Numbers:

Description	Cat. No.	Unit
Blank 1% Aliquot 336/MIBK	D-3237-01	100 mL
0.02 g Pb / gal (5.3 mg Pb/ L) in 1% Aliquat 336 / MIBK	D-3237-02	100 mL
0.05 g Pb / gal (13.2 mg Pb/ L) in 1% Aliquat 336 / MIBK	D-3237-03	100 mL
0.10 g Pb / gal (26.4 mg Pb/ L) in 1% Aliquat 336 / MIBK	D-3237-04	100 mL

Technical Note

D3237 Meets EPA guidelines for RFG Analysis.

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

Column Resolution Mix

D-3524-CR — **1 x 1 mL**
D-3524-CR-PAK — ***SAVE*** **5 x 1 mL**
1.0 each %v/v in n-Heptane — 2 comps.

n-Hexadecane	*n*-Octadecane

Mid Level Daily QC Solution

D-3524-QC-10ML — **1 x 10 mL**
At stated Wt.% — 2 comps.

# 2 Diesel	5.0
SAE 30W Motor oil	95.0

Internal Standard

D-3524-IS-10ML — **1 x 10 mL**
D-3524-IS-10ML-PAK — ***SAVE*** **5 x 10 mL**
At stated Wt.% in n-Heptane — 2 comps.

n-Decane	1.0	*n*-Octadecane	0.2

ASTM D3606 | Benzene and Toluene in Finished Motor & Aviation Gasoline by GC | TIER 3 STANDARDS

ASTM Method D3606 was developed to quantify benzene and toluene in finished motor and aviation spark ignition fuels. An additional updated standard is provided for the 7 level calibration set which includes ethanol at approximately 10% v/v for all 7 levels.

Aromatics Calibration Set without Internal Standards

D-3606-25ML-SET — 7 x 25 mL

Analyte	Calibration 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

Calibration Set with Internal Standard: MEK

D-3606-IS-SET — 7 x 1 mL
D-3606-IS-2ML-SET — 7 x 2 mL

Analyte	Calibration 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	0.64	0.32	0.12	0.06
Toluene	0.5 - 20	19.2	14.4	9.6	4.80	2.40	0.96	0.48
Methyl ethyl ketone (ISTD)		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Isooctane		72.0	79.2	85.2	90.56	93.28	94.92	95.46

Calibration Set with Internal Standard: *sec*-Butanol

D-3606-IS2-SET — 7 x 1 mL

Analyte	Calibration 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	0.64	0.32	0.12	0.06
Toluene	0.5 - 20	19.2	14.4	9.6	4.80	2.40	0.96	0.48
sec-Butanol (ISTD)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Isooctane		72.0	79.2	85.2	90.56	93.28	94.92	95.46

Calibration Set with Internal Standard: *sec*-Butanol

D-3606-IS2-R1-SET — 7 x 1 mL

Analyte	Calibration 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 (ISTD)		4	4	4	4	4	4	4

Calibration Set with Internal Standard: *sec*-Butanol

D-3606-IS2-R2-SET — 7 x 1 mL

Analyte	Calibration 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	0.64	0.32	0.12	0.06
Toluene	0.5 - 20	19.2	14.4	9.6	4.8	2.4	0.96	2.48
Ethanol		9.6	9.6	9.6	9.6	9.6	9.6	9.6
sec-Butanol (ISTD)		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Isooctane		62.4	69.6	75.6	80.96	83.68	85.32	85.86

Calibration Set with Internal Standard: MIBK

D-3606-IS3-SET — 7 x 2 mL

Analyte	Calibration 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	2.5	1.3	0.67	0.33	0.12	0.06
Toluene	0.5 - 20	20	15.0	10.0	5.0	2.5	1.0	0.5
MIBK (ISTD)		4	4.0	4.0	4.0	4.0	4.0	4.0
Isooctane		71	75.8	84.7	90.33	93.17	94.88	95.44

These are target concentrations, actual analytical values will be reported on the COA.

Daily Gasoline Refinery Quality Control Standards

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 Vol.% — 4 comps.

Benzene	0.64
Toluene	4.80
Methyl ethyl ketone (ISTD)	4.0
Isooctane	90.56
	100

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 Vol.% — 4 comps.

Benzene	0.64
Toluene	4.80
sec-Butanol (Internal Std.)	4.0
Isooctane	90.56
	100

Without Internal Standard

D-3606-QC-25ML — 1 x 25 mL
D-3606-QC-25ML-PAK — 5 x 25 mL
Each at stated Vol.% — 3 comps.

Benzene	0.67
Toluene	5.00
Isooctane	94.33
	100

ASTM Methods

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 — ***SAVE*** **5 x 1 mL**
At stated Wt.% — 11 comps.

n-Pentane	0.15	*o*-Xylene	0.15
n-Octane	0.15	Cumene	0.15
Benzene	0.15	Propylbenzene	0.15
Toluene	0.15		———
Ethylbenzene	0.15	Total Analytes	100
p-Xylene	98.65	plus *n*-Undecane* (ISTD)	0.500
m-Xylene	0.15		

Without Internal Standard

D-3798-10ML — **1 x 10 mL**
D-3798-10ML-PAK — ***SAVE*** **5 x 10 mL**
At stated Wt.% — 10 comps.

n-Pentane	0.15	*p*-Xylene	98.65
n-Octane	0.15	*m*-Xylene	0.15
Benzene	0.15	*o*-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 specfic application. To eliminate making standards, contact our Technical Service Department with your custom formulation for a quotation. See back of catalog for details.

ASTM D3831 — Manganese in Gasoline by AA Spectroscopy

Manganese Stock Solution

D-3831-1 — **1 x 100 mL**
1.0 g Mn / gal (264.2 mg Mn / L) in Methyl isobutyl ketone

Manganese

D-3831-R1-1 — **1 x 100 mL**
400 mg/L in Methyl isobutyl ketone

Manganese

ASTM D4291 — Trace Ethylene Glycol in Used Engine Oil

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

Ethylene glycol

ASTM D4420 — Aromatics in Finished Gasoline by GC

Aromatics in Gasoline by GC/TC

D-4420-CAL-SET — **7 x 1 mL**

Analyte	Std. 1 Target Vol. %	Std. 2 Target Vol. %	Std. 3 Target Vol. %	Std. 4 Target Vol. %	Std. 5 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_8 aromatics)	5	10.00	15.00	20.00	25.00	1.00	3.00
n-Butylbenzene (C_9 + aromatics)	30.00	25.00	20.00	10.00	5.00	15.00	2.50
Isooctane	64.45	63.90	62.25	64.25	58.75	66.50	64.50

D-4420-94 — **1 x 1 mL**
D-4420-94-PAK — ***SAVE*** **5 x 1 mL**
At stated Vol.% — 5 comps.

Benzene	3.00
Toluene	10.00
Total Xylenes (C_8 aromatics)	15.00
n-Butylbenzene(C_9 + aromatics)	15.00
Isooctane	57.00

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

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

Nitrogen Calibration Set - Low Boiling Solvents

D-4629-LB-CAL-R1-SET — **8 x 1 mL**
Nitrogen introduced using Pyridine

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

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

Stock Nitrogen Solution Low Boiling Solvents

D-4629-91-LB-CON — **1 x 1 mL**
D-4629-91-LB-CON-PAK — ***SAVE*** **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 — **8 x 1 mL**
Nitrogen introduced using Carbazole

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

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

Stock Nitrogen Solution High Boiling Solvents

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

Nitrogen introduced using Carbazole

ASTM D4629 continued on next page.

ASTM D4629 — Trace Nitrogen in Liquid Petroleum Hydrocarbons (continued)

Nitrogen Calibration Set - Low Level

ASTM-P-0070-SET — **6 x 1 mL**

Nitrogen introduced using Aniline

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

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

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

Technical Note

Standards are prepared by adding well characterized nitrogen compounds gravimetrically to the matrix. Since the matrix may contain some native nitrogen, a blank must be used for background correction and should be purchased with the standard.

ASTM D4815 — MtBE, EtBE, TAME, DIPE, Tertiary-amyl & C1 to C4 Alcohols in Gasoline by GC — TIER 3 STANDARDS

Oxygenate Quantitative Calibration Mixtures

Without Internal Standard

D-4815-10ML-SET — **5 x 10 mL**

Analyte	Std. 1 Wt.%	Std. 2 Wt.%	Std. 3 Wt.%	Std. 4 Wt.%	Std. 5 Wt.%
	Target Concentrations				
Ethanol	3.00	0.10	6.00	9.00	12.00
t-Butanol	0.10	3.00	6.00	8.00	12.00
Methyl *t*-butyl ether (MtBE)	20.0	15.00	10.00	5.00	0.10
t-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 — **5 x 1 mL**

D-4815-IS-SET-PAK — ***SAVE*** **5 x (5 x 1 mL)**

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

Oxygenate Internal Standard

M-GRO-IS-5ML — **1 x 5 mL**

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

1,2-Dimethoxyethane (neat)

Oxygenate Free Refinery Gasoline Blank

RFA-BLNK-10ML — **1 x 10 mL**

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

RFA Gasoline (neat)

Quantitative Peak ID and Retention Time Mixture (Core Mix)

D-4815-RT — **1 x 1 mL**

D-4815-RT-PAK — ***SAVE*** **5 x 1 mL**

At stated Wt.%	16 comps.
Methylcyclopentane	4.00
Methanol	7.30
Ethanol	7.30
Isopropanol	7.30
tert-Butanol	7.30
n-Propanol	7.30
Methyl *tert*-butyl ether (MtBE)	4.00
sec-Butanol	7.30
Isopropyl ether	4.00
Isobutanol	7.30
Ethyl *tert*-butyl ether (EtBE)	4.00
tert-Pentanol	7.30
1,2-Dimethoxyethane (ISTD)	6.00
n-Butanol	7.30
Benzene	5.00
tert-Amyl methyl ether (TAME)	7.30
	100

Valve Timing Mixture

D-4815-VT — **1 x 1 mL**

D-4815-VT-PAK — ***SAVE*** **5 x 1 mL**

At stated Wt.%	5 comps.
Methylcyclopentane	10.00
Isopropyl ether	10.00
Ethyl *tert*-butyl ether (EtBE)	10.00
Methyl *tert*-butyl ether (MtBE)	10.00
n-Hexane	60.00

ASTM D4929 — Organic Chloride Content in Crude Oil - Test Method B Combustion & Microcoulometry

Working Level Chlorine Standard

D-4929-94 — **1 x 5 mL**

D-4929-94-PAK — ***SAVE*** **5 x 5 mL**

10 µg/mL in Isooctane

Chlorine

Stock Chlorine Standard

D-4929-94-100X — **1 x 5 mL**

D-4929-94-100X-PAK — ***SAVE*** **5 x 5 mL**

1000 µg/mL in Isooctane

Chlorine

Chlorine in Lube Oils

ASTM-P-0092-100ML-SET — **7 x 100 mL**

Each in 75 cSt Mineral oil

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

ASTM Methods

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**

At stated conc. (g/gal) in Isooctane

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

Part C - Lead in Gasoline Standards

D-5059-C-CAL-100ML-SET ▲ — **7 x 100 mL**

At stated conc. (g/gal) in Isooctane

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

Internal Standard

D-5059-IS-100ML — **1 x 100 mL**

D-5059-IS-10ML-PAK — **5 x 10 mL**

0.793 mg/mL in Mineral Oil

Bismuth

D5059 Meets EPA Guidelines for RFG Analysis

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.

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.	Unit
Alkylate Standard neat fraction approx. 30 comps. identified	D-5134-92-ALK	1 mL
Naphtha Standard neat fraction approx. 70 comps. identified	D-5134-92-NAP	1 mL
Reformate Standard neat fraction approx. 100 comps. identified	D-5134-92-REF	1 mL

Column Evaluation Mix

D-5134-92-CEM — **1 x 1 mL**

At stated Wt.% — 7 comps.

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		

Linearity Check Mix

D-5134-92-LCM-PAK — **5 x 50 mg**

10 Wt.% each — 10 comps.

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

ASTM D5184 — Aluminum and Silicon in Fuel Oils by Ashing, Fusion, ICP-AES Spectrometry & AA Spectrometry

Tartaric Acid / Hydrochloric Acid Solution

D-5184-91-TA-5 ▲ — **1 x 500 mL**

Tartaric acid @ 0.5% w/v in 4% HCl

Aluminum Standard Solution

D-5184-91-AL-1 ▲ — **1 x 100 mL**

D-5184-91-AL-5 ▲ — **1 x 500 mL**

Aluminum @ 1000 µg/mL in 5 % HCl tr. HNO_3

Silicon Standard Solution

D-5184-91-SI-1 — **1 x 100 mL**

D-5184-91-SI-5 — **1 x 500 mL**

Silicon @ 1000 µg/mL in water tr. NaOH tr. HF

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 Wt.% — 4 comps.

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**

#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 Wt.% in Toluene

▲ Hazardous fee required for air shipments.

ASTM Methods

ASTM D5188 — Vapor - Liquid Ratio Temperature

Performance Check Samples
Daily monitoring of instrument performance

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

ASTM D5191 & D5482 — Vapor Pressuree

Vapor Pressure Quality Control Samples

Vapor Pressure	Cat. No.	Set
68.3kPa (9.91 psi)	ASTM-P-124-01-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

Value Added PAK
Packaged in ready to use quantities.

Technical Note
Consists of pure solvents with known vapor pressures.

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.

n-Decane	*n*-Octadecane
n-Undecane	*n*-Eicosane
n-Dodecane	*n*-Tetracosane
n-Tridecane	*n*-Octacosane
n-Tetradecane	*n*-Dotriacontane
n-Pentadecane	*n*-Hexatriacontane
n-Hexadecane	*n*-Tetracontane
n-Heptadecane	*n*-Tetratetracontane

Qualitative Paraffins Standard

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

n-Propane	10	*n*-Heptane	15
n-Butane	15	*n*-Octane	15
n-Pentane	18	*n*-Nonane	15
n-Hexane	18		

Internal Standard

D-5307-IS-10ML — **1 x 10 mL**
D-5307-IS-10ML-PAK — ***SAVE*** **5 x 10 mL**
At stated Wt.% — 4 comps.

n-Tetradecane	25
n-Pentadecane	25
n-Hexadecane	25
n-Heptadecane	25

Column Resolution Mix

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

n-Hexadecane	1.0
n-Octadecane	1.0
n-Octane	98.0

Save 20% on a pack of 5

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_4 to C_{12} olefins, methyl, isopropyl and tert-butyl alcohols, methyl sec-butyl and methyl tert-amyl ethers, acetone, and methyl ethyl ketones. The presence of these impurities in MtBE can have a direct effect upon the value of the MtBE as a gasoline additive. The following reference standards have been formulated to meet the method specifications. Different packaging sizes are available to meet various sample testing capacities.

MtBE Contaminant Standard
Low Concentration

D-5441 — **1 x 1 mL**
D-5441-PAK — ***SAVE*** **5 x 1 mL**

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

- TAME
- *t*-Butanol
- EtBE
- 4,4-Dimethyl-2-neopentyl-1-pentene
- Methanol
- 2-Methylbutane
- 2-Methyl-2-butene
- 2,2',4,6,6'-Pentamethyl-3-heptene
- *n*-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.%. each in MtBE — 12 comps.

- TAME
- *t*-Butanol
- EtBE
- 4,4-Dimethyl-2-neopentyl-1-pentene
- Methanol
- 2-Methylbutane
- 2-Methyl-2-butene
- 2,2',4,6,6'-Pentamethyl-3-heptene
- *n*-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.% each in n-Dodecane — 33 comps.

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

Quantitative Standard

D-5441-QUANT-R1 — **1 x 1 mL**
0.1 Wt.% each in n-Dodecane — 29 comps.

- Methanol *(0.04 Wt.%)*
- 3-Methyl-1-butene
- Acetone
- 2-Methylbutane
- Isopropanol
- 1-Pentene
- 2-Methyl-1-butene
- *n*-Pentane
- *trans*-2-Pentene
- *t*-Butanol
- *cis*-2-Pentene
- 2-Methyl-2-butene
- Cyclopentene
- MtBE
- 2,3-Dimethyl-1-butene
- cis-4-Methyl-2-pentene
- 2-Methylpentane
- Methyl ethyl ketone
- 3-Methylpentane
- *sec*-Butyl methyl ether
- EtBE
- TAME
- 3,5-Dimethyl-1-hexene
- Diisobutylene
- 2,4,4-Trimethyl-2-pentene
- 3,4,4-Trimethyl-*trans*-2-pentene
- 2,3,4-Trimethyl-2-pentene
- 4,4-Dimethyl-2-neopentyl-1-pentene
- 2,2',4,6,6'-Pentamethyl-3-heptene

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.% each in MtBE — 3 comps.

- *trans*-2-Pentene
- *t*-Butanol
- *cis*-Pentene

ASTM Methods

ASTM D5442 — Analysis of Petroleum Waxes by GC

Quantitative Wax Standard

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

n-Dodecane	0.02	*n*-Octacosane	0.12
n-Tetradecane	0.03	*n*-Triacontane	0.10
n-Hexadecane	0.04	*n*-Dotriacontane	0.08
n-Octadecane	0.05	*n*-Hexatriacontane	0.06
n-Eicosane	0.06	*n*-Tetracontane	0.05
n-Docosane	0.08	*n*-Tetratetracontane	0.04
n-Tetracosane	0.10	*n*-Pentacontane	0.03
n-Hexacosane	0.12	*n*-Hexacontane	0.02

Column Resolution Standard

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

n-Eicosane	0.05
n-Tetracontane	0.05

Hydrocarbon Standard Brownfield Regulation

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

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

Retention Time Standard Mix 1

D-5442-RT1 — 500 mg
Equal Wt.% — 12 comps.

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

Retention Time Standard Mix 2

D-5442-RT2 — 500 mg
Equal Wt.% — 16 comps.

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

Standards of Interest

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

ASTM D5443 — Paraffin, Naphthene & Aromatic Hydrocarbon Type Analysis in Petro Distillates 200°C by Multi-Dimen. GC

Hydrocarbon Test Mix

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

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

ASTM D5501 — Ethanol Content of Denatured Fuel Ethanol by GC

Denatured Fuel Ethanol Calibration Set

D-5501-94-SET — 7 x 1 mL

Analyte	LEVEL 1 Wt.%	LEVEL 2 Wt.%	LEVEL 3 Wt.%	LEVEL 4 Wt.%	LEVEL 5 Wt.%	LEVEL 6 Wt.%	LEVEL 7 Wt.%
Ethanol	92	93	94	95	96	97	98
Methanol	0.6	0.5	0.4	0.3	0.2	0.1	0.05
Heptane	7.4	6.5	5.6	4.7	3.8	2.9	1.95

ASTM Method D5501-12

D-5501-12-SET — 5 x 1 mL

Analyte	D-5501-12-01 1 mL LEVEL 1 Wt.%	D-5501-12-02 1 mL LEVEL 2 Wt.%	D-5501-12-03 1 mL LEVEL 3 Wt.%	D-5501-12-04 1 mL LEVEL 4 Wt.%	D-5501-12-05 1 mL LEVEL 5 Wt.%
Ethanol	20	50	75	90	99.4
Methanol	0.6	0.5	0.3	0.2	0.1
Heptane	10	10	10	4	0.5
Isooctane	69.4	39.5	14.8	5.8	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.

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

Aromatics Quantitative Calibration Mixes

Without Internal Standard

D-5580-95-CAL-10ML-SET — 5 x 10 mL

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

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
At stated Wt.% — 6 comps.

Benzene	4.5
Toluene	4.5
Ethylbenzene	9.0
o-Xylene	9.0
2-Hexanone (ISTD)	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
At stated Wt.% — 5 comps.

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
1.5 Wt.% in Isooctane

n-Dodecane

Daily Quality Control Standards

Without Internal Standard

D-5580-QC-R1-10ML — 1 x 10 mL
D-5580-QC-R1-10ML-PAK — *SAVE* 5 x 10 mL
At stated Wt.% — 14 comps.

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

Without Internal Standard

D-5580-QC-10ML — 1 x 10 mL
D-5580-QC-10ML-PAK — *SAVE* 5 x 10 mL
At stated Wt.% — 14 comps.

n-Hexane	12	Toluene	9
n-Heptane	20	Ethylbenzene	2
n-Octane	15	*p*-Xylene	3
n-Decane	10	*o*-Xylene	2
n-Tridecane	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** | **TIER 3 STANDARDS**

Oxygenates Calibration Curves

With Internal Standard

M-GRO-CAL-IS-SET — 8 x 1 mL
M-GRO-CAL-IS-SET-PAK — *SAVE* 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	---	---
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	---
t-Pentanol	0.1 - 2.0	0.3	1	---	0.5	0.1	2	---	---
Butanol	0.1 - 2.0	1	---	0.3	---	0.5	0.1	2	---
TAME	1.0 - 18.0	---	3.5	1	18	7.5	12	---	---
1,2-Dimethoxyethane (ISTD)		4	4	4	4	4	4	4	---
RFA Gasoline		70.2	68.8	68.7	68.5	68.5	68.8	68.4	100
Total oxygenates and ISTD		**29.8**	**31.2**	**31.3**	**31.5**	**31.5**	**31.2**	**31.6**	**0**

With Internal Standard

M-GRO-CAL-IS-R1-SET — 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	---	---
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	---
t-Pentanol	0.1 - 2.0	0.3	1	---	0.5	0.1	2	---	---
Butanol	0.1 - 2.0	1	---	0.3	---	0.5	0.1	2	---
TAME	1.0 - 18.0	---	3.5	1	18	7.5	12	---	---
1,2-Dimethoxyethane (ISTD)		4	4	4	4	4	4	4	---
RFA Gasoline		74.2	72.8	72.7	72.5	72.5	72.8	72.4	100
Total oxygenates and ISTD		**28.6**	**30.0**	**30.1**	**30.3**	**30.3**	**30.0**	**30.4**	**0**

Technical Note

The revised set formulation is made by adding all the oxygenates, RFA Gasoline and the Internal Standard.

Without Internal Standard

M-GRO-CAL-SET — 8 x 10 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	---	---
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	---
t-Pentanol	0.1 - 2.0	0.3	1	---	0.5	0.1	2	---	---
Butanol	0.1 - 2.0	1	---	0.3	---	0.5	0.1	2	---
TAME	1.0 - 18.0	---	3.5	1	18	7.5	12	---	---
RFA Gasoline		74.2	72.8	72.7	72.5	72.5	72.8	72.4	100
Total oxygenates		**25.8**	**27.2**	**27.3**	**27.5**	**27.5**	**27.2**	**27.6**	**0**

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.

ASTM Methods

ASTM D5599 | **Oxygenates in Gas by GC & O-FID (continued)** | **TIER 3 STANDARDS**

Daily QC Standard
Without Internal Standard

M-GRO-QC-10ML — **1 x 10 mL**
M-GRO-QC-10ML-PAK — ***SAVE*** **5 x 10 mL**
At stated Wt.% — 14 comps.

Methanol	1	Isopropyl ether	3
Ethanol	1	Isobutanol	1
Isopropanol	1	EtBE	3
t-Butanol	1	*t-Amyl alcohol*	1
n-Propanol	1	*n*-Butanol	1
MtBE	3	TAME	3
sec-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**
At stated Wt.% — 15 comps.

Methanol	1	Isopropyl ether	3
Ethanol	1	Isobutanol	1
Isopropanol	1	EtBE	3
t-Butanol	1	*t-Amyl alcohol*	1
n-Propanol	1	*n*-Butanol	1
MtBE	3	TAME	3
sec-Butanol	1	RFA Gasoline	79

1,2-Dimethoxyethane (Internal Std.) is combined in a 4 to 100 Wt. ratio

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**
At stated Wt.% — 2 comps.

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**
At stated Wt.% — 14 comps.

Methanol	1	Isopropyl ether	1
Ethanol	1	Isobutanol	1
Isopropanol	1	EtBE	3
t-Butanol	1	*t-Amyl alcohol*	1
n-Propanol	1	*n*-Butanol	1
MtBE	3	TAME	3
sec-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**
At stated Wt.% — 15 comps.

Methanol	1	Diisopropyl ether	1
Ethanol	1	Isobutanol	1
Isopropanol	1	EtBE	3
t-Butanol	1	*t*-Pentanol	1
n-Propanol	1	*n*-Butanol	1
MtBE	3	TAME	3
sec-Butanol	1	RFA Gasoline	81

1,2-Dimethoxyethane (Internal Std.) is combined in a 4 to 100 Wt. ratio

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 (neat)

Standards of Interest

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. We have bulk packaged check standards to meet this increased usage.

Save 20% on a pack of 5

ASTM D5599 | **Oxygenates in Gas by GC & O-FID (continued)** | **TIER 3 STANDARDS**

EPA O-FID Quantitative Calibration Mixes

Without Internal Standard

M-GRO-CAL-EPA-10ML-SET — **5 x 10 mL**

	Calibration 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
t-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**

	Calibration 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
t-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**
At stated Wt.% — 5 comps.

Methanol	4.0	MtBE	12.0
Ethanol	8.0	RFA gasoline	71.0
t-Butanol	5.0		

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**
At stated Wt.% — 4 comps.

Methanol	14.3	*t*-Butanol	14.3
Ethanol	28.6	MtBE	42.8

Internal Standard

M-GRO-IS-5ML — **1 x 10 mL**
M-GRO-IS-5ML-PAK — ***SAVE*** **5 x 10 mL**

1,2-Dimethoxyethane (neat)

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**
At stated Wt.% — 6 comps.

Methanol	3.80	RFA gasoline	67.45
Ethanol	7.60	1,2-Dimethoxyethane	5.0
tert-Butanol	4.75	(Internal Standard)	
MtBE	11.40		

Oxygenate Free Gasoline Refinery Blank

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

RFA Gasoline (neat)

ASTM Methods

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
TAME in Oxygenate free RFA gasoline	10.0	ASTM-P-0063-SET	3 x 10 mL
TAME in Oxygenate free RFA gasoline	15.0	ASTM-P-0064-SET	3 x 10 mL
EtBE in Oxygenate free RFA gasoline	10.0	ASTM-P-0065-SET	3 x 10 mL
EtBE in Oxygenate free RFA gasoline	15.0	ASTM-P-0066-SET	3 x 10 mL
MtBE in Oxygenate free RFA gasoline	10.0	ASTM-P-0067-SET	3 x 10 mL
MtBE 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

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 — **22 x 1 mL**

Approx. 2.0 mg/mL each in Toluene

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

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 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.	Unit
Xylene Blank	D-5762-95-BL	1 mL
Nitrogen @ 1.0 µg/mL in Xylene	D-5762-95-1X	1 mL
Nitrogen @ 5.0 µg/mL in Xylene	D-5762-95-5X	1 mL
Nitrogen @ 10 µg/mL in Xylene	D-5762-95-10X	1 mL
Nitrogen @ 50 µg/mL in Xylene	D-5762-95-50X	1 mL
Nitrogen @ 100 µg/mL in Xylene	D-5762-95-100X	1 mL

Nitrogen Calibration Set - Low Level

ASTM-P-0070-SET — **6 x 1 mL**

Nitrogen introduced using Aniline

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

Low Level Nitrogen & Sulfur Calibration Set

ASTM-P-0071-SET — **4 x 1 mL**

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

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

Stock Nitrogen Standard

D-5762-95-500X-PAK — **5 x 1 mL**

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

Technical Note

Standards are prepared by adding well characterized nitrogen and/or sulfur compounds gravimetrically to the matrix. Since the matrix may contain some native nitrogen and/or sulfur, a blank must be used for background correction and should be purchased with the standard.

ASTM D5769 | **Benzene, Toluene & Total Aromatics in Finished Gasoline by GC-MS** | **TIER 3 STANDARDS**

Quality Control Standards to determine benzene, toluene, and total aromatics in finished gasoline, including gasolines containing oxygenated blending components by GC-MS.

Calibration Curve with No Internal Standard

Six Level Calibration Curve without Internal Standard

D-5769-CAL6-5ML-SET — 6 x 5 mL
D-5769-CAL6-10ML-SET — 6 x 10 mL

Core Calibration Mix 24 comps.	Std. 1 Target Wt.%	Std. 2 Wt.%	Std. 3 Wt.%	Std. 4 Wt.%	Std. 5 Wt.%	Std. 6 Wt.%
Benzene	5.25	2.95	1.575	0.8144	0.4143	4.16
Toluene	19.67	11.06	5.898	3.0505	1.5519	16.41
Ethylbenzene	5.18	2.91	1.552	0.8026	0.4083	4.10
m-Xylene	6.19	3.48	1.856	0.9598	0.4883	4.91
p-Xylene	6.19	3.48	1.856	0.9598	0.4883	4.91
o-Xylene	6.30	3.54	1.890	0.9776	0.4973	5.00
Isopropylbenzene	3.09	1.74	0.925	0.4786	0.2435	2.45
n-Propylbenzene	3.09	1.74	0.926	0.4787	0.2435	2.45
3-Ethyltoluene	3.10	1.74	0.928	0.4801	0.2442	2.45
4-Ethyltoluene	3.08	1.73	0.925	0.4782	0.2433	2.44
1,3,5-Trimethylbenzene	3.10	1.74	0.929	0.4804	0.2444	2.46
2-Ethyltoluene	3.15	1.77	0.945	0.4890	0.2488	2.50
1,2,4-Trimethylbenzene	5.23	2.94	1.567	0.8104	0.4123	4.14
1,2,3-Trimethylbenzene	3.20	1.80	0.960	0.4965	0.2526	2.54
Indan	3.45	1.94	1.034	0.5350	0.2722	2.73
1,4-Diethylbenzene	3.09	1.74	0.925	0.4786	0.2435	2.45
n-Butylbenzene	3.08	1.73	0.923	0.4776	0.2430	2.44
1,2-Diethylbenzene	3.15	1.77	0.945	0.4885	0.2485	2.50
1,2,4,5-Tetramethylbenzene	2.12	1.19	0.635	0.3284	0.1671	1.68
1,2,3,5-Tetramethylbenzene	2.12	1.19	0.637	0.3295	0.1676	1.68
Naphthalene	2.37	1.34	0.712	0.3683	0.1874	1.88
1-Methylnaphthalene	2.37	1.34	0.712	0.3683	0.1874	1.88
2-Methylnaphthalene	2.43	1.37	0.730	0.3773	0.1919	1.93
Isooctane	-----	43.77	70.015	84.4922	92.1105	19.92

Five Level Calibration Curve Without Internal Standard

D-5769-CAL-5ML-SET — 5 x 5 mL (Std. 1 - 5)
D-5769-CAL-10ML-SET — 5 x 10 mL (Std. 1 - 5)

Additional Calibration Level Without Internal Standard

D-5769-ADD-5ML — 1 x 5 mL (Std. 6)
D-5769-ADD-10ML — 1 x 10 mL (Std. 6)

Technical Note

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

Calibration Amounts

Each analyte is weighed. Actual weights and weight percents are provided on CD.

Daily Quality Control Standard

Without Internal Standard

D-5769-QC-15ML — 1 x 15 mL
D-5769-QC-15ML-PAK — 5 x 15 mL

D-5769-QC-10ML — 1 x 10 mL
D-5769-QC-10ML-PAK — *SAVE* 5 x 10 mL

At stated Wt.% — 14 comps.

n-Hexane	12	Toluene	9
n-Heptane	17	Ethylbenzene	3
n-Octane	17	*m*-Xylene	3
n-Decane	12	*o*-Xylene	3
n-Dodecane	5	1,2,4-Trimethylbenzene	3
Isooctane	12	1,2,4,5-Tetramethylbenzene	2
Benzene	1	Naphthalene	1

4 component Deuterated Internal Standard

M-GRA-IS-R-10ML — 1 x 10 mL
M-GRA-IS-R-10ML-PAK — *SAVE* 5 x 10 mL

At stated Wt.% — 4 comps.

Benzene-d_6	16.67
Ethylbenzene-d_{10}	16.65
Naphthalene-d_8	8.77
Toluene-d_8	57.91

3 component Deuterated Internal Standard

M-GRA-IS-5ML — 1 x 5 mL
M-GRA-IS-5ML-PAK — *SAVE* 5 x 5 mL

At stated Wt.% — 3 comps.

Benzene-d_6	40
Ethylbenzene-d_{10}	40
Naphthalene-d_8	20

ASTM D5769 | **Benzene, Toluene & Total Aromatics in Finished Gasoline by GC-MS (continued)** | **TIER 3 STANDARDS**

Calibration Curve with 3 Component Internal Standard

Six Level Calibration Curve with Internal Standard

D-5769-CAL6-IS-SET — 6 x 1 mL

Core Calibration Mix 24 Comps.	Target Wt.%	Std. 1 Wt.%	Std. 2 Wt.%	Std. 3 Wt.%	Std. 4 Wt.%	Std. 5 Wt.%	Std. 6 Wt.%
Benzene		5.25	2.95	1.575	0.8144	0.4143	4.16
Toluene		19.67	11.06	5.898	3.0505	1.5519	16.41
Ethylbenzene		5.18	2.91	1.552	0.8026	0.4083	4.10
m-Xylene		6.19	3.48	1.856	0.9598	0.4883	4.91
p-Xylene		6.19	3.48	1.856	0.9598	0.4883	4.91
o-Xylene		6.30	3.54	1.890	0.9776	0.4973	5.00
Isopropylbenzene		3.09	1.74	0.925	0.4786	0.2435	2.45
n-Propylbenzene		3.09	1.74	0.926	0.4787	0.2435	2.45
3-Ethyltoluene		3.10	1.74	0.928	0.4801	0.2442	2.45
4-Ethyltoluene		3.08	1.73	0.925	0.4782	0.2433	2.44
1,3,5-Trimethylbenzene		3.10	1.74	0.929	0.4804	0.2444	2.46
2-Ethyltoluene		3.15	1.77	0.945	0.4890	0.2488	2.50
1,2,4-Trimethylbenzene		5.23	2.94	1.567	0.8104	0.4123	4.14
1,2,3-Trimethylbenzene		3.20	1.80	0.960	0.4965	0.2526	2.54
Indan		3.45	1.94	1.034	0.5350	0.2722	2.73
1,4-Diethylbenzene		3.09	1.74	0.925	0.4786	0.2435	2.45
n-Butylbenzene		3.08	1.73	0.923	0.4776	0.2430	2.44
1,2-Diethylbenzene		3.15	1.77	0.945	0.4885	0.2485	2.50
1,2,4,5-Tetramethylbenzene		2.12	1.19	0.635	0.3284	0.1671	1.68
1,2,3,5-Tetramethylbenzene		2.12	1.19	0.637	0.3295	0.1676	1.68
Naphthalene		2.37	1.34	0.712	0.3683	0.1874	1.88
1-Methylnaphthalene		2.37	1.34	0.712	0.3683	0.1874	1.88
2-Methylnaphthalene		2.43	1.37	0.730	0.3773	0.1919	1.93
Isooctane		-----	43.77	70.015	84.4922	92.1105	19.92

Internal Standard 3 Comps.	Target Wt.%	Wt.%	Wt.%	Wt.%	Wt.%	Wt.%	Wt.%
Benzene-d_6		2	2	2	2	2	2
Ethylbenzene-d_{10}		2	2	2	2	2	2
Naphthalene-d_8		1	1	1	1	1	1

Five Level Calibration Curve with ISTD

D-5769-CAL-IS-SET — 5 x 1 mL (Std. 1 to Std 5)

Additional Calibration Level with ISTD

D-5769-ADD-IS — 1 x 1 mL (Std. 6)

Technical Note

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

Calibration Amounts

Each analyte is weighed. Actual weights and weight percents are provided on CD.

The M-GRA-IS Internal Standard mix is added on top of the 24 core comps. to formulate a complete calibration solution containing 27 comps.

Daily Quality Control Standard

With Internal Standard

D-5769-QC-IS-15ML — 1 x 15 mL
D-5769-QC-IS-15ML-PAK — *SAVE* 5 x 15 mL

D-5769-QC-IS-5ML — 1 x 5 mL
D-5769-QC-IS-5ML-PAK — *SAVE* 5 x 5 mL
At stated Wt.% — 17 comps.

n-Hexane	12	Toluene	9
n-Heptane	17	Ethylbenzene	3
n-Octane	17	*m*-Xylene	3
n-Decane	12	*o*-Xylene	3
n-Dodecane	5	1,2,4-Trimethylbenzene	3
Isooctane	12	1,2,4,5-Tetramethylbenzene	2
Benzene	1	Naphthalene	1

Includes

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

Resolution Standard

M-GRA-RES — 1 x 1 mL
M-GRA-RES-PAK — *SAVE* 5 x 1 mL
At stated Wt.% — 3 comps.

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

Deuterated Internal Standard Mix

M-GRA-IS-5ML — 1 x 5 mL
M-GRA-IS-5ML-PAK — *SAVE* 5 x 5 mL
At stated Wt.% — 3 comps.

Benzene-d_6	40	Naphthalene-d_8	20
Ethylbenzene-d_{10}	40		

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

Fragmentation Pattern Standard

M-GRA-FP — 1 x 1 mL
M-GRA-FP-PAK — *SAVE* 5 x 1 mL
3.0 Wt.% 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 Wt.% in Isooctane

Toluene

ASTM D5769 | **Benzene, Toluene & Total Aromatics in Finished Gasoline by GC-MS (continued)** | **TIER 3 STANDARDS**

With 4 Component Internal Standard (includes Toluene-d_8)

Six Level Calibration Curve with Deuterated Toluene

With Internal Standard

D-5769-CAL6-IS-R-SET — **6 x 1 mL**

Core Calibration Mix 24 Comps.	Target Wt.%	Std. 1 Wt.%	Std. 2 Wt.%	Std. 3 Wt.%	Std. 4 Wt.%	Std. 5 Wt.%	Std. 6 Wt.%
Benzene	5.25	2.95	1.575	0.8144	0.4143	4.16	
Toluene	19.67	11.06	5.898	3.0505	1.5519	16.41	
Ethylbenzene	5.18	2.91	1.552	0.8026	0.4083	4.10	
m-Xylene	6.19	3.48	1.856	0.9598	0.4883	4.91	
p-Xylene	6.19	3.48	1.856	0.9598	0.4883	4.91	
o-Xylene	6.30	3.54	1.890	0.9776	0.4973	5.00	
Isopropylbenzene	3.09	1.74	0.925	0.4786	0.2435	2.45	
n-Propylbenzene	3.09	1.74	0.926	0.4787	0.2435	2.45	
3-Ethyltoluene	3.10	1.74	0.928	0.4801	0.2442	2.45	
4-Ethyltoluene	3.08	1.73	0.925	0.4782	0.2433	2.44	
1,3,5-Trimethylbenzene	3.10	1.74	0.929	0.4804	0.2444	2.46	
2-Ethyltoluene	3.15	1.77	0.945	0.4890	0.2488	2.50	
1,2,4-Trimethylbenzene	5.23	2.94	1.567	0.8104	0.4123	4.14	
1,2,3-Trimethylbenzene	3.20	1.80	0.960	0.4965	0.2526	2.54	
Indan	3.45	1.94	1.034	0.5350	0.2722	2.73	
1,4-Diethylbenzene	3.09	1.74	0.925	0.4786	0.2435	2.45	
n-Butylbenzene	3.08	1.73	0.923	0.4776	0.2430	2.44	
1,2-Diethylbenzene	3.15	1.77	0.945	0.4885	0.2485	2.50	
1,2,4,5-Tetramethylbenzene	2.12	1.19	0.635	0.3284	0.1671	1.68	
1,2,3,5-Tetramethylbenzene	2.12	1.19	0.637	0.3295	0.1676	1.68	
Naphthalene	2.37	1.34	0.712	0.3683	0.1874	1.88	
1-Methylnaphthalene	2.37	1.34	0.712	0.3683	0.1874	1.88	
2-Methylnaphthalene	2.43	1.37	0.730	0.3773	0.1919	1.93	
Isooctane	-----	43.77	70.015	84.4922	92.1105	19.92	

Internal Standard 4 Comps.	Target Wt.%	Wt.%	Wt.%	Wt.%	Wt.%	Wt.%	Wt.%
Benzene-d_6	2	2	2	2	2	2	
Ethylbenzene-d_{10}	2	2	2	2	2	2	
Naphthalene-d_8	1	1	1	1	1	1	
Toluene-d_8	7	7	7	7	7	7	

Five Level Calibration Curve with ISTD

D-5769-CAL-IS-R-SET — **5 x 1 mL (Std. 1 to Std 5)**

Additional Calibration Level with ISTD

D-5769-ADD-IS-R — **1 x 1 mL (Std. 6)**

Technical Note

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

Calibration Amounts

Each analyte is weighed. Actual weights and weight percents are provided on CD.

The M-GRA-IS-R Internal Standard mix is added on top of the 24 core comps. to formulate a complete calibration solution containing 28 comps.

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**

D-5769-QC-IS-15ML — **1 x 15 mL**

At stated Wt.% — 18 comps.

n-Hexane	12	Toluene	9
n-Heptane	17	Ethylbenzene	3
n-Octane	17	*m*-Xylene	3
n-Decane	12	*o*-Xylene	3
n-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.) added in 12 to 100 weight ratio

Deuterated Internal Standard Mix

M-GRA-IS-R-10ML — **1 x 10 mL**

M-GRA-IS-R-10ML-PAK — ***SAVE*** **5 x 10 mL**

At stated Wt.% — 4 comps.

Benzene-d_6	16.67	Naphthalene-d_8	8.77
Ethylbenzene-d_{10}	16.65	Toluene-d_8	57.91

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

Resolution Standard

M-GRA-RES — **1 x 1 mL**

M-GRA-RES-PAK — ***SAVE*** **5 x 1 mL**

At stated Wt.% — 3 comps.

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 Wt.% in Isooctane

1,2,3-Trimethylbenzene

ASTM D5769 | **Benzene, Toluene & Total Aromatics in Finished Gasoline by GC-MS (continued)** | **TIER 3 STANDARDS**

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.

Calibration Curve with 3 Component Deuterated Internal Standard Added

Aromatics Calibration Standards Kit
Internal Standard Version

M-GRA-CAL-IS-SET — **5 x 1 mL**

Core Calibration Mix 24 Comps.	Target Vol. %	Std. 1 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	
m-Xylene	6	3.00	1.50	0.750	0.3750	
p-Xylene	6	3.00	1.50	0.750	0.3750	
o-Xylene	6	3.00	1.50	0.750	0.3750	
Isopropylbenzene	3	1.50	0.75	0.375	0.1875	
n-Propylbenzene	3	1.50	0.75	0.375	0.1875	
3-Ethyltoluene	3	1.50	0.75	0.375	0.1875	
4-Ethyltoluene	3	1.50	0.75	0.375	0.1875	
1,3,5-Trimethylbenzene	3	1.50	0.75	0.375	0.1875	
2-Ethyltoluene	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	
n-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	--	47.5	71.25	83.15	89.05	
Internal Standard						
Benzene-d_6	2	2	2	2	2	
Ethylbenzene-d_{10}	2	2	2	2	2	
Naphthalene-d_8	1	1	1	1	1	

Optional Sixth Standard
Internal Standard Added

M-GRA-ADD-IS — **1 x 1 mL**

Core Calibr. Mix 24 Comps.	Optional Std. 6 Target Vol. %
Benzene	2.25
Toluene	15
Ethylbenzene	3.75
m-Xylene	4.50
p-Xylene	4.50
o-Xylene	4.50
Isopropylbenzene	2.25
n-Proplylbenzene	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
n-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	20.5
Internal Standard	
Benzene-d_6	2
Ethylbenzene-d_{10}	2
Naphthalene-d_8	1

Calibration Amounts
Each analyte is weighed. Actual weights and weight percents are provided on CD.

The M-GRA-IS ISTD mix is added on top of the 24 core comps. to formulate a complete calibration solution containing 27 comps.

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**
At stated Wt.% — 13 comps.

n-Hexane	12	Toluene	9
n-Heptane	17	Ethylbenzene	3
n-Octane	17	*m*-Xylene	3
n-Decane	12	*o*-Xylene	3
n-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 — ***SAVE*** **5 x 5 mL**
At stated Wt.% — 16 comps.

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

Internal Standard

Benzene-d_6	2
Ethylbenzene-d_{10}	2
Naphthalene-d_8	1

The M-GRA-IS ISTD mix is added on top of the 24 core comps. to formulate a complete calibration solution containing 27 comps.

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

3 Comp. Deuterated Internal Std. Mix

M-GRA-IS-5ML — **1 x 5 mL**
M-GRA-IS-5ML-PAK — ***SAVE*** **5 x 5 mL**
At stated Wt.% — 3 comps.

Benzene-d_6	40	Naphthalene-d_8	20
Ethylbenzene-d_{10}	40		

Aromatics for Analysis by GC-MS (Daily QC Standards) Sets

Original Formulations
M-GRA-K1-SET — **Set**

Set includes:	Units
M-GRA-CAL-IS-SET	5 x 1 mL
M-GRA-QC-IS-5ML	1 x 5 mL
M-GRA-IS-5ML	1 x 5 mL
M-GRA-ST	1 x 1 mL

Revision 5 F
M-GRA-K2-SET — **Set**

Set includes:	Units
M-GRA-CAL-IS-SET	5 x 1 mL
M-GRA-ADD-IS	1 x 1 mL
M-GRA-QC-IS-5ML	1 x 5 mL
M-GRA-IS-5ML	1 x 5 mL
M-GRA-ST	1 x 1 mL

ASTM D5769 | **Benzene, Toluene & Total Aromatics in Finished Gasoline by GC-MS (continued)** | **TIER 3 STANDARDS**

Calibration Curve with 4 Component Deuterated Internal Standard Added

Aromatics Calibration Standards Kit
With Internal Standard

M-GRA-CAL-R-IS-R-SET — **5 x 1 mL**

Core Calibration Mix 24 comps.	Target Wt.%	Std. 1 Wt.%	Std. 2 Wt.%	Std. 3 Wt.%	Std. 4 Wt.%	Std. 5 Wt.%
Benzene	3.13	1.78	0.95	0.490	0.2490	
Toluene	19.65	11.11	5.90	3.058	1.5547	
Ethylbenzene	5.12	2.92	1.55	0.805	0.4090	
m-Xylene	6.27	3.50	1.86	0.962	0.4891	
p-Xylene	6.33	3.50	1.86	0.962	0.4891	
o-Xylene	6.51	3.56	1.89	0.980	0.4891	
Isopropylbenzene	3.06	1.74	0.93	0.480	0.2439	
n-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	
n-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	2.23	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	*At stated Wt.%*					
Benzene-d_6	16.57	16.57	16.57	16.57	16.57	
Ethylbenzene-d_{10}	16.76	16.76	16.76	16.76	16.76	
Naphthalene-d_8	8.78	8.78	8.78	8.78	8.78	
Toluene-d_8	57.88	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
m-Xylene	4.87
p-Xylene	4.87
o-Xylene	4.96
Isopropylbenzene	2.43
n-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
n-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
M-GRA-IS-R (ISTD)	*At stated Wt.%*
Benzene-d_6	16.57
Ethylbenzene-d_{10}	16.76
Naphthalene-d_8	8.78
Toluene-d_8	57.88

Technical Note

This set of calibration solutions was formulated to improve the quantification of toluene by using toluene-d_8 as an additional ISTD.

The M-GRA-IS-R ISTD mix is add ton top of the 24 core comps. to formulate a complete calibration solution containing 28 comps.

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**
At stated Wt.% — 13 comps.

n-Hexane	12	Toluene	9
n-Heptane	17	Ethylbenzene	3
n-Octane	17	*m*-Xylene	3
n-Decane	12	*o*-Xylene	3
n-Dodecane	5	1,2,4-Trimethylbenzene	3
Isooctane	12	1,2,4,5-Tetramethylbenzene	3
Benzene	1		

Deuterated Internal Standard Mix

M-GRA-IS-R-10ML — **1 x 10 mL**
M-GRA-IS-R-10ML-PAK — ***SAVE*** **5 x 10 mL**
At stated Wt.% — 4 comps.

Benzene-d_6	16.67	Naphthalene-d_8	8.77
Ethylbenzene-d_{10}	16.65	Toluene-d_8	57.91

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

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**
At stated Wt.% — 17 comps.

n-Hexane	12	Toluene	9
n-Heptane	17	Ethylbenzene	3
n-Octane	17	*m*-Xylene	3
n-Decane	12	*o*-Xylene	3
n-Dodecane	5	1,2,4-Trimethylbenzene	3
Isooctane	12	1,2,4,5-Tetramethylbenzene	3
Benzene	1	Core Mix (13 comps.)	100

Internal Standard

Benzene-d_6	2
Ethylbenzene-d_{10}	2
Naphthalene-d_8	1
Toluene-d_8	7

The M-GRA-IS-R ISTD mix is added on top of the 13 core comp to formulate a 17 comp QC-IS-R solution.

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

4 Component ISTD Formulations

M-GRA-K4-SET — **Set**

Set includes:	Units
M-GRA-CAL-R-IS-R-SET	5 x 1 mL
M-GRA-ADD-IS-R	1 x 1 mL
M-GRA-QCR-IS-R-5ML	1 x 5 mL
M-GRA-IS-R-10ML	1 x 10 mL
M-GRA-ST	1 x 1 mL

ASTM D5769 — Benzene, Toluene & Total Aromatics in Finished Gasoline by GC-MS (continued) — TIER 3 STANDARDS

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
At stated Wt.% — 15 comps.

n-Hexane	12	Ethylbenzene	3
n-Heptane	17	*m*-Xylene	3
n-Octane	17	*o*-Xylene	3
n-Decane	12	1,2,4-Trimethylbenzene	3
n-Dodecane	5	1,2,4,5-Tetramethylbenzene	1
Isooctane	12	Pentamethylbenzene	1
Benzene	1	1-Methylnaphthalene	1
Toluene	9		

For use with any M-GRA Calibration Curve

Daily QC Standard
With Internal Standard M-GRA-IS-R

M-GRA-QCR-IS-R-5ML — 1 x 5 mL
M-GRA-QCR-IS-R-5ML-PAK — *SAVE* 5 x 5 mL
At stated Wt.% — 19 comps.

n-Hexane	12	Ethylbenzene	3
n-Heptane	17	*m*-Xylene	3
n-Octane	17	*o*-Xylene	3
n-Decane	12	1,2,4-Trimethylbenzene	3
n-Dodecane	5	1,2,4,5-Tetramethylbenzene	1
Isooctane	12	Pentamethylbenzene	1
Benzene	1	1-Methylnaphthalene	1
Toluene	9		

Includes M-GRA-IS-R (4 comp.) combined with the above Core Mix (15 comp.) in a 12 to 100 weight ratio.

Deuterated Internal Standard

M-GRA-IS-R-10ML — 1 x 10 mL
M-GRA-IS-R-10ML-PAK — *SAVE* 5 x 10 mL
At stated Wt.% — 4 comps.

Benzene-d_6	16.67
Ethylbenzene-d_{10}	16.65
Naphthalene-d_8	8.77
Toluene-d_8	57.91

Deuterated Internal Standard

M-GRA-IS-5ML — 1 x 5 mL
M-GRA-IS-5ML-PAK — *SAVE* 5 x 5 mL
At stated Wt.% — 3 comps.

Benzene-d_6	40	Naphthalene-d_8	20
Ethylbenzene-d_{10}	40		

ASTM D5769 — Additional Internal, Deuterated and Quality Control — TIER 3 STANDARDS

Deuterated Internal Standard

ASTM-P-0140-IS — 1 x 10 mL
ASTM-P-0140-IS-PAK — *SAVE* 5 x 10 mL
At stated Wt.% — 4 comps.

Benzene-d_6	2	Naphthalene-d_8	1
Ethylbenzene-d_{10}	2	Isooctane	balance

Performance Evaluation Standard

ASTM-P-0140-PES — 1 x 1 mL
ASTM-P-0140-PES-PAK — *SAVE* 5 x 1 mL
At stated Wt.% — 11 comps.

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 (50:50)	balance

Deuterated Internal Standard

ASTM-P-0140-IS2 — 1 x 10 mL
ASTM-P-0140-IS2-PAK — *SAVE* 5 x 10 mL
At stated Wt.% — 5 comps.

Benzene-d_6	2	Toluene-d_8	7
Ethylbenzene-d_{10}	2	Isooctane	balance
Naphthalene-d_8	1		

Composition of Daily QC Standard

ASTM-P-0140-QC — 1 x 10 mL
ASTM-P-0140-QC-PAK — *SAVE* 5 x 10 mL
At stated Wt.% — 9 comps.

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	balance

ASTM D5986 — Oxygenates, Benzene, Toluene, C8-C12, Aromatics & Total Aromatics in Finished Gasolines by GC-FTIR

Daily QC Standard
Without Internal Standard

M-GRA-QC-10ML — 1 x 10 mL
M-GRA-QC-10ML-PAK — *SAVE* 5 x 10 mL
At stated Wt.% — 13 comps.

n-Hexane	12	Toluene	9
n-Heptane	17	Ethylbenzene	3
n-Octane	17	*m*-Xylene	3
n-Decane	12	*o*-Xylene	3
n-Dodecane	5	1,2,4-Trimethylbenzene	3
Isooctane	12	1,2,4,5-Tetramethylbenzene	3
Benzene	1		

Technical Note

This quality control standard was formulated to meet Section 11 of ASTM D-5986 specification which stipulates “analyze the quality control reference material before every batch of samples. Bracket the samples with the reference materials”.

ASTM Methods

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

Technical Note

Although Solvent Red 164 is the dye used in fuel, Solvent Red 26 has an identical spectrum profile.

D-6258 Calibration Curve

D-6258-5ML-SET — **6 x 5 mL**

	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

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-VER-SET-PAK — **5 x (2 x 1 mL)**
D-6296-VER1, D-6296-VER2

System Setup and Verification 1

D-6296-VER1 — **1 x 1 mL**
At stated Wt.% — 2 comps.

MtBE	5
Isooctane	95

System Setup and Verification 2

D-6296-VER2 — **1 x 1 mL**
At stated Wt.% — 2 comps.

EtBE	5
Isooctane	95

Isooctane Blank Compensation Standard

D-6296-BL — **1 x 5 mL**

Isooctane (neat)

Calibration Standard with MtBE

D-6296-CAL1 — **1 x 1 mL**
D-6296-CAL1-PAK — ***SAVE*** **5 x 1 mL**
At stated Wt.% — 10 comps.

1-Pentene	1.0
1-Hexene	1.0
1-Heptene	1.0
1-Octene	1.0
1-Nonene	1.0
1-Decene	1.0
n-Undecane	1.0
n-Dodecane	1.0
Isooctane	87.0
MtBE	5.0

Calibration Standard with EtBE

D-6296-CAL2 — **1 x 1 mL**
D-6296-CAL2-PAK — ***SAVE*** **5 x 1 mL**
At stated Wt.% — 11 comps.

1-Pentene	1.0
1-Hexene	1.0
1-Heptene	1.0
1-Octene	1.0
1-Nonene	1.0
1-Decene	1.0
n-Decane	1.0
n-Undecane	1.0
n-Dodecane	1.0
Isooctane	86.0
EtBE	5.0

ASTM D6352 — Boiling Range Distribution of Petroleum Distillates from 174 to 700ºC by GC

Polywax 500®

ASTM-P-0051N-2G — **2 grams**

Polywax 500

Polywax 655®

ASTM-P-0053N-2G — **2 grams**

Polywax 655

Polywax 850®

ASTM-P-0137N-2G — **2 grams**

Polywax 850

Polywax 1000®

ASTM-P-0138N-2G — **2 grams**

Polywax 1000

Hydrocarbon Window Defining Std.

DRH-008S-R2 — **1 x 1 mL**
DRH-008S-R2-PAK — ***SAVE*** **5 x 1 mL**
500 µg/mL each in Chloroform — 35 comps.

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

Calibration Mix

DRH-002N — **100 mg**
DRH-002N-10X — **1 gm**
At stated Wt.% — 17 comps.

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		

Column Test Mixture

D-2887 — **1 x 1 mL**
10 mg/mL in n-Octane — 2 comps.

n-Hexadecane *n*-Octadecane

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-Methylnaphthalene	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-Methylnaphthalene	0.5

Calibration Curves (Alternative Conc.)

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-Methylnaphthalene	5	1.0	0.2	0.05

D-6379-10X-SET — **4 x 1 mL**
D-6379-10X-SET-PAK — **5 x (4 x 1 mL)**

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

ASTM Methods

ASTM D6550 — Olefin Content of Gasolines by SFC — TIER 3 STANDARDS

Stock Olefin Calibration Standard

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

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

ASTM D6591-11 (IP 391) — Aromatic Hydrocarbon Types in Middle Distillates - HPLC method with Refractive Index Detection

System Performance Standard

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

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

IP 391-95 Calibration Curve

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

Analyte	Std. 1	Std. 2	Std. 3	Std. 4
Cyclohexane	50	20	5	1
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 D6733 — Spark ignition Engine Indivdual Comonents by GC

ASTM D6733 System Performance Mix

D-6733-SPM — **1 mL**
2% each by weight in Hexane — 7 comps.

n-Pentane	2-Methylheptane
n-Heptane	4-Methylheptane
n-Octane	Toluene
n-Dodecane	

ASTM D7039 — Sulfur content in fuel by XRF

Low Level Calibration Set

D-7039-LL-SET — **6 x 1 mL**
in (µg/g) Isooctane:Toluene (75:25)

Blank	Level 1	Level 2	Level 3	Level 4	Level 5
D-7039-LL-BK	-01	-02	-03	-04	-05
	5	10	20	40	50

High Level Calibration Set

D-7039-HL-SET — **6 x 1 mL**
in Isooctane:Toluene (75:25)

Blank	Level 1	Level 2	Level 3	Level 4	Level 5
D-7039-HL-BK	-01	-02	-03	-04	-05
	100	200	300	400	500

ASTM D7096 — Gasoline Boiling Range Distribution by GC

D-7096-SET — **2 x 1 mL** (D-7096-01, D-7096-02)

D-7096-01 — **1 x 1 mL**
At stated conc. Wt.% — 17 comps.

2-Methylbutane	2.5	Toluene	15.5	n-Dodecane	3.5
n-Pentane	3	n-Octane	7	n-Tridecane	4.5
2-Methylpentane	4	p-Xylene	16	n-Tetradecane	3
n-Hexane	3	n-Propylbenzene	6.5	n-Pentadecane	5
2,4-Dimethylpentane	5.5	n-Decane	4.5	n-Hexadecane	3
n-Heptane	7.5	n-Butylbenzene	6		

D-7096-02 — **1 x 1 mL**
100 µg/mL in Isooctane:Ethanol (97:3) — 3 comps.

n-Propane	n-Butane
2-Methylpropane	

ASTM Methods

ASTM D7423 — Oxygenates and Hydrocarbons by GC-MS

D7423 Calibration Standard

D-7423-TP-CAL-SET — **7 x 1 mL**

At stated conc. (µg/g) in Isooctane — 24 comps.

Blank	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
D-7423-TP-CAL	**-01**	**-02**	**-03**	**-04**	**-05**	**-06**
Acetaldehyde	10	25	50	75	100	200
Acetone	10	25	50	75	100	200
Allyl alcohol	10	25	50	75	100	200
Butanal	10	25	50	75	100	200
1-Butanol	10	25	50	75	100	200
t-Butanol	10	25	50	75	100	200
sec-Butanol	10	25	50	75	100	200
Diethyl ether	10	25	50	75	100	200
Dimethyl ether	10	25	50	75	100	200
EtBE	10	25	50	75	100	200
Ethanol	10	25	50	75	100	200
Isobutanol	10	25	50	75	100	200
Isobutyraldehyde	10	25	50	75	100	200
Isopropanol	10	25	50	75	100	200
Isopropyl ether	10	25	50	75	100	200
Isovaleraldehyde	10	25	50	75	100	200
Methanol	10	25	50	75	100	200
Methyl ethyl ketone	10	25	50	75	100	200
MtBE	10	25	50	75	100	200
Pentanal	10	25	50	75	100	200
Propanal	10	25	50	75	100	200
1-Propanol	10	25	50	75	100	200
Propyl ether	10	25	50	75	100	200
TAME	10	25	50	75	100	200

D7423 Oxygenate Standard

D-7423 — **1 mL**

Equal w/w% — 24 comps.

- Acetaldehyde
- Acetone
- Allyl alcohol
- Butanal
- 1-Butanol
- t-Butanol
- sec-Butanol
- Diethyl ether
- Dimethyl ether
- EtBE
- Ethanol
- Isobutanol
- Isobutyraldehyde
- Isopropanol
- Isopropyl ether
- Isovaleraldehyde
- Methanol
- Methyl ethyl ketone
- MtBE
- Pentanal
- Propanal
- 1-Propanol
- Propyl ether
- TAME

ASTM D7576 — Total Aromatics in Denatured Ethanol

D-7576-SET — **5 x 1 mL**

At stated Wt.% (Prepared by weight)

Compounds	D-7576-01	D-7576-02	D-7576-03	D-7576-04	D-7576-05
Benzene	0.02	0.04	0.06	0.08	0.1
Toluene	0.05	0.1	0.2	0.4	0.6
Ethylbenzene	0.02	0.05	0.1	0.15	0.2
o-Xylene	0.02	0.05	0.1	0.15	0.2
1,2,4-Trimethylbenzene	0.05	0.1	0.2	0.4	0.6
2-Hexanone	1.0	1.0	1.0	1.0	1.0
Ethanol	98.8	98.7	98.3	97.8	97.3

D-7576-R1-SET — **5 x 1 mL**

At state % v/v (Prepared by volume))

Compounds	D-7576-01-R1	D-7576-02-R1	D-7576-03-R1	D-7576-04-R1	D-7576-05-R1
Benzene	0.02	0.04	0.06	0.08	0.1
Toluene	0.05	0.1	0.2	0.4	0.6
Ethylbenzene	0.02	0.05	0.1	0.15	0.2
o-Xylene	0.02	0.05	0.1	0.15	0.2
1,2,4-Trimethylbenzene	0.05	0.1	0.2	0.4	0.6
2-Hexanone	1.0	1.0	1.0	1.0	1.0
Ethanol	98.8	98.7	98.3	97.8	97.3

Technical Note

This standard covers the determination of benzene and total aromatics in finished denatured fuel ethanol by gas chromatography.

ASTM D7900 — Light Hydrocarbons by GC

ASTM D7900 Valve Timing Mixture

D-7900-VTM — **1 mL**

At stated conc. (%w/w).

n-Pentane	1	n-Nonane	1
n-Hexane	1	n-Decane	1
n-Heptane	1	n-Hexadecane	94
n-Octane	1		

ASTM Methods

ASTM D8071 Hydrocarbon Analysis by GC-VUV

Hydrocarbon Analysis

ASTM-P-VUV-01-SVM — **1 mL**

At stated conc. by %w/w — 28 comps.

Cyclopentane	1.1	4-Methyl-1-hexene	1.6	n-Decane	4.5	Ethylbenzene	4.5
n-Pentane	1.1	n-Heptane	3.5	n-Undecane	3.5	o-Xylene	4
Cyclohexane	2.1	1,2-Dimethylcyclohexane	5	n-Dodecane	3.5	n-Propylbenzene	5
2,3-Dimethylbutane	2.1	Isooctane	5	Benzene	2.2	1,2,4-Trimethylbenzene	4.5
n-Hexane	2.1	n-Octane	5	Toluene	2.2	1,2,3-Trimethylbenzene	5
1-Hexene	1.5	1,2,4-Trimethylcyclohexane	4	trans-Decahydronaphthalene	4	1,2,4,5-Tetramethylbenzene	5
Methylcyclohexane	4	n-Nonane	4.5	n-Tetradecane	4.5	Pentamethylbenzene	5

ASTM D8305 Aromatic Hydrocarbons and Polynuclear Aromatic Hydrocarbons in Aviation Fuel

ASTM D8305 Performance Mix

D-8305-PM — **1 mL**

At stated conc. (%w/w) — 4 comps.

n-Hexadecane	75	Tetralin	3
Toluene	20	Naphthalene	2

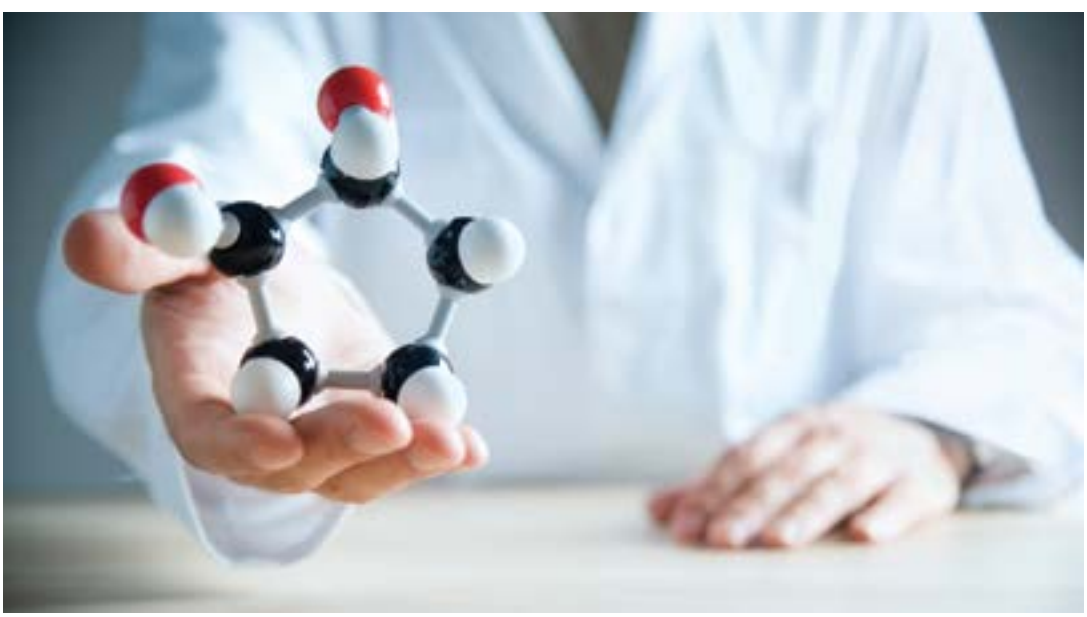
ASTM D8368 FAME in Diesel by GC-VUV

FAME in Diesel

ASTM-P-VUV-02-SVM — **1 mL**

2500 µg/g in Dichloromethane — 28 comps.

n-Heptane	n-Tetradecane	n-Nonadecane	n-Hexacosane
n-Octane	n-Pentadecane	n-Eicosane	n-Heptacosane
n-Nonane	n-Hexadecane	n-Heneicosane	n-Octacosane
n-Decane	Methyl hexadecanoate	n-Docosane	Naphthalene
n-Undecane	n-Heptadecane	n-Tricosane	2-Methylnaphthalene
n-Dodecane	n-Octadecane	n-Tetracosane	1,2,4-Trimethylbenzene
n-Tridecane	Linoleic acid methyl ester	n-Pentacosane	Phenanthrene



Detailed Hydrocarbon Analysis
PIANO

ASTM D6729, D6730, D6733, D8071 | **Paraffins, Isoparaffins, Aromatics, Napthenes, Olefins (PIANO)**

AccuStandard offers a petroleum naphtha-based PIANO mixture This mix is used to determine hydrocarbon components in spark-ignition engine fuels, including oxygenated blends of ethanol and *tert*-butyl methyl ether, with boiling ranges to 225°C in accordance with ASTM Methods D6729, D6730, D6733 and D8071.

Two hundred and ten (210) individual hydrocarbons have been identified with a total of 263 compounds separated into the appropriate chemical class within the PIANO designation. These compounds comprise the master list. Each entry contains the Total Ion Chromatogram peak number, retention time, percent of the total and compound name.

To simplify component identification, all compounds have been grouped into chemical classes with the paraffin and isoparaffin classes combined to optimize the format. Each entry contains the same information as the master list. The identified components in each chemical class include:

- **62 paraffins/isoparaffins**
- **54 aromatics**
- **51 naphthenes**
- **43 olefins**

The master list is further categorized via extracted ion plots utilizing key ions for each chemical class. The retention time of each component in the extracted ion plot can be compared to the master list for identification.

The analysis of the mix was performed on a 100 meter methyl siloxane phase capillary column with a 1.0 µm film (QuadRex Corporation, Bethany, CT) in an attempt to improve low boiling range component separation.

As in other published analyses, the complexity of the petroleum product resulted in a number of co-elutions and chromatographic peaks that cannot be identified with an acceptable degree of certainty. Consequently, the analysis and data are subject to the same disclaimers enumerated in ASTM Method D6729 regarding the estimation of bulk hydrocarbon group-type composition. The chromatograms provided have been integrated to optimize the usefulness of the analysis and reduce the number of unidentified components present on the chromatogram.

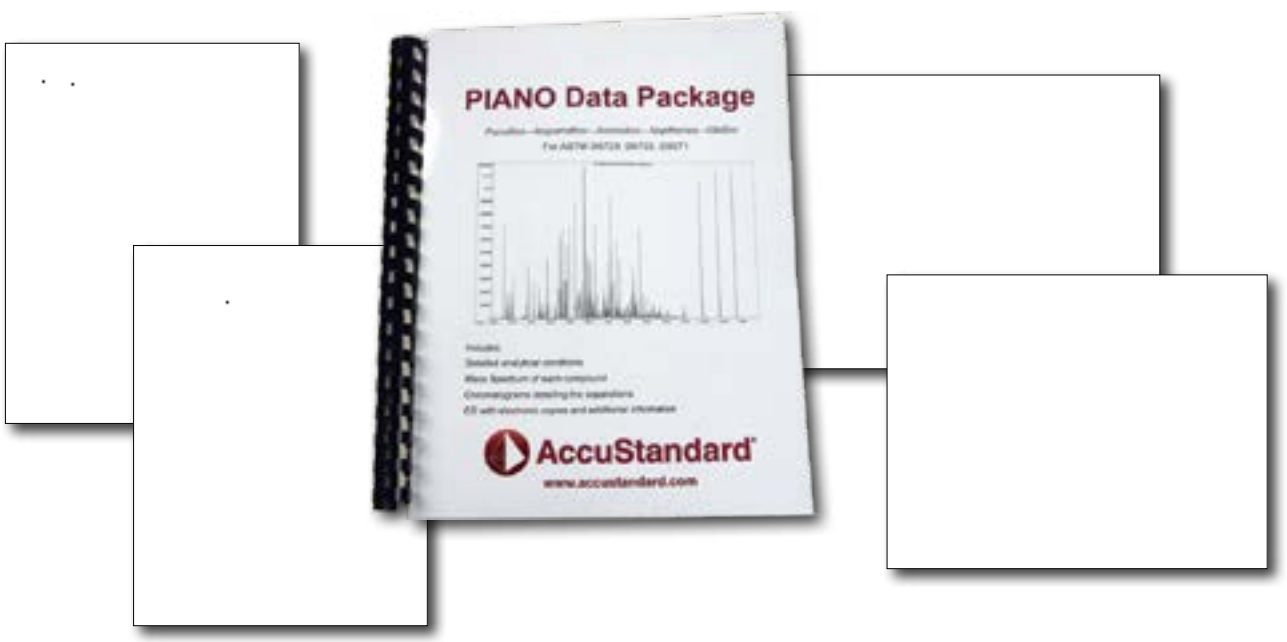
The identification of each hydrocarbon was based on the following:

1. Mass spectrum library search of NIST08 and Wiley WN08 libraries
2. Mass spectrum library search of an in-house generated library
3. Comparison of elution data from ASTM Methods D6729 and 6730
4. Analysis of individual standards
5. Interpretation of mass spectra target ions

PIANO Gasoline		PIANO Gasoline (with Ethanol)		PIANO Gasoline (with MtBE)	
PIANO	1 x 0.5 mL	PIANO-ETOH	1 x 0.5 mL	PIANO-MTBE	1 x 0.5 mL
PIANO-PAK	SAVE 5 x 0.5 mL	PIANO-ETOH-PAK	SAVE 5 x 0.5 mL	PIANO-MTBE-PAK	SAVE 5 x 0.5 mL

Complete data package of the PIANO Mix is provided with each order.

Data package includes: detailed analytical conditions, Mass Spectrum of each compound, chromatograms detailing separations, and flash drive containing data package.



Detailed Hydrocarbon Analysis
Simulated Distillation

Simulated Distillation (SIM DIS) standards used 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.

This SIM DIS (Simulated Distillation or GCD) method is used to determine the boiling range distribution of gasoline and gasoline components. For instance, ASTM 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.

ASTM D2789 — Hydrocarbon Types in Low Olefinic Gas by MS

Hydrocarbon Mixture

D-2789-CTM — **1 x 1 mL**
D-2789-CTM-PAK — ***SAVE*** **5 x 1 mL**
At stated Vol.% — 9 comps.

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		

ASTM D2887 — Boiling Range Distribution of Petroleum Fractions by GC

Calibration Mixture

DRH-002N — **100 mg**
DRH-002N-10X — **1 gm**
At stated Wt.% — 17 comps.

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		

Column Test Mixture

D-2887 — **1 x 1 mL**
10 mg/mL in n-Octane — 2 comps.

n-Hexadecane — *n*-Octadecane

Reference Gas Oil Sample Lot #2

D-2887-REFOIL — **1 x 1 mL**

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.

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

Fuel Oil Degradation/Retention Time Mix for Quantification of C_{17}/Pristane & C_{18}/Phytane ratios

DRH-005S-10X — **1 x 1 mL**
2.0 mg/mL each in CH_2Cl_2:CS_2 (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

Pristane and phytane are included in the hydrocarbon window defining standard with C_8 to C_{40} odd and even alkanes. Measuring the C_{17} / pristane and C_{18}/ phytane ratios can be used to estimate fuel oil degradation.

A fuel oil degradation mix containing just the four required analytes to determine the C_{17} / pristane and C_{18} / phytane ratio (DRH-005S-10X).

Calibration Solutions

DRH-002S-R1 — **1 x 1 mL**
DRH-002S-R1-PAK — ***SAVE*** **5 x 1 mL**
At stated conc. (µg/mL) in Chloroform — 17 comps.

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		

DRH-002S-R2 — **1 x 1 gm**
DRH-002S-R2-PAK — ***SAVE*** **5 x 1 gm**
0.1 Wt.% each in Chloroform — 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	

Reference Oil - Batch 3

D-2887-REFOIL-B3 — **1 mL**

Reference gas oil

Technical Note

Due to the difference in consensus values between Batch 2 and Batch 3, it is highly recommended to update your method using the current Round Robin consensus analysis provided with this batch.

Reformulated to ship by Air

Detailed Hydrocarbon Analysis
Simulated Distillation

ASTM D2887 — **Boiling Range Distribution of Petroleum Fractions by GC (continued)**

Boiling Range Distribution of Petroleum Fractions by GC
Calibration Solution

DRH-002S-R1 — 1 x 1 mL
DRH-002S-R1-PAK — *SAVE* 5 x 1 mL
At stated conc. (µg/mL) in Chloroform — 17 comps.

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

Stock SIM DIS Paraffin Solution
ASTM-P-0050 — 1 x 5 mL
At stated Wt.% — 14 comps.

n-Pentane	6.66	*n*-Dodecane	13.33
n-Hexane	6.66	*n*-Tetradecane	6.66
n-Heptane	6.66	*n*-Pentadecane	6.66
n-Octane	6.66	*n*-Hexadecane	6.66
n-Nonane	6.66	*n*-Heptadecane	6.66
n-Decane	6.66	*n*-Octadecane	6.66
n-Undecane	6.66	*n*-Eicosane	6.66

Standards of Interest

See ASTM Methods D3710, D5307, D5442, D6352, D7169 for additional calibration standards for hydrocarbon analysis.

Working Level SIM DIS Paraffin Solution with Polywax 500
ASTM-P-0052 — 1 x 1 mL
ASTM-P-0052-PAK — *SAVE* 5 x 1 mL
At stated Wt.% in Carbon disulfide — 15 comps.

n-Pentane	0.0333	*n*-Tetradecane	0.0333
n-Hexane	0.0333	*n*-Pentadecane	0.0333
n-Heptane	0.0333	*n*-Hexadecane	0.0333
n-Octane	0.0333	*n*-Heptadecane	0.0333
n-Nonane	0.0333	*n*-Octadecane	0.0333
n-Decane	0.0333	*n*-Eicosane	0.0333
n-Undecane	0.0333	Polywax 500	0.5
n-Dodecane	0.0666		

Can not ship by air. When possible alternate solvents can be used. Contact our Technical Service Dept. for other options.

Polywax 850®
ASTM-P-0137N-2G — **2 grams**
Polywax 850

Polywax 1000®
ASTM-P-0138N-2G — **2 grams**
Polywax 1000

Polywax 500®
ASTM-P-0051N-2G — **2 grams**
Polywax 500

Polywax 655®
ASTM-P-0053N-2G — **2 grams**
Polywax 655

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

Qualitative Calibration Standard
D-3710-QUAL — 1 x 1 mL
D-3710-QUAL-PAK — *SAVE* 5 x 1 mL
At stated Wt.% — 19 comps.

n-Butane	4.5	*n*-Octane	5.4
n-Butylbenzene	3.2	*n*-Pentadecane	2.2
n-Decane	3.2	*n*-Pentane	7.6
2,4-Dimethylpentane	5.4	*n*-Propane	1.5
n-Dodecane	3.2	*n*-Propylbenzene	4.3
n-Heptane	9.7	*n*-Tetradecane	2.2
n-Hexane	5.4	Toluene	10.8
2-Methylbutane	9.7	*n*-Tridecane	2.2
2-Methylpentane	5.4	*p*-Xylene	13
2-Methylpropane	1.5		

Quanitative Calibration Standard
D-3710 — 1 x 1 mL
D-3710-PAK — *SAVE* 5 x 1 mL
At stated Wt.% — 16 comps.

n-Butylbenzene	3.5	*n*-Octane	5.8
n-Decane	3.5	*n*-Pentadecane	2.3
2,4-Dimethylpentane	5.8	*n*-Pentane	8.1
n-Dodecane	3.5	*n*-Propylbenzene	4.7
n-Heptane	10.5	*n*-Tetradecane	2.3
n-Hexane	5.8	Toluene	11.6
2-Methylbutane	10.5	*n*-Tridecane	2.3
2-Methylpentane	5.8	*p*-Xylene	14.0

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
At stated Wt.% — 33 comps.

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

Reformulated to ship by Air

O-PONA Olefin Mix
ASTM-P-0081 — 1 x 1 mL
ASTM-P-0081-PAK — *SAVE* 5 x 1 mL
At stated Wt.% in Hexane:Heptane (50:50) — 5 comps.

1-Pentene	5.0	1-Octene	2.0
1-Hexene	2.0	1-Nonene	3.0
1-Heptene	2.0		

O-PONA Paraffin Mixes
ASTM-P-0082 — 1 x 1 mL
ASTM-P-0082-PAK — *SAVE* 5 x 1 mL
At stated Wt.% in Hexane:Heptane (50:50) — 2 comps.

n-Nonane	5.0	*n*-Decane	2.0

ASTM-P-0082-R1 — 1 x 1 mL
ASTM-P-0082-R1-PAK — *SAVE* 5 x 1 mL
At stated Wt.% in Hexane:Heptane (50:50) — 2 comps.

n-Nonane	3.0	*n*-Decane	3.0

Detailed Hydrocarbon Analysis
Simulated Distillation

ASTM D6730 — **Individual Component in Spark Ignition Engine Fuel by GC**

D6730 System Evaluation Mix
D-6730-SEM — **1 mL**
At stated conc. by Wt.% — 29 comps.

Ethanol	8.0 wt %	Benzene	1.0 wt %	n-Octane	2.0 wt %	n-Decane	1.0 wt %
n-Pentane	2.0 wt %	Cyclohexane	28.9 wt %	Ethylbenzene	25 wt %	n-Undecane	0.5 wt %
t-Butanol	0.5 wt %	3-Ethylpentane	0.2 wt %	p-Xylene	1.0 wt %	1,2,3,5-Tetramethylbenzene	0.25 wt %
2-Methyl-2-butene	2.5 wt %	trans-1,2-Dimethylcyclopentane	0.5 wt %	2,3-Dimethylheptane	0.2 wt %	Naphthalene	0.5 wt %
2,3-Dimethylbutane	0.5 wt %	n-Heptane	2.0 wt %	n-Nonane	2.0 wt %	n-Dodecane	0.25 wt %
MtBE	10.0 wt %	2,3,3-Trimethylpentane	0.5 wt %	5-Methylnonane	0.2 wt %	1-Methylnaphthalene	0.25 wt %
n-Hexane	2.0 wt %	Toluene	7.0 wt %	o-Ethyltoluene	0.5 wt %	n-Tridecane	0.25 wt %
1-Methylcyclopentene	0.5 wt %						

ASTM D6839 — **Hydrocarbon Types, Oxygenated Compounds, Benzene, and Toluene in Spark Ignition Engine Fuels by GC**

System Validation Mixture by GC-VUV - Hydrocarbon Analysis
ASTM-P-VUV-01-SVM — **1 mL**
At stated conc. by %w/w — 28 comps.

Cyclopentane	1.1	n-Decane	4.5
n-Pentane	1.1	n-Undecane	3.5
Cyclohexane	2.1	n-Dodecane	3.5
2,3-Dimethylbutane	2.1	Benzene	2.2
n-Hexane	2.1	Toluene	2.2
1-Hexene	1.5	trans-Decahydronaphthalene	4
Methylcyclohexane	4	n-Tetradecane	4.5
4-Methyl-1-hexene	1.6	Ethylbenzene	4.5
n-Heptane	3.5	o-Xylene	4
1,2-Dimethylcyclohexane	5	n-Propylbenzene	5
Isooctane	5	1,2,4-Trimethylbenzene	4.5
n-Octane	5	1,2,3-Trimethylbenzene	5
1,2,4-Trimethylcyclohexane	4	1,2,4,5-Tetramethylbenzene	5
n-Nonane	4.5	Pentamethylbenzene	5

System Validation Mixture by GC-VUV - Hydrocarbon Analysis
ASTM-P-VUV-02-SVM — **1 mL**
2500 µg/g each in Dichloromethane — 28 comps.

n-Heptane	n-Nonadecane
n-Octane	n-Eicosane
n-Nonane	n-Heneicosane
n-Decane	n-Docosane
n-Undecane	n-Tricosane
n-Dodecane	n-Tetracosane
n-Tridecane	n-Pentacosane
n-Tetradecane	n-Hexacosane
n-Pentadecane	n-Heptacosane
n-Hexadecane	n-Octacosane
Methyl hexadecanoate	Naphthalene
n-Heptadecane	2-Methylnaphthalene
n-Octadecane	1,2,4-Trimethylbenzene
Linoleic acid methyl ester	Phenanthrene

ASTM D7169 — **Boiling Point Distribution by High Temperature by GC**

D7169 Relative Response Mix
D-7169-RRM — **100 mg**
Each at 12.5 %w/w — 8 comps.

n-Decane	n-Octacosane
n-Tetradecane	n-Dotriacontane
n-Octadecane	n-Tetracontane
n-Eicosane	n-Pentacontane

D7169 Retention Time Mix
D-7169-RT — **500 mg**
Varied %w/w — 18 comps.

n-Pentane	7 %w/w	n-Undecane	7 %w/w	n-Heptadecane	7 %w/w
n-Hexane	7 %w/w	n-Dodecane	7 %w/w	n-Octadecane	2 %w/w
n-Heptane	7 %w/w	n-Tridecane	7 %w/w	n-Nonadecane	2 %w/w
n-Octane	7 %w/w	n-Tetradecane	7 %w/w	n-Eicosane	2 %w/w
n-Nonane	7 %w/w	n-Pentadecane	7 %w/w	n-Tetracontane	2 %w/w
n-Decane	7 %w/w	n-Hexadecane	7 %w/w	Polywax 655	1 %w/w

Miscellaneous Petroleum

Skinner List for Refinery Waste

Semi-Volatiles

Base/Neutral Extractables

M-005B — **1 x 1 mL**
M-005B-PAK — ***SAVE*** **5 x 1 mL**
0.2 mg/mL each in CH_2Cl_2

M-005B-10X — **1 x 1 mL**
M-005B-10X-PAK — ***SAVE*** **5 x 1 mL**
2.0 mg/mL each in CH_2Cl_2 — 27 comps.

- Anthracene
- Benz[a]anthracene
- Benzo[b]fluoranthene
- Benzo[k]fluoranthene
- Benz[a]pyrene
- bis(2-Ethylhexyl)phthalate
- Butyl benzyl phthalate
- Chrysene
- Dibenz[a,h]acridine
- Dibenz[a,h]anthracene
- *o*-Dichlorobenzene
- *m*-Dichlorobenzene
- *p*-Dichlorobenzene
- Diethyl phthalate
- 7,12-Dimethylbenz[a]anthracene
- Dimethyl phthalate
- Di-*n*-butyl phthalate
- Di-*n*-octyl phthalate
- Indene
- Fluoranthene
- 6-Methylchrysene
- 1-Methylnaphthalene
- Naphthalene
- Phenanthrene
- Pyrene
- Pyridine
- Quinoline

Acid Extractables

M-005A — **1 x 1 mL**
M-005A-PAK — ***SAVE*** **5 x 1 mL**
0.2 mg/mL each in CH_2Cl_2

M-005A-10X — **1 x 1 mL**
M-005A-10X-PAK — ***SAVE*** **5 x 1 mL**
2.0 mg/mL each in CH_2Cl_2 — 8 comps.

- *o*-Cresol
- *m*-Cresol
- *p*-Cresol
- 2,4-Dimethylphenol
- 2,4-Dinitrophenol
- 4-Nitrophenol
- Phenol
- Thiophenol

Volatiles

M-005V — **1 x 1 mL**
M-005V-PAK — ***SAVE*** **5 x 1 mL**
0.2 mg/mL each in MeOH

M-005V-10X — **1 x 1 mL**
M-005V-10X-PAK — ***SAVE*** **5 x 1 mL**
2.0 mg/mL each in MeOH — 14 comps.

- Benzene
- Carbon disulfide
- Chlorobenzene
- Chloroform
- 1,2-Dichloroethane
- 1,4-Dioxane
- Ethyl benzene
- Ethylene dibromide
- Methyl ethyl ketone
- Styrene
- Toluene
- *o*-Xylene
- *m*-Xylene
- *p*-Xylene

ASTM E1387 & E1618 — Resolution Check for Fire Debris Analysis

ASTM E1387 Resolution Check Mix

ASTM-E1387 — **1 x 1 mL**
ASTM-E1387-PAK — ***SAVE*** **5 x 1 mL**
2.0 mg/mL each in CH_2Cl_2 — 13 comps.

- Decane
- Dodecane
- Eicosane
- 2-Ethyltoluene
- 3-Ethyltoluene
- Hexadecane
- Hexane
- Octadecane
- Octane
- Tetradecane
- Toluene
- 1,2,4-Trimethylbenzene
- *p*-Xylene

ASTM E1618 Test Mix for Fire Debris Analysis

ASTM-E1618 — **1 x 1 mL**
ASTM-E1618-PAK — ***SAVE*** **5 x 1 mL**
0.05 Vol.% each in CH_2Cl_2 — 13 comps.

- *n*-Decane
- *n*-Dodecane
- *n*-Eicosane
- *o*-Ethyltoluene
- *m*-Ethyltoluene
- *n*-Hexadecane
- *n*-Hexane
- *n*-Octadecane
- *n*-Octane
- *n*-Tetradecane
- Toluene
- 1,2,4-Trimethylbenzene
- *p*-Xylene

Custom Formulations

Custom CRMs are a fast and economical way to meet your specific laboratory needs. We have decades of experience to formulate stable, reliable, and quality custom standards.

Talk to one of our Quotation Specialists

UOP Standards

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

Method 543 Standard

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

UOP-M-543-PAK **5 x 1 mL**

At stated Wt.% 2 comps.

n-Dodecane	70	Toluene	30

Method 551 Standard

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

UOP-M-551-PAK **5 x 1 mL**

Equal Wt.% 7 comps.

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

Method 660 Standard

UOP-M-660-PAK **5 x 1 mL**

1% in Water

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

10% in Water

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

0.1% in Water

Tetramethylene sulfone

Method 720 Standard

Impurities in High Purity p-Xylene by GC.

UOP-M-720-PAK **5 x 1 mL**

At stated Wt.% 5 comps.

o-Xylene	0.1	*n*-Undecane	1.0
m-Xylene	0.1	*p*-Xylene	98.7
Ethylbenzene	0.1		

Method 744 Standard

Aromatics in Hydrocarbons by GC.

UOP-M-744-PAK **5 x 1 mL**

At stated Wt.% 8 comps.

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

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	

Method 868 Standard

Trace Saturates in High Purity Aromatics by GC.

UOP-M-868-PAK **5 x 1 mL**

Stated conc. (µg/g) in Toluene 10 comps.

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

Method 931 Standard

Trace Impurities in Mixed Xylenes by GC.

UOP-M-931-PAK **5 x 1 mL**

At stated Wt.% 5 comps.

Benzene	2.0	*n*-Undecane	2.0
Toluene	2.0	*n*-Heptane	92.0
o-Ethyltoluene	2.0		

Biofuels

ASTM, EN and IP standard test methods have been developed to monitor the properties of chemical impurities and physical properties for the application of testing biofuels and biofuel blends. The source materials used to produce these fuels include plant oils, ethyl alcohol (usually from corn) and vegetable waste products.

- Physical properties such as viscosity and flash point
- Chemical classes such as Glycerins, FAMEs, and Hydrocarbon fraction
- All products are derived from ASTM, EN and IP Standard Methods

Refinery and Consumer Grade Biofuels

Compound	Conc.	Matrix	Cat. No.	Unit
Biofuel 20	0.5 mg/mL	CH2Cl2	BF-FU-030-D	2 mL
	20 mg/mL	CH2Cl2	BF-FU-030-D-40X	2 mL
Biofuel 100 (Consumer grade)	0.5 mg/mL	CH2Cl2	BF-FU-029-D	2 mL
	20 mg/mL	CH2Cl2	BF-FU-029-40X	2 mL

Compound	Conc	Matrix	Cat. No.	Unit
Biofuel 100 (Refinery grade)	0.5 mg/mL	CH2Cl2	BF-FU-032-D	2 mL
	20 mg/mL	CH2Cl2	BF-FU-032-D-40X	2 mL

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

Sulfur in Biodiesel 5%

ppm (µg/g)	% Wt.	Cat. No. ▲	Unit
0	0	BF-5453-B5-BL	100 mL
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	100 mL
50	0.005	BF-5453-B5-50X	100 mL
75	0.0075	BF-5453-B5-75X	100 mL
100	0.01	BF-5453-B5-100X	100 mL
200	0.02	BF-5453-B5-200X	100 mL
500	0.05	BF-5453-B5-500X	100 mL

Sulfur in Biodiesel 20%

ppm (µg/g)	% Wt.	Cat. No.	Unit
0	0	BF-5453-B20-BL	100 mL
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	100 mL
50	0.005	BF-5453-B20-50X	100 mL
75	0.0075	BF-5453-B20-75X	100 mL
100	0.01	BF-5453-B20-100X	100 mL
200	0.02	BF-5453-B20-200X	100 mL
500	0.05	BF-5453-B20-500X	100 mL

Sulfur in Biodiesel 100%

ppm (µg/g)	% Wt.	Cat. No.	Unit
0	0	BF-5453-B100-BL	100 mL
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	100 mL
50	0.005	BF-5453-B100-50X	100 mL
75	0.0075	BF-5453-B100-75X	100 mL
100	0.01	BF-5453-B100-100X	100 mL
200	0.02	BF-5453-B100-200X	100 mL
500	0.05	BF-5453-B100-500X	100 mL

Biofuel Blank

B100

BF-WM-B100-BL-1 **100 grams** BF-WM-B100-BL-5 **500 grams**

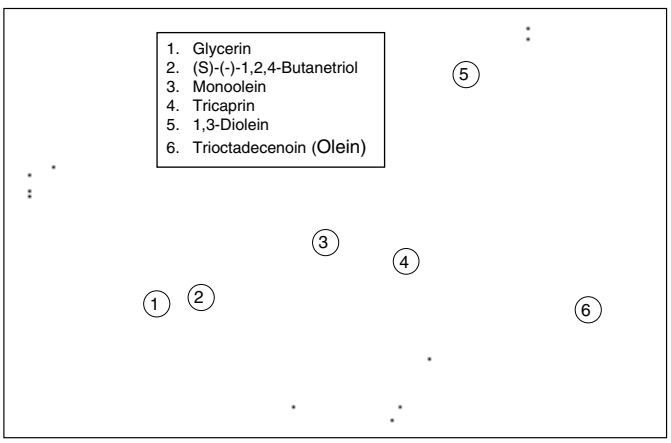
Technical Note

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.

ASTM D6584 / EN14105 — 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
				BF-D-6584-SET	**7 units**

Mix of above compounds, on right (MSTFA separate)



ASTM D6584 Mix

BF-D-6584-MIX **1 x 5 mL**

At stated conc.(mg/mL) in Pyridine 6 comps.

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

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

ASTM Standard D6584 SET (without IS)

GLYC-FT-SET **5 x 1 mL**

At stated conc. (µg/mL) in Pyridine 4 comps.

Level	1	2	3	4	5
GLYC-FT	-01	-02	-03	-04	-05
1,3-Diolein	50	100	200	350	500
Triolein	50	100	200	350	500
Glycerol	5	15	25	35	50
Monoolein	100	250	500	750	1000

ASTM 6584 / EN14105 continued on next page

ASTM D6584 / EN14105 — Free and Total Glycerin in Biodiesel by GC (continued)

Solution I
EN-14105-01 — **1 mL**
At stated conc. (µg/mL) in Pyridine — 6 comps.

(s)-(-)-1,2,4-Butanetriol	80
Monoolein	250
Diolein	50
Triolein	50
Glycerol	5
Tricaprin	800

Solution II
EN-14105-02 — **1 mL**
At stated conc. (µg/mL) in Pyridine — 6 comps.

(s)-(-)-1,2,4-Butanetriol	80
Monoolein	600
Diolein	200
Triolein	150
Glycerol	20
Tricaprin	800

Solution III
EN-14105-03 — **1 mL**
At stated conc. (µg/mL) in Pyridine — 6 comps.

(s)-(-)-1,2,4-Butanetriol	80
Monoolein	950
Diolein	350
Triolein	300
Glycerol	35
Tricaprin	800

Solution IV
EN-14105-04 — **1 mL**
At stated conc. (µg/mL) in Pyridine — 6 comps.

(s)-(-)-1,2,4-Butanetriol	80
Monoolein	1250
Diolein	500
Triolein	400
Glycerol	50
Tricaprin	800

EN12916 — Hydrocarbons in Biofuel

EN-12916-SET — **4 x 1 mL**
At stated conc. (mg/mL) in Heptane — 3 comps.

	EN-12916-01	EN-12916-02	EN-12916-03	EN-12916-04
o-Xylene (1,2-Dimethylbenzene)	40	10	2.5	0.5
Fluorene	20	10	2.5	0.2
Phenanthrene	4.0	2.0	0.5	0.1

EN14103 — Fatty Acid Methyl Esters (FAMEs)

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

Soy and Corn
BF-SOY-ME — **100 mg**
At stated Wt.% — 6 comps.

16:0 Methyl palmitate	6
18:0 Methyl stearate	3
20:0 Methyl arachidate	3
18:1 Methyl oleate	35
18:2 Methyl linoleate	50
18:3 Methyl linolenate	3

Palm Kernel
BF-PALM-ME — **100 mg**
At stated Wt.% — 8 comps.

8:0 Methyl paprylate	7
10:0 Methyl caprate	5
12:0 Methyl laurate	48
14:0 Methyl myristate	15
16:0 Methyl palmitate	7
18:0 Methyl stearate	3
18:1 Methyl oleate	12
18:2 Methyl linoleate	3

Beef Tallow & Palm Oil
BF-BT-ME — **100 mg**
At stated Wt.% — 7 comps.

14:0 Methyl myristate	2
16:0 Methyl palmitate	30
16:1 Methyl palmitoleate	3
18:0 Methyl stearate	14
18:1 Methyl oleate	41
18:2 Methyl linoleate	7
18:3 Methyl linolenate	3

Rapeseed Oil
BF-RAP-ME — **100 mg**
At stated Wt.% — 11 comps.

14:0 Methyl myristate	1
16:0 Methyl palmitate	4
18:0 Methyl stearate	3
20:0 Methyl arachidate	3
22:0 Methyl behenate	3
24:0 Methyl lignocerate	3
18:1 Methyl oleate	60
22:1 Methyl erucate	5
18:2 Methyl linoleate	12
18:3 Methyl linolenate	5
20:1 Methyl eicosenoate	1

Percent Methanol Calibration Standard Set (EN14110)
BF-MEOH-SET — **5 x 1 mL**
At stated conc. (µg/g)

BF-MEOH-1X	100	BF-MEOH-10X	1000	BF-MEOH-50X	5000
BF-MEOH-5X	500	BF-MEOH-25X	2500		

Methanol in water

Technical Note

Individual mixes packaged under nitrogen for stability.

EN15721 — Ethanol Impurities

Ethanol Impurities Solution A
EN-15721-A — **1 mL**
1 Wt.% each in Ethanol — 10 comps.

Methanol	2-Methyl-1-propanol	*n*-Propanol
Acetaldehyde	*sec*-Butanol	Ethyl acetate
3-Methyl-1-butanol	*n*-Butanol	Acetal
2-Methyl-1-butanol		

Internal Standard Solution A
EN-15721-A-IS — **1 mL**
1 Wt.% in Ethanol

3-Pentanol

EN15721 Solution A Set
EN-15721-A-SET — **2 x 1 mL**

EN-15721-A
EN-15721-A-IS

EN15779 Polyunsaturated Fatty Acid Methyl Esters (PUFAMEs)

PUFAMEs
EN-15779-R1 — **1 mL**
0.25% w/v in n-Heptane — 4 comps.

cis-4,7,10,13,16,19-Docosahexaenoic acid methyl ester
cis-7,10,13,16,19-Docosapentaenoic acid methyl ester
Arachidonic acid methyl ester
Eicosapentaenoic acid methyl ester

Internal Standard
EN-15779-IS — **1 mL**
1.0 mg/mL in Heptane

Methyl tricosanoate

IP585 Fatty Acid Methyl Esters (FAMEs) in Aviation Turbine Fuel

FAME in Aviation Turbine Fuel
IP-585-BCS — **1 mL**
1000 µg/g each in n-Dodecane — 6 comps.

Methyl palmitate
Methyl heptadecanoate
Methyl stearate
Methyl oleate
Methyl linoleate
Methyl linolenate

Internal Standard
IP-585-IS — **1 mL**
1000 µg/g in n-Dodecane

Methyl heptadecanoate-d_{33}

Fatty Acid Ethyl Esters (FAEEs)

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

Ethyl Esters in Soy & Corn
BF-SOY-EE — **100 mg**
At stated Wt.% — 6 comps.

16:0 Ethyl palmitate	6
18:0 Ethyl stearate	3
20:0 Ethyl arachidate	3
18:1 Ethyl oleate	35
18:2 Ethyl linoleate	50
18:3 Ethyl linolenate	3

Ethyl Esters in Rapeseed Oil
BF-RAP-EE — **100 mg**
At stated Wt.% — 10 comps.

14:0 Ethyl myristate	1
16:0 Ethyl palmitate	4
18:0 Ethyl stearate	3
20:0 Ethyl arachidate	3
22:0 Ethyl behenate	3
24:0 Ethyl lignocerate	3
18:1 Ethyl oleate	45
22:1 Ethyl erucate	20
18:2 Ethyl linoleate	15
18:3 Ethyl linolenate	3

Ethyl Esters in Palm Kernel Oil
BF-PALM-EE — **100 mg**
At stated Wt.% — 8 comps.

8:0 Ethyl caprylate	7
10:0 Ethyl caprate	5
12:0 Ethyl laurate	48
14:0 Ethyl myristate	15
16:0 Ethyl palmitate	7
18:0 Ethyl stearate	3
18:1 Ethyl oleate	12
18:2 Ethyl linoleate	3

Ethyl Esters in Beef Tallow
BF-BT-EE — **100 mg**
At stated Wt.% — 7 comps.

14:0 Ethyl myristate	2
16:0 Ethyl palmitate	30
16:1 Ethyl palmitoleate	3
18:0 Ethyl stearate	14
18:1 Ethyl oleate	41
18:2 Ethyl linoleate	7
18:3 Ethyl linolenate	3

IP391/07 Aromatic Hydrocarbon / FAME Test Method for Diesel and Petro / Biodiesel

Aromatic Hydrocarbon
IP-391-07-01 — **5 mL**
At stated conc. (µg/mL) in n-Heptane — 7 comps.

Cyclohexane	10,000
Dodecylbenzene	1,000
o-Xylene	5,000
Hexamethylbenzene	1,000
Naphthalene	1,000
Dibenzothiophene	500
9-Methylanthracene	500

FAME Test Method
IP-391-07-02 — **5 mL**
At stated conc. (µg/mL) in n-Heptane — 6 comps.

Methyl palmitate	800
Methyl stearate	800
Methyl *cis*-9-octadecenoate	800
Methyl linoleate	800
Chrysene	400
Methyl linolenate	800

IP391/07 Test Method Set
IP-391-07-SET — **2 x 5 mL**

IP-391-07-01
IP-391-07-02

Biofuels

Physical Standards

Compound	Conc.		Matrix	Cat. No.	Unit
ASTM D2500					
Cloud Point	-16	˚C *	B5	BF-D-2500-B5-250ML ▲	250 mL
	-14	˚C *	B20	BF-D-2500-B20-250ML	250 mL
	-1	˚C *	B100	BF-D-2500-B100-250ML	250 mL
ASTM D93 / EN-ISO 3679					
Flash Point	60	˚C *		BF-D-93-60C-250ML	250 mL
	65	˚C *		BF-D-93-65C-250ML	250 mL
	140	˚C *		BF-D-93-140C-250ML	250 mL
ASTM D4951 / EN 14107					
Phosphorus Content	0.001	µg/g *	B100	BF-D-4951-B100	100 g
ASTM D6304 / EN ISO 12937					
(KF) Water Content	60	µg/g *	Anisole	BF-KF-0.6X-5ML-VAP	10 x 5 mL
	100	µg/g *	Anisole	BF-KF-1X-5ML-VAP	10 x 5 mL
	1000	µg/g *	Anisole	BF-KF-10X-5ML-VAP	10 x 5 mL
	5000	µg/g *	Anisole	BF-KF-50X-5ML-VAP	10 x 5 mL
ASTM D6751 / UOP 391 / EN 14108 / EN 14109					
Sodium / Potassium	100	µg/g *	B100	BF-UOP-391-B100	100 g
EN 14538					
Calcium / Magnesium	100	µg/g *	B100	BF-14538-B100	100 g

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

EN14214 Wear Metals

Each is 100 grams at 500 µg/g concentration.

Compound	Matrix	Cat. No.	Unit
Aluminum (Al)	B100	BF-WM-B100-01-0.5X	100 grams
Calcium (Ca)	B100	BF-WM-B100-09-0.5X	100 grams
Chromium (Cr)	B100	BF-WM-B100-13-0.5X	100 grams
Copper (Cu)	B100	BF-WM-B100-15-0.5X	100 grams
Iron (Fe)	B100	BF-WM-B100-27-0.5X	100 grams
Lead (Pb)	B100	BF-WM-B100-29-0.5X	100 grams
Magnesium (Mg)	B100	BF-WM-B100-32-0.5X	100 grams
Phosphorus (P)	B100	BF-WM-B100-41-0.5X	100 grams
Potassium (K)	B100	BF-WM-B100-43-0.5X	100 grams
Sodium (Na)	B100	BF-WM-B100-54-0.5X	100 grams
Zinc (Zn)	B100	BF-WM-B100-70-0.5X	100 grams

Biofuel Blank

B100

BF-WM-B100-BL-1 **100 grams** **BF-WM-B100-BL-5** **500 grams**

Biofuel Metals Mix

Multi-Element Biofuel Standard

BF-WM-B100-MIX **100 grams**

200 µg/g each in B100 5 comps.

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

Technical Note

Prepared by adding well characterized sulfur compounds gravimetrically to the matrix. The matrix may contain some native sulfur, a blank must be used for background correction and should be purchased with the standard.

Technical Note

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

▲ Hazardous fee required for air shipments.

TPH, Fuel and 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.	Unit
5-alpha Androstane 438-22-2	1 mg/mL	CH_2Cl_2	GRH-IS	1 mL
	10 mg/mL	CH_2Cl_2	GRH-IS-10X	1 mL
Aviation (gas) (grade 100-LL)	0.5 mg/mL	MeOH	GA-004	1 mL
	20 mg/mL	MeOH	GA-004-40X	1 mL
	20 mg/mL	CH_2Cl_2	GA-004-D-40X	1 mL
Biodiesel 20	0.5 mg/mL	CH_2Cl_2	FU-030-D	1 mL
	20 mg/mL	CH_2Cl_2	FU-030-D-40X	1 mL
Biodiesel 100	0.5 mg/mL	CH_2Cl_2	FU-029-D	1 mL
	20 mg/mL	CH_2Cl_2	FU-029-D-40X	1 mL
Biodiesel 100 (refinery grade)	0.5 mg/mL	CH_2Cl_2	FU-032-D	1 mL
	20 mg/mL	CH_2Cl_2	FU-032-D-40X	1 mL
p-Bromofluorobenzene 460-00-4	2.5 mg/mL	Acetone	GARH-SS	1 mL
1-Chloro-4-fluorobenzene 352-33-0	2 mg/mL	MeOH	AK-101-IS-10X	1 mL
1-Chlorooctadecane 3386-33-2	1 mg/mL	Hexane	DRH-007-SS	1 mL
1-Chloro-4-fluorobenzene 352-33-0	1 mg/mL	CH_2Cl_2	GARH-IS	1 mL
2,5-Dibromotoluene 615-59-8	50 µg/mL	MeOH	GRH-004-SS	1 mL
	500 µg/mL	MeOH	GRH-004-SS-10X	1 mL
	5 mg/mL	MeOH	GRH-004-SS-100X	1 mL
Diesel	0.5 mg/mL	MeOH	FU-009	1 mL
	5 mg/mL	CH_2Cl_2	FU-009-D-10X	1 mL
	20 mg/mL	MeOH	FU-009-40X	1 mL
	20 mg/mL	CH_2Cl_2	FU-009-D-40X	1 mL
#1 Diesel (Low Sulfur)	0.5 mg/mL	MeOH	FU-013	1 mL
	20 mg/mL	MeOH	FU-013-40X	1 mL
	20 mg/mL	CH_2Cl_2	FU-013-D-40X	1 mL
#2 Diesel 68334-30-5	50 mg/mL	Acetone	DRO-AK-102-LCS-10X-R1	1 mL
#2 Diesel (Extra Low Sulfur) 68476-43-6	0.5 mg/mL	MeOH	FU-017	1 mL
	5 mg/mL	CH_2Cl_2	FU-017-D-10X	1 mL
	5 mg/mL	Acetone	DRO-AK-102-LCS	1 mL
	50 mg/mL	Acetone	DRO-AK-102-LCS-10X	1 mL
	20 mg/mL	MeOH	FU-017-40X	1 mL
	20 mg/mL	CH_2Cl_2	FU-017-D-40X	1 mL
#2 Diesel (Low Sulfur) 25% Weathered	5 mg/mL	CH_2Cl_2	FD2-W25-10X	1 mL
#2 Diesel (Low Sulfur) 50% Weathered	5 mg/mL	CH_2Cl_2	FD2-W50-10X	1 mL
#2 Diesel (Low Sulfur) 75% Weathered	5 mg/mL	CH_2Cl_2	FD2-W75-10X	1 mL
#2 Diesel 25% Weathered	5 mg/mL	CH_2Cl_2	FD2-W25-R1-10X	1 mL
#2 Diesel 50% Weathered	5 mg/mL	CH_2Cl_2	FD2-W50-R1-10X	1 mL
#2 Diesel 75% Weathered	5 mg/mL	CH_2Cl_2	FD2-W75-R1-10X	1 mL
Renewable Diesel Fuel#2	20 mg/mL	CH_2Cl_2	FU-033-D-40X	1 mL
Docosane 629-97-0	20 Wt.%	Toluene	D-5186-91-PM-0.4X	1 mL
n-Dodecane 112-40-3	5 mg/mL	MeOH	AS-E0238	1 mL
	1.5 Wt.%	Isooctane	M-GRA-SCS-AS	1 mL
#1 Fuel oil 70892-10-3	0.5 mg/mL	MeOH	FU-001	1 mL
	20 mg/mL	MeOH	FU-001-40X	1 mL
	20 mg/mL	CH_2Cl_2	FU-001-D-40X	1 mL
#2 Fuel oil 68476-30-2	0.5 mg/mL	MeOH	FU-002	1 mL
	20 mg/mL	MeOH	FU-002-40X	1 mL
	20 mg/mL	CH_2Cl_2	FU-002-D-40X	1 mL
#4 Fuel oil 68476-31-3	0.5 mg/mL	Hexane	FU-004	1 mL
	20 mg/mL	Hexane	FU-004-40X	1 mL
	20 mg/mL	CH_2Cl_2	FU-004-D-40X	1 mL
#6 Fuel oil 68553-00-4	0.5 mg/mL	Hexane	FU-008	1 mL
	20 mg/mL	Hexane	FU-008-40X	1 mL
	20 mg/mL	CH_2Cl_2	FU-008-D-40X	1 mL
Gasoline Regular, unleaded	0.5 mg/mL	MeOH	GA-001	1 mL
	5 mg/mL	MeOH	GA-001-10X	1 mL
	20 mg/mL	MeOH	GA-001-40X	1 mL
	20 mg/mL	CH_2Cl_2	GA-001-D-40X	1 mL
Gasoline Premium	0.5 mg/mL	MeOH	GA-003	1 mL
	20 mg/mL	MeOH	GA-003-40X	1 mL
	20 mg/mL	CH_2Cl_2	GA-003-D-40X	1 mL
RFA Gasoline (oxygenate-free)	0.5 mg/mL	MeOH	GA-005	1 mL
	20 mg/mL	MeOH	GA-005-40X	1 mL
	20 mg/mL	CH_2Cl_2	GA-005-D-40X	1 mL
Regular Leaded Gasoline	0.5 mg/mL	MeOH	GA-002	1 mL
	20 mg/mL	MeOH	GA-002-40X	1 mL
	20 mg/mL	CH_2Cl_2	GA-002-D-40X	1 mL
Unleaded Gasoline 25% Weathered	5 mg/mL	MeOH	GA-W25-10X	1 mL
Unleaded Gasoline 50% Weathered	5 mg/mL	MeOH	GA-W50-10X	1 mL
Unleaded Gasoline 75% Weathered	5 mg/mL	MeOH	GA-W75-10X	1 mL
Hydraulic Fluid 64742-54-7	0.5 mg/mL	Hexane	FU-020-H	1 mL
	20 mg/mL	Hexane	FU-020-H-40X	1 mL
	20 mg/mL	CH_2Cl_2	FU-020-D-40X	1 mL
Jet Reference Fuel Type I	0.5 mg/mL	MeOH	FU-011	1 mL
	20 mg/mL	MeOH	FU-011-40X	1 mL
	20 mg/mL	CH_2Cl_2	FU-011-D-40X	1 mL
JP-4 Jet Fuel 50815-00-4	0.5 mg/mL	MeOH	FU-010	1 mL
	20 mg/mL	MeOH	FU-010-40X	1 mL
	20 mg/mL	CH_2Cl_2	FU-010-D-40X	1 mL
JP-5 Fuel	0.5 mg/mL	MeOH	FU-012	1 mL
	20 mg/mL	MeOH	FU-012-40X	1 mL
	20 mg/mL	CH_2Cl_2	FU-012-D-40X	1 mL
JP-7 Fuel	0.5 mg/mL	MeOH	FU-014	1 mL
	20 mg/mL	MeOH	FU-014-40X	1 mL
	20 mg/mL	CH_2Cl_2	FU-014-D-40X	1 mL
JP-8 Fuel	0.5 mg/mL	MeOH	FU-015	1 mL
	20 mg/mL	MeOH	FU-015-40X	1 mL
	20 mg/mL	CH_2Cl_2	FU-015-D-40X	1 mL
JP-TS Aviation Fuel 64742-47-8	0.5 mg/mL	MeOH	FU-016	1 mL
	20 mg/mL	MeOH	FU-016-40X	1 mL
	20 mg/mL	CH_2Cl_2	FU-016-D-40X	1 mL
JP-10 Aviation Fuel	0.5 mg/mL	MeOH	FU-022	1 mL
	20 mg/mL	MeOH	FU-022-40X	1 mL
	20 mg/mL	CH_2Cl_2	FU-022-D-40X	1 mL
Kerosene 25% Weathered	5 mg/mL	CH_2Cl_2	FK-W25-10X	1 mL
Kerosene 50% Weathered	5 mg/mL	CH_2Cl_2	FK-W50-10X	1 mL
Kerosene 75% Weathered	5 mg/mL	CH_2Cl_2	FK-W75-10X	1 mL
Kerosene 8008-20-6	0.5 mg/mL	MeOH	FU-005	1 mL
	20 mg/mL	MeOH	FU-005-40X	1 mL
	5 mg/mL	CH_2Cl_2	FU-005-D-10X	1 mL
	20 mg/mL	CH_2Cl_2	FU-005-D-40X	1 mL
Lacquer Thinner	1 gram	Neat	HS-001N	1 mL
	0.5 mg/mL	MeOH	HS-001S	1 mL
	20 mg/mL	MeOH	HS-001S-40X	1 mL
	20 mg/mL	CH_2Cl_2	HS-001S-D-40X	1 mL
Mineral Spirits 8030-30-6	1 gram	Neat	HS-002N	1 mL
	0.5 mg/mL	MeOH	HS-002S	1 mL
	20 mg/mL	MeOH	HS-002S-40X	1 mL
	20 mg/mL	CH_2Cl_2	HS-002S-D-40X	1 mL

Individual Fuel and Hydrocarbons continued on next page.

TPH, Fuel and Hydrocarbons

Individual Fuel and Hydrocarbons (continued)

Compound	Conc.	Matrix	Cat. No.	Unit
Naphtha 64742-89-8	1 gram	Neat	HS-003N	1 mL
	0.5 mg/mL	MeOH	HS-003S	1 mL
	20 mg/mL	MeOH	HS-003S-40X	1 mL
	20 mg/mL	CH_2Cl_2	HS-003S-D-40X	1 mL
n-Nonatriacontane 7194-86-7	750 µg/mL	Chloroform	DRH-FL-SS-R1	1 mL
	1 mg/mL	CS_2	DRH-FL-SS	1 mL
	3 mg/mL	CS_2	DRH-FL-SS-3X	1 mL
n-Pentadecane 629-62-9	5 mg/mL	MeOH	AS-E0241	1 mL
SAE 5W30 Motor oil	0.5 mg/mL	Hexane	FU-025-H	1 mL
	20 mg/mL	Hexane	FU-025-H-40X	1 mL
	20 mg/mL	CH_2Cl_2	FU-025-D-40X	1 mL
SAE 10W30 Motor oil	0.5 mg/mL	Hexane	FU-026-H	1 mL
	20 mg/mL	Hexane	FU-026-H-40X	1 mL
	20 mg/mL	CH_2Cl_2	FU-026-D-40X	1 mL
SAE 10W40 Motor oil	0.5 mg/mL	Hexane	FU-027-H	1 mL
	20 mg/mL	Hexane	FU-027-H-40X	1 mL
	20 mg/mL	CH_2Cl_2	FU-027-D-40X	1 mL
SAE 20W50 Motor oil	0.5 mg/mL	Hexane	FU-028-H	1 mL
	20 mg/mL	Hexane	FU-028-H-40X	1 mL
	20 mg/mL	CH_2Cl_2	FU-028-D-40X	1 mL
SAE 30W Motor oil	0.5 mg/mL	Hexane	FU-018-H	1 mL
	20 mg/mL	Hexane	FU-018-H-40X	1 mL
	20 mg/mL	CH_2Cl_2	FU-018-D-40X	1 mL
SAE 40W Motor oil	0.5 mg/mL	Hexane	FU-019-H	1 mL
	5 mg/mL	Acetone:CH_2Cl_2	RRO-AK-103-LCS	1 mL
	20 mg/mL	Hexane	FU-019-H-40X	1 mL
	20 mg/mL	CH_2Cl_2	FU-019-D-40X	1 mL
	20 mg/mL	Acetone:CH_2Cl_2	RRO-AK-103-LCS-5X	1 mL
SAE 50W Motor oil	20 mg/mL	CH_2Cl_2	FU-021-D-40X	1 mL
Stoddard solvent 8052-41-3	1 gram	Neat	HS-005N	1 mL
	0.5 mg/mL	MeOH	HS-005S	1 mL
	5 mg/mL	MeOH	HS-005S-10X	1 mL
	20 mg/mL	MeOH	HS-005S-40X	1 mL
	20 mg/mL	CH_2Cl_2	HS-005S-D-40X	1 mL
o-Terphenyl 84-15-1	200 µg/mL	Acetone	DRO-AK-102-SS	1 mL
	1 mg/mL	CH_2Cl_2	DRH-006-SS	1 mL
	2 mg/mL	Acetone	DRO-AK-102-SS-10X	1 mL
	2 mg/mL	Acetone	GRH-SS	1 mL
***n*-Tetradecane** 629-59-4	5 mg/mL	MeOH	AS-E0240	1 mL
Tetracosane 646-31-1	500 µg/mL	CS_2	D-5480-C40-5ML	5 mL
	500 µg/mL	Chloroform	D-5480-C40-R1-5ML	5 mL
***n*-Tridecane** 629-50-5	5 mg/mL	MeOH	AS-E0239	1 mL
1,2,3-Trimethylbenzene 526-73-8	1 mg/mL	CH_2Cl_2	V-028S-D-10X	1 mL
n-Triacontane-d_{62} 93952-07-9	500 µg/mL	Acetone:THF	RRO-AK-103-SS	1 mL
	5 mg/mL	Acetone:THF	RRO-AK-103-SS2	1 mL
	5 mg/mL	THF	DRH-SS	1 mL
Turbine (Jet) fuel	0.5 mg/mL	MeOH	FU-006	1 mL
	20 mg/mL	MeOH	FU-006-40X	1 mL
	20 mg/mL	CH_2Cl_2	FU-006-D-40X	1 mL
Turpentine 8006-64-2	NEAT		HS-004N	1 gram
	0.5 mg/mL	MeOH	HS-004S	1 mL
	20 mg/mL	MeOH	HS-004S-40X	1 mL
	20 mg/mL	CH_2Cl_2	HS-004S-D-40X	1 mL

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

Motor Fuels & Lubricating Oils Set

TPH-001-R2-SET — **12 x 1 mL**

	mg/mL	Solv.	Cat. No.	Unit
Gasoline, regular unleaded	20	MeOH	GA-001-40X	1 mL
Gasoline, regular leaded	20	MeOH	GA-002-40X	1 mL
Gasoline, premium	20	MeOH	GA-003-40X	1 mL
RFA Gasoline (Oxygenate free)	20	MeOH	GA-005-40X	1 mL
#2 Diesel (Conventional)	20	CH_2Cl_2	FU-009-D-40X	1 mL
#1 Diesel (Low sulfur)	20	CH_2Cl_2	FU-013-D-40X	1 mL
#2 Diesel (Extra low sulfur)	20	CH_2Cl_2	FU-017-D-40X	1 mL
SAE 30W Motor oil	20	CH_2Cl_2	FU-018-D-40X	1 mL
SAE 40W Motor oil	20	CH_2Cl_2	FU-019-D-40X	1 mL
SAE 50W Motor oil	20	CH_2Cl_2	FU-021-D-40X	1 mL
Biodiesel 20	20	CH_2Cl_2	FU-030-D-40X	1 mL
Biodiesel 100 (consumer grade)	20	CH_2Cl_2	FU-029-D-40X	1 mL

Heating Fuel Oils Set

TPH-002-R2-SET — **5 x 1 mL**

	mg/mL	Solv.	Cat. No.	Unit
#1 Fuel oil	20	CH_2Cl_2	FU-001-D-40X	1 mL
#2 Fuel oil	20	CH_2Cl_2	FU-002-D-40X	1 mL
#4 Fuel oil	20	CH_2Cl_2	FU-004-D-40X	1 mL
#6 Fuel oil	20	CH_2Cl_2	FU-008-D-40X	1 mL
Kerosene	20	CH_2Cl_2	FU-005-D-40X	1 mL

Aviation Fuels & Oils Set

TPH-003-SET — **10 x 1 mL**

	mg/mL	Solv.	Cat. No.	Unit
Aviation (Gas) Grade 100 LL	20	CH_2Cl_2	GA-004-D-40X	1 mL
JP-4 Fuel	20	CH_2Cl_2	FU-010-D-40X	1 mL
JP-5 Fuel	20	CH_2Cl_2	FU-012-D-40X	1 mL
JP-7 Fuel	20	CH_2Cl_2	FU-014-D-40X	1 mL
JP-8 Fuel	20	CH_2Cl_2	FU-015-D-40X	1 mL
JP-10 Aviation Fuel	20	CH_2Cl_2	FU-022-D-40X	1 mL
JP-TS Aviation	20	CH_2Cl_2	FU-016-D-40X	1 mL
Jet Fuel (Type 1)	20	CH_2Cl_2	FU-011-D-40X	1 mL
Turbine (Jet A) Fuel	20	CH_2Cl_2	FU-006-D-40X	1 mL
Hydraulic fluid	20	CH_2Cl_2	FU-020-D-40X	1 mL

Household & Industrial Solvent Set

TPH-004-SET — **5 x 1 mL**

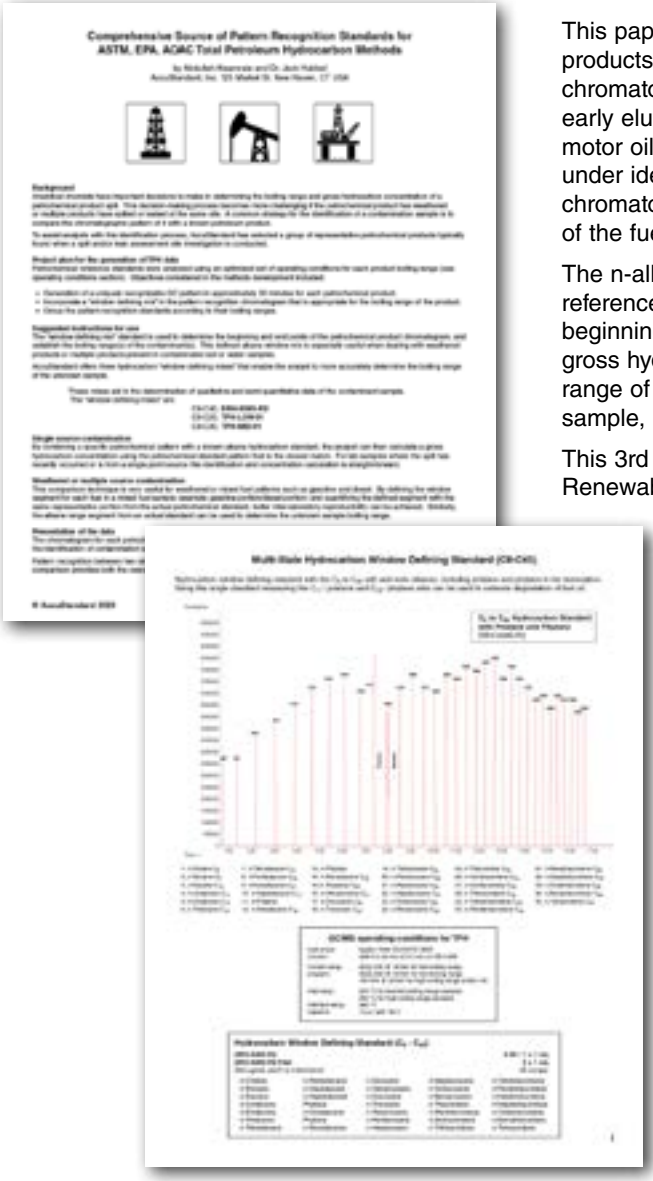
	mg/mL	Solv.	Cat. No.	Unit
Lacquer Thinner	20	CH_2Cl_2	HS-001S-D-40X	1 mL
Mineral Spirits	20	CH_2Cl_2	HS-002S-D-40X	1 mL
Naphtha	20	CH_2Cl_2	HS-003S-D-40X	1 mL
Turpentine	20	CH_2Cl_2	HS-004S-D-40X	1 mL
Stoddard solvent	20	CH_2Cl_2	HS-005S-D-40X	1 mL

TPH-R4-SET — **32 x 1 mL**
(TPH-001-R2-SET, TPH-002-R2-SET, TPH-003-SET, TPH-004-SET)

Motor Oil Standards

Compound	mg/mL	Matrix	Cat. No.	Unit
SAE 5W30 Motor oil	0.5	Hexane	FU-025-H	1 mL
	20.0	Hexane	FU-025-H-40X	1 mL
	20.0	CH_2Cl_2	FU-025-D-40X	1 mL
SAE 10W30 Motor oil	0.5	Hexane	FU-026-H	1 mL
	20.0	Hexane	FU-026-H-40X	1 mL
	20.0	CH_2Cl_2	FU-026-D-40X	1 mL
SAE 10W40 Motor oil	0.5	Hexane	FU-027-H	1 mL
	20.0	Hexane	FU-027-H-40X	1 mL
	20.0	CH_2Cl_2	FU-027-D-40X	1 mL
SAE 20W50 Motor oil	0.5	Hexane	FU-028-H	1 mL
	20.0	Hexane	FU-028-H-40X	1 mL
	20.0	CH_2Cl_2	FU-028-D-40X	1 mL
Motor Oil Composite Standard	5.0 each SAE 5W30, SAE 10W30, SAE 10W40, SAE 20W50	CH_2Cl_2	MO-COMP-D-40X	1 mL 4 comps.

Comprehensive Source of Pattern Recognition Standards for ASTM, EPA, AOAC Total Petroleum Hydrocarbon Methods - 3rd edition



This paper 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-R2) analyzed under identical conditions has been overlaid on each petroleum product chromatogram. This reference can will assist the chemist's identification of the fuel for pattern recognition.

The n-alkane standard (DRH-008S-R2) 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.

This 3rd edition includes two new fuel, Renewable Diesel Fuel #2 and Renewable Aviation Fuel.

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TPH, Fuel and Hydrocarbons
Brownfield Regulation & ISO/DIS 9337

Petroleum Brownfield Regulation

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

Light Petroleum Fraction

CCME-LPF-SET — **5 x 1 mL**
At stated conc. (µg/mL) in MeOH — 8 comps.

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

Medium & Heavy Petroleum Fraction

CCME-MHPF-SET — **3 x 1 mL**
At stated conc. (µg/mL) in n-Hexane — 3 comps.

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

Performance Check Standard

CCME-QC — **1 x 1 mL**
CCME-QC-PAK — ***SAVE*** **5 x 1 mL**
40 µg/mL each in n-Hexane:Cyclohexane (50:50) — 2 comps.

n-Pentacontane
n-Tetracontane

Spike Standard

CCME-SPIKE — **1 x 1 mL**
2500 µg/mL each in n-Hexane — 2 comps.

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

Hydrocarbon Standard

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

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

Canadian Atlantic RBCA EPH Mix

CCME-EPH — **1 x 1 mL**
1000 µg/mL each in Hexane:CH_2Cl_2 (85:15) — 11 comps.

Acenapthene
Anthracene
Benz[a]pyrene
Chrysene
n-Decane
n-Dodecane
n-Dotriacontane
n-Heneicosane
n-Hexadecane
n-Octaconsane
Naphthalene

Surrogate Standard

CCME-EPH-SS — **1 x 1 mL**
1000 µg/mL each in CH_2Cl_2 — 2 comps.

n-Dotriacontane
Isobutylbenzene

Canadian Atlantic RBCA VPH Mix

CCME-VPH — **1 x 1 mL**
1000 µg/mL each in MeOH — 12 comps.

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

Surrogate Standard

CCME-VPH-SS — **1 x 1 mL**
1000 µg/mL in MeOH

Isobutylbenzene

ISO / DIS 9377 — Hydrocarbon Oil Index

Diesel #2/Mineral Oil Standard

ENISO9377-2-1 — **1 x 1 mL**
5000 µg/mL each in Hexane — 2 comps.

#2 Diesel
Heavy mineral oil

Quality Control Standard Mix

ISO-DIS9377-4-1 — **1 x 1 mL**
500 µg/mL each in Acetone — 2 comps.

#2 Diesel
Mineral Oil

Extraction Solvent Stock Soln.

ENISO9377-2-3 — **1 x 5 mL**
At stated conc.(µg/mL) in Hexane — 2 comps.

n-Decane	14.5
n-Tetracontane	20

Stearyl Stearate Test Solution

ISO-DIS9377-4-2 — **1 x 10 mL**
2000 µg/mL in Cyclohexane

Stearyl stearate

Florisil Cartridge QC Std. Mix

ENISO9377-2-4 — **1 x 10 mL**
1000 µg/mL each in Hexane — 2 comps.

#2 Diesel
Heavy mineral oil

System Performance Standard of n-alkanes

ENISO9377-2-2 — **1 x 1 mL**
50 µg/mL each in Hexane — 16 comps.

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

ISO/DIS 9377-4 Standard Mixture Stock Solution

TPH-006-10X — **1 x 1 mL**
TPH-006-10X-PAK — ***SAVE*** **5 x 1 mL**
5000 µg/mL each in Cyclohexane — 2 comps.

#2 Diesel
Mineral oil

UST (LUFT/LUST)

According to the USEPA there are approximately 4,000 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 one third of all Americans. Other health and environmental risks, including the potential for fire and explosion also exist.

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

UST (Underground Storage Tank)

Leaking Underground Fuel Tank (LUFT)
Leaking Underground Storage Tank (LUST)

UST CONTENTS

Multi-State Method Hydrocarbon Window Defining

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

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

Technical Note

This Hydrocarbon window defining standard with the C_8 to C_{40} odd and even alkanes should meet the numerous state-to-state variations for hydrocarbon validation and reporting. Many LUFT/LUST programs require the use of the C_{17} (Pristane) and C_{18} (Phytane) ratio to estimate subsurface degradation of fuel oil spills. These compounds are included in the formulation.

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_2Cl_2 — 12 comps.

n-Decane	*n*-Eicosane	*n*-Octadecane
n-Dodecane	*n*-Hexacosane	*n*-Tetracosane
n-Docosane	*n*-Hexadecane	*n*-Tetradecane
n-Dotriacontane	*n*-Octacosane	*n*-Triacontane

Surrogate Standards

DRO-AK-102-SS-10X — **1 x 1 mL**
DRO-AK-102-SS-10X-PAK — ***SAVE*** **5 x 1 mL**
2.0 mg/mL in Acetone

o-Terphenyl

Retention Time Verification Standard

DRO-ORO-AZ-8015-RTV — **1 x 1 mL**
DRO-ORO-AZ-8015-RTV-PAK — ***SAVE*** **5 x 1 mL**
1000 µg/mL each in CH_2Cl_2 — 3 comps.

n-Decane	*n*-Dotriacontane
n-Docosane	

Stock Calibration Standard

DRO-ORO-AZ-8015-SCS — **1 x 1 mL**
DRO-ORO-AZ-8015-SCS-PAK — ***SAVE*** **5 x 1 mL**
10,000 µg/mL each in CH_2Cl_2 — 2 comps.

#2 Diesel — SAE 10W30 Motor Oil

California — 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	Toluene	*m*-Xylene
Ethylbenzene	*o*-Xylene	*p*-Xylene
MtBE		

LA County Well Investigation & Monitoring Program

Purgeable Aromatics - Gasoline ID

M-602-GAS-10X — **1 x 1 mL**
M-602-GAS-10X-PAK — ***SAVE*** **5 x 1 mL**
2.0 mg/mL each in MeOH — 11 comps.

Benzene	1,4-Dichlorobenzene	*p*-Xylene
Chlorobenzene	Ethylbenzene	*m*-Xylene
1,2-Dichlorobenzene	Toluene	MtBE
1,3-Dichlorobenzene	*o*-Xylene	

Oxygenate Gasoline Additive Standard

OGAD-001 — **1 x 1 mL**
OGAD-001-PAK — ***SAVE*** **5 x 1 mL**
At stated conc. (µg/mL) in MeOH — 5 comps.

MtBE	2000	TAME	2000
EtBE	2000	*t*-Butanol	10000
Isopropyl ether	2000		

Ethanol

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

Methanol

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

Method 1004 Carbonyl Compounds as DNPH Derivatives by HPLC

M-1004 — **1 x 1 mL**
At stated conc. (µg/mL) in AcCN — 13 comps.

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

Acetaldehyde-DNPH	15.3	Formaldehyde-DNPH	21.0
Acetone-DNPH	12.3	Hexanal-DNPH	8.4
Acrolein-DNPH	12.7	Methacrolein-DNPH	10.7
Benzaldehyde-DNPH	8.1	Propionaldehyde-DNPH	12.3
2-Butanone-DNPH *(MEK)*	10.5	*m*-Tolualdehyde-DNPH	7.5
n-Butyraldehyde-DNPH	10.5	Valeraldehyde-DNPH	9.3
Crotonaldehyde-DNPH	10.7		

CAR-DNPH — **1 x 1 mL**
At stated conc. (µg/mL) in AcCN — 7 comps.

Acetaldehyde-DNPH	1000	Butyraldehyde-DNPH	500
Acetone-DNPH	500	Formaldehyde-DNPH	1500
Acrolein-DNPH	500	Propionaldehyde-DNPH	500
Benzaldehyde-DNPH	500		

Reference Gas Oil Sample

RGS-001 — **1 x 1 mL**

Hydrocarbon Mixture *(boiling point range 250-850°F)*

Technical Note

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

UST (LUFT/LUST)
CT / MS / NJ / PA / TN / WI Methods

Connecticut — Extractable TPHs

CT ETPH Alkane Standard
DRH-009S — 1 x 1 mL
DRH-009S-PAK — *SAVE* 5 x 1 mL
1000 µg/mL each in CH_2Cl_2 — 15 comps.

n-Nonane	*n*-Octadecane	*n*-Octacosane
n-Decane	*n*-Eicosane	*n*-Triacontane
n-Dodecane	*n*-Docosane	*n*-Dotriacontane
n-Tetradecane	*n*-Tetracosane	*n*-Tetratriacontane
n-Hexadecane	*n*-Hexacosane	*n*-Hexatriacontane

Internal Standard
GRH-IS — 1 x 1 mL
GRH-IS-PAK — *SAVE* 5 x 1 mL
1.0 mg/mL in CH_2Cl_2

5-alpha Androstane

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)*

Mississippi — Method

DRO Defining Mix
DRO-AK-102-NAS-10X — 1 x 1 mL
DRO-AK-102-NAS-10X-PAK — *SAVE* 5 x 1 mL
2.0 mg/mL each in CH_2Cl_2 — 16 comps.

n-Decane	*n*-Hexadecane	*n*-Heneicosane
n-Undecane	*n*-Heptadecane	*n*-Docosane
n-Dodecane	*n*-Octadecane	*n*-Tricosane
n-Tridecane	*n*-Nonadecane	*n*-Tetracosane
n-Tetradecane	*n*-Eicosane	*n*-Pentacosane
n-Pentadecane		

New Jersey — Method

DEP (NJ) Aliphatic Hydrocarbon Standard
DRH-NJ-001S — 1 x 1 mL
1.0 mg/mL each in Hexane — 20 comps.

n-Nonane	*n*-Heneicosane	*n*-Tetratriacontane
n-Decane	*n*-Docosane	*n*-Hexatriacontane
n-Dodecane	*n*-Tetracosane	*n*-Octatriacontane
n-Tetradecane	*n*-Hexacosane	*n*-Tetracontane
n-Hexadecane	*n*-Octacosane	Naphthalene
n-Octadecane	*n*-Triacontane	2-Methylnaphthalene
n-Eicosane	*n*-Dotriacontane	

DEP (NJ) Aromatic Hydrocarbon Standard
DRH-NJ-002S — 1 x 1 mL
2.0 mg/mL each in CH_2Cl_2 — 18 comps.

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

Pennsylvania — Storage Tank Site Closure & Monitoring

PA Extractable PAH Standard
DRH-PA-001 — 1 x 1 mL
DRH-PA-001-PAK — *SAVE* 5 x 1 mL
2000 µg/mL each in CH_2Cl_2 — 5 comps.

Benz[a]anthracene	Fluorene	Phenanthrene
Benz[a]pyrene	Naphthalene	

PA Volatile Petroleum Standard
GRH-PA-001 — 1 x 1 mL
GRH-PA-001-PAK — *SAVE* 5 x 1 mL
At stated conc. (µg/mL) in MeOH — 9 comps.

Benzene	1000	*o*-Xylene	1000
Ethylbenzene	1000	*m*-Xylene	1000
MtBE	2000	*p*-Xylene	1000
Naphthalene	1000	Isopropylbenzene	1000
Toluene	1000		

Tennessee — Method

DRO Defining Mix
DRO-AK-102-NAS-10X — 1 x 1 mL
DRO-AK-102-NAS-10X-PAK — *SAVE* 5 x 1 mL
2.0 mg/mL each in CH_2Cl_2 — 16 comps.

n-Decane	*n*-Hexadecane	*n*-Heneicosane
n-Undecane	*n*-Heptadecane	*n*-Docosane
n-Dodecane	*n*-Octadecane	*n*-Tricosane
n-Tridecane	*n*-Nonadecane	*n*-Tetracosane
n-Tetradecane	*n*-Eicosane	*n*-Pentacosane
n-Pentadecane		

Wisconsin — Method

Wisconsin DNR - Gasoline Range Hydrocarbons
GRH-003S — 1 x 1 mL
GRH-003S-PAK — *SAVE* 5 x 1 mL
2.0 mg/mL each in MeOH — 10 comps.

Benzene	Toluene	*o*-Xylene
Ethylbenzene	1,2,4-Trimethylbenzene	*m*-Xylene
MtBE	1,3,5-Trimethylbenzene	*p*-Xylene
Naphthalene		

Save 20% **on a pack of 5**

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

Normal Alkane Standard - GRO Defining Mix

GRO-AK-101-NAS-10X — 1 x 1 mL
GRO-AK-101-NAS-10X-PAK — *SAVE* 5 x 1 mL
2.0 mg/mL each in MeOH — 5 comps.

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

Laboratory Control Standard

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

Gasoline-Regular, unleaded

Internal Standard

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

1-Chloro-4-fluorobenzene

Surrogate Control Standard

GRO-AK-101-SS — 1 x 1 mL
GRO-AK-101-SS-PAK — *SAVE* 5 x 1 mL
50 µg/mL each in MeOH — 2 comps.

GRO-AK-101-SS-10X — 1 x 1 mL
GRO-AK-101-SS-10X-PAK — *SAVE* 5 x 1 mL
500 µg/mL each in MeOH — 2 comps.

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

p-Bromofluorobenzene	a,a,a-Trifluorotoluene

Certified BTEX in Unleaded Gasoline

GA-001-20X-BTEX — 1 x 1 mL
10.0 mg/mL in MeOH

Gasoline-Regular, unleaded

includes certified concentration of:

Benzene	Toluene	*o*-Xylene
Ethylbenzene	*m,p*-Xylene	

Certified BTEX in Gasoline Composite (Multi Source)

GRO-AK-101-GCS-BTEX — 1 x 1 mL
At stated conc. (mg/mL) in MeOH — 3 comps.

Gasoline-Premium, unleaded	1.66
Gasoline-Regular, leaded	1.67
Gasoline-Regular, unleaded	1.67

Gasoline Calibration Composite Mix

GRO-AK-101-GCS — 1 x 1 mL
GRO-AK-101-GCS-PAK — *SAVE* 5 x 1 mL
At stated conc. (mg/mL) in MeOH — 3 comps.

Gasoline-Premium, unleaded	1.66
Gasoline-Regular, leaded	1.67
Gasoline-Regular, unleaded	1.67

Gasoline Calibration Mix Version

GRO-AK-101-GSC-R1 — 1 x 1 mL
GRO-AK-101-GSC-R1-PAK — *SAVE* 5 x 1 mL
Equal Wt.% — 3 comps.

Gasoline-Regular, unleaded
Gasoline-Plus, unleaded
Gasoline-Premium, unleaded

Alaska — Method 101AA Determination of Aromatic & Aliphatic Hydrocarbons in GRO

AK101AA Aromatics Mix

GRO-AK-101AA-ARO — 1 x 1 mL
GRO-AK-101AA-ARO-PAK — *SAVE* 5 x 1 mL
2000 µg/mL each in MeOH — 14 comps.

Benzene	*o*-Xylene	*m*-Ethyltoluene
Toluene	1,2,3-Trimethylbenzene	*p*-Ethyltoluene
Ethylbenzene	1,2,4-Trimethylbenzene	*o*-Ethyltoluene
m-Xylene	1,3,5-Trimethylbenzene	*n*-Propylbenzene
p-Xylene	Isopropylbenzene	

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

Laboratory Control Standard

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

#2 Diesel (Conventional)

Normal Alkane Standard - DRO Defining Mix

DRO-AK-102-NAS-10X — **1 x 1 mL**
DRO-AK-102-NAS-10X-PAK — ***SAVE*** **5 x 1 mL**
2.0 mg/mL each in CH_2Cl_2 — 16 comps.

n-Decane	*n*-Hexadecane	*n*-Heneicosane
n-Undecane	*n*-Heptadecane	*n*-Docosane
n-Dodecane	*n*-Octadecane	*n*-Tricosane
n-Tridecane	*n*-Nonadecane	*n*-Tetracosane
n-Tetradecane	*n*-Eicosane	*n*-Pentacosane
n-Pentadecane		

Surrogate Standards

DRO-AK-102-SS — **1 x 1 mL**
DRO-AK-102-SS-PAK — ***SAVE*** **5 x 1 mL**
200 µg/mL in Acetone

DRO-AK-102-SS-10X — **1 x 1 mL**
DRO-AK-102-SS-10X-PAK — ***SAVE*** **5 x 1 mL**
2.0 mg/mL in Acetone

o-Terphenyl

Internal Standard

DRO-AK-102-IS — **1 x 1 mL**
DRO-AK-102-IS-PAK — ***SAVE*** **5 x 1 mL**
1.0 mg/mL in CH_2Cl_2

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**
2000 µg/mL each in CH_2Cl_2 — 10 comps.

n-Undecane	*n*-Tetracosane	Fluorene
n-Pentadecane	Naphthalene	Pyrene
n-Heptadecane	Acenaphthene	Anthracene
n-Octadecane		

Residual Composite Mixtures

RRO-AK-103-RCS — **1 x 1 mL**
RRO-AK-103-RCS-PAK — ***SAVE*** **5 x 1 mL**
At stated conc. (mg/mL) in CH_2Cl_2 — 3 comps.

SAE 30W Motor oil	1.66
SAE 40W Motor oil	1.67
SAE 50W Motor Oil	1.67

RRO-AK-103-RCS-10X — **1 x 1 mL**
RRO-AK-103-RCS-10X-PAK — ***SAVE*** **5 x 1 mL**
At stated conc. (mg/mL) in CH_2Cl_2 — 3 comps.

SAE 30W Motor oil	16.6
SAE 40W Motor oil	16.7
SAE 50W Motor Oil	16.7

Surrogate Standard

DRO-AK-102-103AA-SS — **1 x 1 mL**
DRO-AK-102-103AA-SS-PAK — ***SAVE*** **5 x 1 mL**
1000 *µg/mL each in CH_2Cl_2* — 3 comps.

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

Retention Time Marker Standard

DRO-AK-102-103AA-RT — **1 x 1 mL**
DRO-AK-102-103AA-RT-PAK — ***SAVE*** **5 x 1 mL**
50 *µg/mL each in CH_2Cl_2* — 3 comps.

n-Decane	*n*-Hexatriacontane
n-Pentacosane	

Laboratory Control Standard

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

RRO-AK-103-LCS-5X — **1 x 1 mL**
RRO-AK-103-LCS-5X-PAK — ***SAVE*** **5 x 1 mL**
25.0 mg/mL in Acetone:CH_2Cl_2 (50:50)

SAE 40W Motor oil

Surrogate Control Standard

RRO-AK-103-SS — **1 x 1 mL**
RRO-AK-103-SS-PAK — ***SAVE*** **5 x 1 mL**
500 µg/mL in Acetone:THF (90:10)

RRO-AK-103-SS2 — **1 x 1 mL**
RRO-AK-103-SS2-PAK — ***SAVE*** **5 x 1 mL**
5.0 mg/mL in THF:Acetone (75:25)

n-Triacontane-d_{62}

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

Residual Standard

RRO-AK-103AA — **1 x 1 mL**
RRO-AK-103AA-PAK — ***SAVE*** **5 x 1 mL**
2000 µg/mL each in CH_2Cl_2 — 9 comps.

n-Hexacosane	Benzo[b]fluoranthene
n-Octacosane	Benz[a]pyrene
n-Triacontane	Benzo[g,h,i]perylene
n-Dotriacontane	Dibenz[a,h]anthracene
n-Tetratriacontane	

Surrogate Standard

DRO-AK-102-103AA-SS — **1 x 1 mL**
DRO-AK-102-103AA-SS-PAK — ***SAVE*** **5 x 1 mL**
1000 *µg/mL each in CH_2Cl_2* — 3 comps.

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

Retention Time Marker Standard

DRO-AK-102-103AA-RT — **1 x 1 mL**
DRO-AK-102-103AA-RT-PAK — ***SAVE*** **5 x 1 mL**
50 *µg/mL each in CH_2Cl_2* — 3 comps.

n-Decane	*n*-Hexatriacontane
n-Pentacosane	

Florida | **Total Recoverable Petroleum Hydrocarbon (FTRPH) Standard and Surrogates**

Calibration / Window Defining Hydrocarbon

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.

n-Octane	(C_8)	*n*-Hexacosane	(C_{26})
n-Decane	(C_{10})	*n*-Octacosane	(C_{28})
n-Dodecane	(C_{12})	*n*-Triacontane	(C_{30})
n-Tetradecane	(C_{14})	*n*-Dotriacontane	(C_{32})
n-Hexadecane	(C_{16})	*n*-Tetratriacontane	(C_{34})
n-Octadecane	(C_{18})	*n*-Hexatricontane	(C_{36})
n-Eicosane	(C_{20})	*n*-Octatriacontane	(C_{38})
n-Docosane	(C_{22})	*n*-Tetracontane	(C_{40})
n-Tetracosane	(C_{24})		

Technical Note

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

Internal Standard

GRH-IS — **1 x 1 mL**
GRH-IS-PAK — ***SAVE*** **5 x 1 mL**
1.0 mg/mL in CH_2Cl_2

GRH-IS-10X — **1 x 1 mL**
10 mg/mL in CH_2Cl_2

5-alpha Androstane

Surrogate Standards

DRH-SS — **1 x 1 mL**
DRH-SS-PAK — ***SAVE*** **5 x 1 mL**
5.0 mg/mL in THF

n-Triacontane-d_{62}

GRH-SS — **1 x 1 mL**
GRH-SS-PAK — ***SAVE*** **5 x 1 mL**
2.0 mg/mL in Acetone

o-Terphenyl (OTP)

FTRPH Calibration / Window Defining

DRH-FTRPH — **1 x 1 mL**
DRH-FTRPH-PAK — ***SAVE*** **5 x 1 mL**
500 µg/mL each in Hexane — 17 comps.

DRH-FTRPH-0.1X — **1 x 1 mL**
50 µg/mL each in Hexane — 17 comps.

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

FTRPH Surrogate Standard

DRH-FL-SS-3X — **1 x 1 mL**
DRH-FL-SS-3X-PAK — ***SAVE*** **5 x 1 mL**
3.0 mg/mL in Carbon disulfide

DRH-FL-SS — **1 x 1 mL**
DRH-FL-SS-PAK — ***SAVE*** **5 x 1 mL**
1.0 mg/mL in Carbon disulfide

n-Nonatriacontane

FTRPH Combined Surrogate Standard

DRH-GRH-FL-SS — **1 x 1 mL**
DRH-GRH-FL-SS-PAK — ***SAVE*** **5 x 1 mL**
5.0 mg/mL each in Carbon disulfide — 2 comps.

n-Nonatriacontane — *o*-Terphenyl *(OTP)*

DRH-GRH-FL-SS-R2 — **1 x 1 mL**
DRH-GRH-FL-SS-R2-PAK — ***SAVE*** **5 x 1 mL**
At stated conc.(µg/mL) in Carbon disulfide — 2 comps.

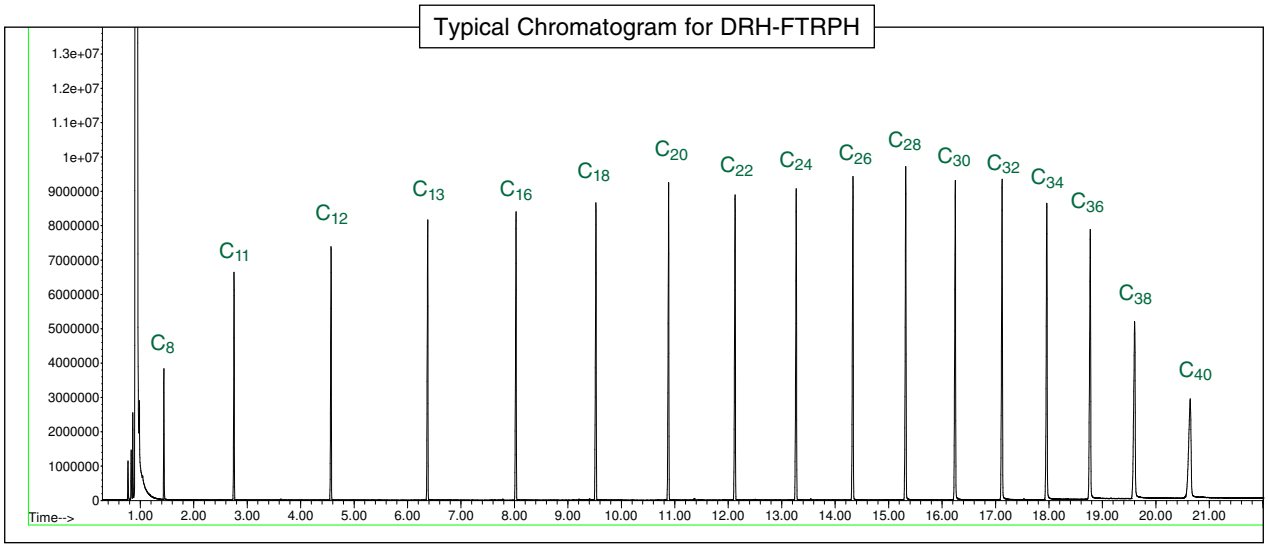
n-Nonatriacontane	6000	*o*-Terphenyl *(OTP)*	1500

Technical Note

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

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

Typical Chromatogram for DRH-FTRPH



Massachusetts | **Determination of Extractable Petroleum Hydrocarbons (EPH)**

Aromatic Hydrocarbons Calibration Set

DRH-006-CAL-SET — **5 x 1 mL**

At stated conc. (µg/mL) in CH_2Cl_2 — 18 comps.

Components	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
Benz[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

DRH-007-CAL-R1-SET — **5 x 1 mL**

At stated conc. (µg/mL) in CH_2Cl_2:n-Hexane (50:50) — 15 comps.

Components	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 — ***SAVE*** **5 x 1 mL**

25 µg/mL each in Hexane:CH_2Cl_2 (95:5) — 31 comps.

Acenaphthene	*n*-Docosane	Naphthalene
Acenaphthylene	*n*-Dodecane	*n*-Nonadecane
Anthracene	*n*-Eicosane	*n*-Nonane
Benz[a]anthracene	Fluoranthene	*n*-Octacosane
Benz[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 *each* in Hexane	**1 x 10 mL**
DRH-MA-FSS-50X	2.0 mg/mL *each* in Hexane	**1 x 1 mL**
DRH-MA-FSS-50X-PAK	2.0 mg/mL *each* in Hexane	***SAVE*** **5 x 1 mL**
		2 comps.

2-Fluorobiphenyl — 2-Bromonaphthalene

Aromatic Surrogate

DRH-006-SS — **1 x 1 mL**

DRH-006-SS-PAK — ***SAVE*** **5 x 1 mL**

1.0 mg/mL in CH_2Cl_2

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_2Cl_2 — 17 comps.

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

Technical Note

Two high concentration EPH stocks for laboratories that prepare in-house working level solutions and Ready-to-Use working level aromatic and aliphatic calibration sets are 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_2Cl_2 : Hexane (50:50) — 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 — **1 x 1 mL**

20 µg/mL each in Acetone — 2 comps.

DRH-MA-SS-10X — **1 x 1 mL**

200 µg/mL each in Acetone — 2 comps.

DRH-MA-SS-100X — **1 x 1 mL**

DRH-MA-SS-100X-PAK — ***SAVE*** **5 x 1 mL**

2,000 µg/mL each in Acetone — 2 comps.

1-Chlorooctadecane — *o*-Terphenyl

EPH Matrix Spike

DRH-MA-MS — **1 x 1 mL**

DRH-MA-MS-PAK — ***SAVE*** **5 x 1 mL**

25 µg/mL each in Acetone — 10 comps.

DRH-MA-MS-10X — **1 x 1 mL**

DRH-MA-MS-10X-PAK — ***SAVE*** **5 x 1 mL**

250 µg/mL each in Acetone — 10 comps.

DRH-MA-MS-40X — **1 x 1 mL**

DRH-MA-MS-40X-PAK — ***SAVE*** **5 x 1 mL**

1,000 µg/mL each in Acetone — 10 comps.

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

Internal Standard

GRH-IS — **1 x 1 mL**

GRH-IS-PAK — ***SAVE*** **5 x 1 mL**

1,000 µg/mL in CH_2Cl_2

GRH-IS-10X — **1 x 1 mL**

10.0 mg/mL in CH_2Cl_2

5-alpha Androstane

Massachusetts | **Determination of Volatile Petroleum Hydrocarbons (VPH)**

Stock Concentrate

Volatile Petroleum Hydrocarbon Mix

GRH-004S-10X — **1 x 1 mL**
GRH-004S-10X-PAK — ***SAVE*** **5 x 1 mL**
At stated conc. (mg/mL) in MeOH — 13 comps.

Benzene	5.0	*n*-Pentane	10.0
Ethylbenzene	5.0	Toluene	15.0
Isooctane	15.0	1,2,4-Trimethylbenzene	10.0
2-Methylpentane	15.0	*o*-Xylene	10.0
MtBE	15.0	*m*-Xylene	10.0
Naphthalene	10.0	*p*-Xylene	10.0
n-Nonane	10.0		

DEP (MA) - VPH Surrogate Standard

GRH-004-SS — **1 x 1 mL**
GRH-004-SS-PAK — ***SAVE*** **5 x 1 mL**
50 µg/mL in MeOH

GRH-004-SS-10X — **1 x 1 mL**
GRH-004-SS-10X-PAK — ***SAVE*** **5 x 1 mL**
500 µg/mL in MeOH

GRH-004-SS-100X — **1 x 1 mL**
GRH-004-SS-100X-PAK — ***SAVE*** **5 x 1 mL**
5,000 µg/mL in MeOH

2,5-Dibromotoluene

MA VPH Matrix Spike Mix with Surrogate

GRH-004-MS-SS — **1 x 1 mL**
50 µg/mL each in MeOH — 14 comps.

Benzene	2-Methylpentane	Toluene
n-Butylcyclohexane	MtBE	1,2,4-Trimethylbenzene
n-Decane	Naphthalene	Isooctane
2,5-Dibromotoluene	*n*-Nonane	*m*-Xylene
Ethylbenzene	*n*-Pentane	

VPH Matrix Spike

GRH-004-MS — **1 x 1 mL**
GRH-004-MS-PAK — ***SAVE*** **5 x 1 mL**
50 µg/mL each in MeOH

GRH-004-MS-10X — **1 x 1 mL**
GRH-004-MS-10X-PAK — ***SAVE*** **5 x 1 mL**
500 µg/mL each in MeOH

GRH-004-MS-100X — **1 x 1 mL**
GRH-004-MS-100X-PAK — ***SAVE*** **5 x 1 mL**
5,000 µg/mL each in MeOH — 8 comps.

Benzene	Naphthalene	*m*-Xylene
Ethylbenzene	Toluene	*p*-Xylene
MtBE	*o*-Xylene	

Certified BTEX in Unleaded Gasoline

GA-001-20X-BTEX — **1 x 1 mL**
10.0 mg/mL in MeOH

Gasoline-Regular, unleaded

includes certified concentration of:

Benzene	Toluene	*o*-Xylene
Ethylbenzene	*m,p*-Xylene	

Volatile Petroleum Hydrocarbons without Surrogate

GRH-004S-R1-10X — **1 x 1 mL**
At stated conc. (mg/mL) in MeOH — 15 comps.

Benzene	5.0	Toluene	15.0
Ethylbenzene	5.0	1,2,4-Trimethylbenzene	10.0
Isooctane	15.0	*o*-Xylene	10.0
2-Methylpentane	15.0	*m*-Xylene	10.0
MtBE	15.0	*p*-Xylene	10.0
Naphthalene	10.0	*n*-Butylcyclohexane	10.0
n-Nonane	10.0	*n*-Decane	10.0
n-Pentane	10.0		

GRH-004S-R2 — **1 x 1 mL**
10 mg/mL each in MeOH — 15 comps.

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

Volatile Petroleum Hydrocarbons with Surrogate

GRH-004S-SS — **1 x 1 mL**
GRH-004S-SS-PAK — ***SAVE*** **5 x 1 mL**
At stated conc. (µg/mL) in MeOH — 14 comps.

Benzene	500	*n*-Nonane	1,000
2,5-Dibromotoluene (Surrogate)	1,000	*n*-Pentane	1,000
Ethylbenzene	500	Toluene	1,500
Isooctane	1,500	1,2,4-Trimethylbenzene	1,000
2-Methylpentane	1,500	*o*-Xylene	1,000
MtBE	1,500	*m*-Xylene	1,000
Naphthalene	1,000	*p*-Xylene	1,000

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

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

GRH-004S-SS-R2 — **1 x 1 mL**
10.0 mg/mL each in MeOH — 16 comps.

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

Texas | **Method 1005 & 1006 Petroleum Storage Tanks (PST)**

Stock Hydrocarbon Calibration Standard

DRH-TX-001-10X — **1 x 1 mL**
DRH-TX-001-10X-PAK — ***SAVE*** **5 x 1 mL**
2000 µg/mL each in n-Pentane — 12 comps.

n-Hexane	*n*-Tetradecane	*n*-Docosane
n-Octane	*n*-Hexadecane	*n*-Tetracosane
n-Decane	*n*-Octadecane	*n*-Hexacosane
n-Dodecane	*n*-Eicosane	*n*-Octacosane

Gasoline / Diesel Calibration Curve Set

DRH-TX-002-D-SET — **8 x 1 mL**
At stated conc. (µg/mL) in CH_2Cl_2 — 2 comps.

Components	.01X	.04X	.1X	.20X	.40X	1X	2X	10X
Gasoline-Regular (unleaded)	5	20	50	100	200	500	1000	5000
#2 Diesel Fuel	5	20	50	100	200	500	1000	5000

Each set contains 8 concentrations:

Gasoline/Diesel Continuing Calibration Standard

DRH-TX-002-D-0.4X-10ML — **1 x 10 mL**
200 µg/mL each in CH_2Cl_2 — 2 comps.

Gasoline-Regular, unleaded — #2 Diesel Fuel

Gasoline/Diesel Calibration/Matrix Spike Standard

DRH-TX-002-10X — **1 x 1 mL**
DRH-TX-002-10X-PAK — ***SAVE*** **5 x 1 mL**
5000 µg/mL each in MeOH — 2 comps.

Gasoline-Regular, unleaded — #2 Diesel Fuel

Stock Gasoline/Diesel Calibration Standard

DRH-TX-002-D-40X — **1 x 1 mL**
DRH-TX-002-D-40X-PAK — ***SAVE*** **5 x 1 mL**
20,000 µg/mL each in CH_2Cl_2 — 2 comps.

Gasoline-Regular, unleaded — #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.

Components	.04X	.2X	0.5X	1X	1.5X	2X	10X	20X
Gasoline-Regular (unleaded)	20	100	250	500	750	1000	5000	10,000
#2 Diesel Fuel	20	100	250	500	750	1000	5000	10,000

Each set contains 8 concentrations:

Gasoline and Diesel Standard

DRH-TX-003-20X — **1 x 5 mL**
DRH-TX-003-20X-PAK — ***SAVE*** **5 x 5 mL**
10,000 µg/mL each in Pentane — 2 comps.

Gasoline-Regular, unleaded — #2 Diesel Fuel

Surrogate Standard

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

1-Chlorooctadecane — 1-Chlorooctane

Carbon Number Distribution Maker

DRH-TX-003-CNM — **1 x 1 mL**
DRH-TX-003-CNM-PAK — ***SAVE*** **5 x 1 mL**
2000 µg/mL each in Pentane — 9 comps.

n-Decane	*n*-Heptane	*n*-Octacosane
n-Dodecane	*n*-Hexadecane	*n*-Octane
n-Heneicosane	*n*-Hexane	*n*-Pentatriacontane

Aromatic Fractionation Check Standard

DRH-TX-003-FCS — **1 x 10 mL**
DRH-TX-003-FCS-PAK — ***SAVE*** **5 x 10 mL**
20 µg/mL each in Pentane — 24 comps.

Acenaphthene	Benz[e]pyrene	Naphthalene
Acenaphthylene	Benzo[g,h,i]perylene	Phenanthrene
Anthracene	Chrysene	Pyrene
Benzene	Dibenz[a,h]anthracene	Toluene
Benz[a]anthracene	Ethylbenzene	1,2,3-Trimethylbenzene
Benzo[b]fluoranthene	Fluoranthene	*m*-Xylene
Benzo[k]fluoranthene	Fluorene	*p*-Xylene
Benz[a]pyrene	Indeno[1,2,3-cd]pyrene	*o*-Xylene

Washington | **Determination of Volatile Petroleum Hydrocarbons (VPH)**

VPH Standard

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

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

VPH Primary Dilution Standard with Surrogate

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

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

Stock Concentrate VPH Standards

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

VPH-WA-100X — **1 x 1 mL**
VPH-WA-100X-PAK — ***SAVE*** **5 x 1 mL**
20.0 mg/mL each in MeOH — 15 comps.

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

Certified BTEX in Unleaded Gasoline

GA-001-20X-BTEX — **1 x 1 mL**
10.0 mg/mL in MeOH

Gasoline-Regular, unleaded

includes certified concentration of:

Benzene	Toluene	*o*-Xylene
Ethylbenzene	*m,p*-Xylene	

Certified BTEX in Gasoline Composite (Multi Source)

GRO-AK-101-GCS-BTEX — **1 x 1 mL**
At stated conc. (mg/mL) in MeOH — 3 comps.

Gasoline-Premium, unleaded	1.66
Gasoline-Regular, leaded	1.67
Gasoline-Regular, unleaded	1.67

VPH Matrix Spike

VPH-WA-MS — **1 x 1 mL**
VPH-WA-MS-PAK — ***SAVE*** **5 x 1 mL**
At stated conc. (µg/mL) in MeOH — 11 comps.

Benzene	60	Toluene	60
Ethylbenzene	60	1,2,3-Trimethylbenzene	60
MtBE	180	*m*-Xylene	60
Naphthalene	360	*p*-Xylene	60
n-Nonane	200	*o*-Xylene	60
n-Pentane	600		

VPH Surrogate Standard

GRH-004-SS — **1 x 1 mL**
GRH-004-SS-PAK — ***SAVE*** **5 x 1 mL**
50 µg/mL in MeOH

GRH-004-SS-10X — **1 x 1 mL**
GRH-004-SS-10X-PAK — ***SAVE*** **5 x 1 mL**
500 µg/mL in MeOH

GRH-004-SS-100X — **1 x 1 mL**
GRH-004-SS-100X-PAK — ***SAVE*** **5 x 1 mL**
5,000 µg/mL in MeOH

2,5-Dibromotoluene

VPH Retention Time Marker

VPH-WA-RT — **1 x 1 mL**
VPH-WA-RT-PAK — ***SAVE*** **5 x 1 mL**
2,000 µg/mL each in MeOH — 6 comps.

n-Pentane	*n*-Octane	*n*-Dodecane
n-Hexane	*n*-Decane	*n*-Tridecane

1,2,3-Trimethylbenzene Standard

V-028S-D-10X — **1 x 1 mL**
V-028S-D-10X-PAK — ***SAVE*** **5 x 1 mL**
1000 µg/mL each in CH_2Cl_2

1,2,3-Trimethylbenzene

Washington | **Determination of Extractable Petroleum Hydrocarbons (EPH)**

EPH Aromatic/PAH Standard

EPH-WA-10X — **1 x 1 mL**
EPH-WA-10X-PAK — ***SAVE*** **5 x 1 mL**
1.0 mg/mL each in CH_2Cl_2 — 18 comps.

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

Internal Standard

GRH-IS — **1 x 1 mL**
GRH-IS-PAK — ***SAVE*** **5 x 1 mL**
1000 µg/mL in CH_2Cl_2

GRH-IS-10X — **1 x 1 mL**
10.0 mg/mL in CH_2Cl_2

5-alpha Androstane

EPH Surrogate Spike

DRH-MA-SS — **1 x 1 mL**
20 µg/mL each in Acetone — 2 comps.

DRH-MA-SS-10X — **1 x 1 mL**
200 µg/mL each in Acetone — 2 comps.

DRH-MA-SS-100X — **1 x 1 mL**
DRH-MA-SS-100X-PAK — ***SAVE*** **5 x 1 mL**
2,000 µg/mL each in Acetone — 2 comps.

1-Chlorooctadecane	*o*-Terphenyl

EPH Matrix Spike

EPH-WA-MS2-20ML — **1 x 20 mL**
EPH-WA-MS2-20ML-PAK — ***SAVE*** **5 x 20 mL**
25 µg/mL each in Acetone — 10 comps.

Acenaphthene	*n*-Decane	*n*-Heneicosane
Anthracene	*n*-Dodecane	Naphthalene
Benzo[g,h,i]perylene	*n*-Hexadecane	Pyrene
Benz[a]pyrene		

EPH Aliphatic Check Mix

EPH-WA-ALI — **1 x 1 mL**
EPH-WA-ALI-PAK — ***SAVE*** **5 x 1 mL**
1.0 mg/mL each in CH_2Cl_2 — 5 comps.

n-Octane	*n*-Dodecane	*n*-Heneicosane
n-Decane	*n*-Hexadecane	

EPH Aromatic Check Mix

EPH-WA-ARO — **1 x 1 mL**
EPH-WA-ARO-PAK — ***SAVE*** **5 x 1 mL**
1.0 mg/mL each in CH_2Cl_2 — 5 comps.

Acenaphthene	Naphthalene	1,2,3-Trimethylbenzene
Benzo[g,h,i]perylene	Pyrene	

Revised EPH Aliphatic Check Mix

EPH-WA-ALI-R1 — **1 x 1 mL**
EPH-WA-ALI-R1-PAK — ***SAVE*** **5 x 1 mL**
1.0 mg/mL each in CH_2Cl_2 — 6 comps.

n-Octane	*n*-Dodecane	*n*-Heneicosane
n-Decane	*n*-Hexadecane	*n*-Tetratriacontane

EPH Fractionation Check Standard

EPH-WA-FCS — **1 x 1 mL**
EPH-WA-FCS-PAK — ***SAVE*** **5 x 1 mL**
25 µg/mL each in Hexane — 24 comps.

Acenaphthene	Chrysene	Pyrene
Acenaphthylene	Dibenz[a,h]anthracene	*n*-Decane
Anthracene	Fluoranthene	*n*-Dodecane
Benz[a]anthracene	Fluorene	*n*-Tetradecane
Benz[a]pyrene	Indeno[1,2,3-cd]pyrene	*n*-Hexadecane
Benzo[b]fluoranthene	2-Methylnaphthalene	*n*-Octadecane
Benzo[g,h,i]perylene	Naphthalene	*n*-Eicosane
Benzo[k]fluoranthene	Phenanthrene	*n*-Heneicosane

Revised EPH Fractionation Check Standard

EPH-WA-FCS-R1 — **1 x 1 mL**
EPH-WA-FCS-R1-PAK — ***SAVE*** **5 x 1 mL**
25 µg/mL each in Hexane — 23 comps

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

1,2,3-Trimethylbenzene Standard

V-028S-D-10X — **1 x 1 mL**
V-028S-D-10X-PAK — ***SAVE*** **5 x 1 mL**
1000 µg/mL each in CH_2Cl_2

1,2,3-Trimethylbenzene

Revised EPH Aromatic Check Mix

EPH-WA-ARO-R1 — **1 x 1 mL**
EPH-WA-ARO-R1-PAK — ***SAVE*** **5 x 1 mL**
1.0 mg/mL each in CH_2Cl_2 — 6 comps.

Acenaphthene	Naphthalene	1,2,3-Trimethylbenzene
Benzo[g,h,i]perylene	Pyrene	Toluene

Aliphatic Surrogate

DRH-007-SS — **1 x 1 mL**
DRH-007-SS-PAK — ***SAVE*** **5 x 1 mL**
1.0 mg/mL in Hexane

1-Chlorooctadecane

Aromatic Surrogate

DRH-006-SS — **1 x 1 mL**
DRH-006-SS-PAK — ***SAVE*** **5 x 1 mL**
1.0 mg/mL in CH_2Cl_2

o-Terphenyl

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. (mg/mL) in MeOH — 10 comps.

	GRH-002S	GRH-002-10X
2-Methylpentane	1.5	15
2,2,4-Trimethylpentane	1.5	15
n-Heptane	0.5	5
Benzene	0.5	5
Toluene	1.5	15
Ethylbenzene	0.5	5
m-Xylene	1.0	10
p-Xylene	1.0	10
o-Xylene	1.0	10
1,2,4-Trimethylbenzene	1.0	10

Internal Standard

GARH-IS — **1 x 1 mL**
1.0 mg/mL in CH_2Cl_2

1-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 — ***SAVE*** **5 x 1 mL**
0.2 mg/mL each in MeOH — 4 comps.

Dibromomethane	1,2-Dichloroethane
1,2-Dibromoethane	MtBE

Certified BTEX in Unleaded Gasoline

GA-001-20X-BTEX — **1 x 1 mL**
10.0 mg/mL in MeOH

Gasoline-Regular, unleaded

includes certified concentration of:

Benzene	Toluene	*o*-Xylene
Ethylbenzene	*m,p*-Xylene	

Hexadecane Extraction Volatiles

CLP-BTEX — **1 x 1 mL**
CLP-BTEX-PAK — ***SAVE*** **5 x 1 mL**
0.2 mg/mL each in MeOH — 6 comps.

CLP-BTEX-10X — **1 x 1 mL**
CLP-BTEX-10X-PAK — ***SAVE*** **5 x 1 mL**
2.0 mg/mL each in MeOH — 6 comps.

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 — ***SAVE*** **5 x 1 mL**
2.0 mg/mL each in MeOH — 7 comps.

Benzene	Toluene	*m*-Xylene
Ethylbenzene	*o*-Xylene	*p*-Xylene
MtBE		

LA County Well Investigation & Monitoring Program
Purgeable Aromatics - Gasoline ID

M-602-GAS-10X — **1 x 1 mL**
M-602-GAS-10X-PAK — **5 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 — ***SAVE*** **5 x 1 mL**
At stated conc. (µg/mL) in MeOH — 5 comps.

MtBE	2000	TAME	2000
EtBE	2000	*t*-Butanol	10000
Isopropyl ether	2000		

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 — ***SAVE*** **5 x 1 mL**
1.0 mg/mL each in MeOH — 10 comps.

Benzene	1,2,4-Trimethylbenzene
Ethylbenzene	2,2,4-Trimethylpentane
n-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 — ***SAVE*** **5 x 1 mL**
2.0 mg/mL each in MeOH — 10 comps.

Benzene	1,2,4-Trimethylbenzene
Ethylbenzene	1,3,5-Trimethylbenzene
MtBE	*o*-Xylene
Naphthalene	*m*-Xylene
Toluene	*p*-Xylene

UST (LUFT/LUST)
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_2Cl_2 : Hexane (50:50) — 10 comps.

DRH-001S-10X — **1 x 1 mL**
2.0 mg/mL each in CH_2Cl_2 : Hexane (50:50) — 10 comps.

n-Decane (C_{10})	*n*-Octadecane (C_{18})	*n*-Tetracosane (C_{24})
n-Dodecane (C_{12})	*n*-Eicosane (C_{20})	*n*-Hexacosane (C_{26})
n-Tetradecane (C_{14})	*n*-Docosane (C_{22})	*n*-Octacosane (C_{28})
n-Hexadecane (C_{16})		

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_2Cl_2

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.

n-Octane (C_8)	*n*-Eicosane (C_{20})	*n*-Dotriacontane (C_{32})
n-Decane (C_{10})	*n*-Docosane (C_{22})	*n*-Tetratriacontane (C_{34})
n-Dodecane (C_{12})	*n*-Tetracosane (C_{24})	*n*-Hexatriacontane (C_{36})
n-Tetradecane (C_{14})	*n*-Hexacosane (C_{26})	*n*-Octatriacontane (C_{38})
n-Hexadecane (C_{16})	*n*-Octacosane (C_{28})	*n*-Tetracontane ((C_{40})
n-Octadecane (C_{18})	*n*-Triacontane (C_{30})	

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_{62}

D2887 Calibration Solution

Calibration Solution

DRH-002S — **1 x 1 mL**
At stated conc. (µg/mL) in Carbon disulfide — 17 comps.

n-Hexane	600	*n*-Dodecane	1,200	*n*-Octacosane	100
n-Heptane	600	*n*-Tetradecane	1,200	*n*-Dotriacontane	100
n-Octane	800	*n*-Hexadecane	1,000	*n*-Hexatriacontane	100
n-Nonane	800	*n*-Octadecane	500	*n*-Tetracontane	100
n-Decane	1,200	*n*-Eicosane	200	*n*-Tetratetracontane	100
n-Undecane	1,200	*n*-Tetracosane	200		

Column Test Mixture

D-2887 — **1 x 1 mL**
10 mg/mL each 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_{10})	*n*-Tetradecane (C_{14})	*n*-Octadecane (C_{18})
n-Undecane (C_{11})	*n*-Pentadecane (C_{15})	*n*-Nonadecane (C_{19})
n-Dodecane (C_{12})	*n*-Hexadecane (C_{16})	*n*-Eicosane (C_{20})
n-Tridecane (C_{13})	*n*-Heptadecane (C_{17})	

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 µg/mL each in Chloroform — 35 comps.

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

Technical Note

We offer a hydrocarbon window defining standard with the C_8 - C_{40} 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_{17} / Pristane and C_{18} / Phytane ratio be used to estimate subsurface degradation of fuel oil spills.

Also available, a fuel oil degradation mix containing just 4 required analytes to determine the C_{17} / Pristane and C_{18} / Phytane ratio (DRH-005S-10X)

Fuel Oil Degradation/Retention Time Mixture for Quantification of C_{17}/Pristane & C_{18}/Phytane Ratios

DRH-005S-10X — **1 x 1 mL**
2.0 mg/mL each in CH_2Cl_2 : CS_2 (50:50) — 4 comps.

n-Heptadecane	Phytane	Pristane
n-Octadecane		

Hydrocarbon Window Defining Standard Sets

DRH-FTRPH-SET — **2 x 1 mL**
500 µg/mL each in Hexane

DRH-FTRPH-SET-PAK — ***SAVE*** **5 x (2 x 1 mL)**
DRH-FTRPH, DRH-FTRPH2

FTRPH Calibration/Window Defining Standard

DRH-FTRPH — **1 x 1 mL**
DRH-FTRPH-PAK — ***SAVE*** **5 x 1 mL**
500 µg/mL each in Hexane — 17 comps.

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

Hydrocarbon Window Defining Standard

DRH-FTRPH2 — **1 x 1 mL**
DRH-FTRPH2-PAK — ***SAVE*** **5 x 1 mL**
500 µg/mL each in Hexane — 18 comps.

n-Nonane	Phytane	*n*-Nonacosane
n-Undecane	*n*-Nonadecane	*n*-Hentriacontane
n-Tridecane	*n*-Heneicosane	*n*-Tritriacontane
n-Pentadecane	*n*-Tricosane	*n*-Pentatriacontane
n-Heptadecane	*n*-Pentacosane	*n*-Heptatriacontane
Pristane	*n*-Heptacosane	*n*-Nonatriacontane

Weathered LUFT/LUST Fuel Sets

The weathered fuel mimics the weathering, evaporation, and migration process. These standards can assist 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 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-W50-10X	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_2Cl_2		4 x 1 mL
Kerosene	FU-005-D-10X	1 mL
Kerosene (25% Weathered)	FK-W25-10X	1 mL
Kerosene (50% Weathered)	FK-W50-10X	1 mL
Kerosene (75% Weathered)	FK-W75-10X	1 mL

Weathered #2 Diesel (extra Low Sulfur Content) Set

WFD2-SET Each in 5.0 mg/mL in CH_2Cl_2		4 x 1 mL
#2 Diesel (Extra Low Sulfur)	FU-017-D-10X	1 mL
#2 Diesel (Extra Low Sulfur) (25% Weathered)	FD2-W25-10X	1 mL
#2 Diesel (Extra Low Sulfur) (50% Weathered)	FD2-W50-10X	1 mL
#2 Diesel (Extra Low Sulfur) (75% Weathered)	FD2-W75-10X	1 mL

Weathered #2 Diesel (Conventional) Set

WFD2-R1-SET Each in 5.0 mg/mL in CH_2Cl_2		4 x 1 mL
#2 Diesel (Conventional)	FU-009-D-10X	1 mL
#2 Diesel (Conventional) (25% Weathered)	FD2-W25-R1-10X	1 mL
#2 Diesel (Conventional) (50% Weathered)	FD2-W50-R1-10X	1 mL
#2 Diesel (Conventional) (75% Weathered)	FD2-W75-R1-10X	1 mL

Technical Note

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

Most analytical methods for petroleum products focus on several items: the level of BTEX, the total petroleum hydrocarbon number (TPH), and the fingerprint of the petroleum product. Depending on the volatility of the petroleum product, the nature of the contaminated soil, and the age of the spill, analysis can be 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.

Custom Formulations

Custom CRMs are a fast and economical way to meet your specific laboratory needs. We have decades of experience to formulate stable, reliable, and quality custom standards.

Talk to one of our Quotation Specialists

Oil, Grease, TPH, Fracking Fluids
Method 413.2 / 418.1, 1664, & 8440 and EU 528/2012

Method 413.2 & 418.1 — TPH Analysis by IR

Oil, Grease & Petroleum Hydrocarbon Concentrates Mix

M-418-CON — **1 x 1 mL**
At stated Vol.% — 3 comps.

Chlorobenzene	25.0	*n*-Hexadecane	37.5
Isooctane	37.5		

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

M-418 — **1 x 1 mL**
M-418-PAK — ***SAVE*** **5 x 1 mL**
At stated conc. (mg/mL) in Freon 113 — 3 comps.

Chlorobenzene	1.05	Isooctane	1.55
n-Hexadecane	1.55		

Method 1664 — Oil, Grease & TPH Determination

Precision and Recovery (PAR) Spiking Solution

M-1664-5ML — **1 x 5 mL**
M-1664-5ML-PAK — ***SAVE*** **5 x 5 mL**
4.0 mg/mL each in Acetone

M-1664-20ML — **1 x 20 mL**
M-1664-20ML-PAK — ***SAVE*** **5 x 20 mL**
4.0 mg/mL each in Acetone — 2 comps.

n-Hexadecane	Stearic acid

Silica Gel Hexane Extraction Material

SGT-HEM — **1 x 1 mL**
20 µg/mL each in Acetone — 2 comps.

Stearic acid	*n*-Hexadecane

Technical Note

Precison 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.

Method 8440 — Total Petroleum Hydrocarbon Analysis

Total Recoverable Petroleum Hydrocarbon Mix

M-8440 — **1 x 1 mL**
M-8440-PAK — ***SAVE*** **5 x 1 mL**
At stated Wt.%. in Tetrachloroethene — 3 comps.

Chlorobenzene	0.10	Isooctane	0.15
n-Hexadecane	0.15		

Silica Gel Cleanup Calibration Solution

M-8440-SGC — **1 x 1 mL**
M-8440-SGC-PAK — ***SAVE*** **5 x 1 mL**
10.0 mg/mL in Tetrachloroethene

Corn Oil

Total Petroleum Hydrocarbon Concentrate Mix

M-8440-CON — **1 x 1 mL**
M-8440-CON-PAK — ***SAVE*** **5 x 1 mL**
At stated Vol.% — 3 comps.

Chlorobenzene	25.0	Isooctane	37.5
n-Hexadecane	37.5		

Retention Time Standard

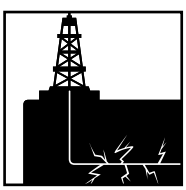
DRH-010S — **1 x 1 mL**
DRH-010S-PAK — ***SAVE*** **5 x 1 mL**
25 µg/mL each in CH_2Cl_2 — 7 comps.

n-Hexane	*n*-Tetracosane	*n*-Triacontane
n-Decane	*n*-Octacosane	*n*-Tetracontane
n-Dodecane		

Technical Note

A sample showing peaks in the C_6-C_{10} range generally indicates a gasoline spill. Samples with the peaks in the C_{12}-C_{24} range are indicative of a diesel spill while samples with the higher carbon numbers above C_{24} are typically oils or lubricants. Once the initial screen is complete, more detailed work can be done to further identify the contaminant.

EU 528/2012 — Biocides in Fracking Fluids



The underground gas and petroleum production enhancement process of fracking has generated much attention. There is concern about potential short and long-term adverse health effects and environmental contamination associated with the process. Biocides are important fracking fluid additives used to kill microbes that might produce corrosive acids or form well-clogging biofilms. Since biocides are inherently toxic, there is a growing concern over the environmental fate and impact on groundwater contamination.

These biocides are part of our 217 biocide product line that was developed for the EU Biocides Regulation 528/2012. This legislation classifies biocides into 22 product types grouped into four main areas.

Compound	CAS	Cat. No.	Unit
Glutaraldehyde Solution (~50% Water)	111-30-8	FRACK-001N	1 mL
2,2-Dibromo-2-cyanoacetamide	10222-01-2	FRACK-002N	100 mg
Tetrakis(hydroxymethyl)phosphonium sulfate	55566-30-8	FRACK-003N	100 mg
Didecyldimethylammonium chloride	7173-51-5	FRACK-004N-10MG	10 mg
Tributyltetradecylphosphonium chloride	81741-28-8	FRACK-005N	100 mg
2-Methyl-2H-isothiazol-3-one	2682-20-4	FRACK-006N-10MG	10 mg
Dazomet	533-74-4	FRACK-007N-10MG	10 mg
2-Bromo-2-nitropropane-1,3-diol	52-51-7	FRACK-009N-25MG	25 mg
N-Bromosuccinimide	128-08-5	FRACK-011N	100 mg

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. 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.

- Single & Multi Element Standards
- Prepared Calibration Curves
- Formulated from Ultra High Purity Organometallic starting materials & matrices
- Certificate of Analysis

Wear Metal Products are NOT on our ISO scope of accreditation.

WEAR METALS CONTENTS

Single Element Wear Metals

	1,000 µg/g in 75 cSt base oil		5,000 µg/g in 75 cSt base oil	
Element	**Cat. No.**	**Unit**	**Cat. No.**	**Unit**
Aluminum (Al)	WM-75CST-01	50 grams	WM-75CST-01-5X	50 grams
Antimony (Sb)	WM-75CST-02	50 grams	WM-75CST-02-5X	50 grams
Arsenic (As)	WM-75CST-03	50 grams	----------	----
Barium (Ba)	WM-75CST-04	50 grams	WM-75CST-04-5X	50 grams
Beryllium (Be)	WM-75CST-05	50 grams	----------	----
Bismuth (Bi)	WM-75CST-06	50 grams	----------	----
Boron (B)	WM-75CST-07	50 grams	WM-75CST-07-5X	50 grams
Cadmium (Cd)	WM-75CST-08	50 grams	WM-75CST-08-5X	50 grams
Calcium (Ca)	WM-75CST-09	50 grams	WM-75CST-09-5X	50 grams
Cerium (Ce)	WM-75CST-11	50 grams	WM-75CST-11-5X	50 grams
Chromium (Cr)	WM-75CST-13	50 grams	WM-75CST-13-5X	50 grams
Cobalt (Co)	WM-75CST-14	50 grams	WM-75CST-14-5X	50 grams
Copper (Cu)	WM-75CST-15	50 grams	WM-75CST-15-5X	50 grams
Indium (In)	WM-75CST-25	50 grams	WM-75CST-25-5X	50 grams
Iron (Fe)	WM-75CST-27	50 grams	WM-75CST-27-5X	50 grams
Lanthanum (La)	----------	----	WM-75CST-28-5X	50 grams
Lead (Pb)	WM-75CST-29	50 grams	WM-75CST-29-5X	50 grams
Lithium (Li)	WM-75CST-30	50 grams	WM-75CST-30-5X	50 grams
Magnesium (Mg)	WM-75CST-32	50 grams	WM-75CST-32-5X	50 grams
Manganese (Mn)	WM-75CST-33	50 grams	WM-75CST-33-5X	50 grams
Mercury (Hg)	WM-75CST-34	50 grams	----------	----
Molybdenum (Mo)	WM-75CST-35	50 grams	WM-75CST-35-5X	50 grams
Nickel (Ni)	WM-75CST-37	50 grams	WM-75CST-37-5X	50 grams
Phosphorus (P)	WM-75CST-41	50 grams	WM-75CST-41-5X	50 grams
Potassium (K)	WM-75CST-43	50 grams	WM-75CST-43-5X	50 grams
Scandium (Sc)	WM-75CST-50	50 grams	----------	----
Selenium (Se)	WM-75CST-51	50 grams	----------	----
Silicon (Si)	WM-75CST-52	50 grams	WM-75CST-52-5X	50 grams
Silver (Ag)	WM-75CST-53	50 grams	WM-75CST-53-5X	50 grams
Sodium (Na)	WM-75CST-54	50 grams	WM-75CST-54-5X	50 grams
Strontium (Sr)	WM-75CST-55	50 grams	WM-75CST-55-5X	50 grams
Sulfur (S)	WM-75CST-56	50 grams	WM-75CST-56-5X	50 grams
Thallium (Tl)	WM-75CST-60	50 grams	----------	----
Tin (Sn)	WM-75CST-63	50 grams	WM-75CST-63-5X	50 grams
Titanium (Ti)	WM-75CST-64	50 grams	WM-75CST-64-5X	50 grams
Tungsten (W)	WM-75CST-65	50 grams	WM-75CST-65-5X	50 grams
Vanadium (V)	WM-75CST-67	50 grams	WM-75CST-67-5X	50 grams
Yttrium (Y)	WM-75CST-69	50 grams	WM-75CST-69-5X	50 grams
Zinc (Zn)	WM-75CST-70	50 grams	WM-75CST-70-5X	50 grams
Zirconium (Zn)	WM-75CST-71	50 grams	WM-75CST-71-5X	50 grams

See our Table of Contents for complete list of Organometallic standards containing < 1 ppm sulfur or phosphorus.

Matrix Oil and Stabilizer

75 cSt Oil
MOSOL-75 — **500 mL**

Stabilizer
WM-STAB — **1 x 50 grams**

Technical Note
Used to improve the stability of Organo-metallic Standards when diluting into solvents such as Kerosene. Add 0.6% by weight.

Metals Additives

MA-900-100G	**100 grams**
MA-900-200G	**200 grams**
900 µg/g in 75 cSt in Base oil	5 comps.
MA-1000-100G	**100 grams**
MA-1000-200G	**200 grams**
1000 µg/g in 75 cSt in Base oil	5 comps.
MA-3000-100G	**100 grams**
MA-3000-200G	**200 grams**
3000 µg/g in 75 cSt in Base oil	5 comps.
MA-5000-100G	**100 grams**
MA-5000-200G	**200 grams**
5000 µg/g in 75 cSt in Base oil	5 comps.

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

Wear Metals
AA, ICP, DCP & XRF Analysis

21 Wear Metal Multi-Element

100 gram Set	**WM-21-100G-SET**	**7 x 100 grams**
200 gram Set	**WM-21-200G-SET**	**7 x 200 grams**

21 Wear Metals in 75 cSt base oil at the stated concentration

Conc.	Cat. No.	Unit
10 µg/g	WM-21-1X-100G	100 grams
	WM-21-1X-200G	200 grams
30 µg/g	WM-21-3X-100G	100 grams
	WM-21-3X-200G	200 grams
50 µg/g	WM-21-5X-100G	100 grams
	WM-21-5X-200G	200 grams
100 µg/g	WM-21-10X-100G	100 grams
	WM-21-10X-200G	200 grams
300 µg/g	WM-21-30X-100G	100 grams
	WM-21-30X-200G	200 grams
500 µg/g	WM-21-50X-100G	100 grams
	WM-21-50X-200G	200 grams
900 µg/g	WM-21-90X-100G	100 grams
	WM-21-90X-200G	200 grams

Silver (Ag)
Aluminum (Al)
Boron (B)
Barium (Ba)
Calcium (Ca)
Cadmium (Cd)
Chromium (Cr)
Copper (Cu)
Iron (Fe)
Magnesium (Mg)
Manganese (Mn)
Molybdenum (Mo)
Sodium (Na)
Nickel (Ni)
Phosphorus (P)
Lead (Pb)
Silicon (Si)
Tin (Sn)
Titanium (Ti)
Vanadium (V)
Zinc (Zn)

22 Wear Metal Multi-Element

100 gram Set	**WM-22-100G-SET**	**7 x 100 grams**
200 gram Set	**WM-22-200G-SET**	**7 x 200 grams**

21 Wear Metals plus Potassium (K) in 75 cSt base oil at the stated concentration

Conc.	Cat. No.	Unit
10 µg/g	WM-22-1X-100G	100 grams
	WM-22-1X-200G	200 grams
30 µg/g	WM-22-3X-100G	100 grams
	WM-22-3X-200G	200 grams
50 µg/g	WM-22-5X-100G	100 grams
	WM-22-5X-200G	200 grams
100 µg/g	WM-22-10X-100G	100 grams
	WM-22-10X-200G	200 grams
300 µg/g	WM-22-30X-100G	100 grams
	WM-22-30X-200G	200 grams
500 µg/g	WM-22-50X-100G	100 grams
	WM-22-50X-200G	200 grams
900 µg/g	WM-22-90X-100G	100 grams
	WM-22-90X-200G	200 grams

Silver (Ag)
Aluminum (Al)
Boron (B)
Barium (Ba)
Calcium (Ca)
Cadmium (Cd)
Chromium (Cr)
Copper (Cu)
Iron (Fe)
Potassium (K)
Magnesium (Mg)
Manganese (Mn)
Molybdenum (Mo)
Sodium (Na)
Nickel (Ni)
Phosphorus (P)
Lead (Pb)
Silicon (Si)
Tin (Sn)
Titanium (Ti)
Vanadium (V)
Zinc (Zn)

23 Wear Metal Multi-Element

100 gram Set	**WM-23-100G-SET**	**7 x 100 grams**
200 gram Set	**WM-23-200G-SET**	**7 x 200 grams**

21 Wear Metals plus Potassium (K) and Antimony (Sb) in 75 cSt base oil at the stated concentration

Conc.	Cat. No.	Unit
10 µg/g	WM-23-1X-100G	100 grams
	WM-23-1X-200G	200 grams
30 µg/g	WM-23-3X-100G	100 grams
	WM-23-3X-200G	200 grams
50 µg/g	WM-23-5X-100G	100 grams
	WM-23-5X-200G	200 grams
100 µg/g	WM-23-10X-100G	100 grams
	WM-23-10X-200G	200 grams
300 µg/g	WM-23-30X-100G	100 grams
	WM-23-30X-200G	200 grams
500 µg/g	WM-23-50X-100G	100 grams
	WM-23-50X-200G	200 grams
900 µg/g	WM-23-90X-100G	100 grams
	WM-23-90X-200G	200 grams

Silver (Ag)
Aluminum (Al)
Boron (B)
Barium (Ba)
Calcium (Ca)
Cadmium (Cd)
Chromium (Cr)
Copper (Cu)
Iron (Fe)
Potassium (K)
Magnesium (Mg)
Manganese (Mn)
Molybdenum (Mo)
Sodium (Na)
Nickel (Ni)
Phosphorus (P)
Lead (Pb)
Antimony (Sb)
Silicon (Si)
Tin (Sn)
Titanium (Ti)
Vanadium (V)
Zinc (Zn)

Wear Metals
AA, ICP, DCP & XRF Analysis

Organometallic Single Element Stock (Premium Sulfur-Free)

	1,000 µg/g		5,000 µg/g	
Element	**Cat. No.**	**Unit**	**Cat. No.**	**Unit**
Aluminum (Al)	WM-NMS-01	50 mL	WM-NMS-01-5X	50 mL
Antimony (Sb)	WM-NMS-02	50 mL	WM-NMS-02-5X	50 mL
Arsenic (As)	WM-NMS-03	50 mL	WM-NMS-03-5X	50 mL
Barium (Ba)	WM-NMS-04	50 mL	WM-NMS-04-5X	50 mL
Beryllium (Be)	WM-NMS-05	50 mL	WM-NMS-05-5X	50 mL
Cadmium (Cd)	WM-NMS-08	50 mL	WM-NMS-08-5X	50 mL
Calcium (Ca)	WM-NMS-09	50 mL	WM-NMS-09-5X	50 mL
Cerium (Ce)	WM-NMS-11	50 mL	WM-NMS-11-5X	50 mL
Chromium (Cr)	WM-NMS-13	50 mL	WM-NMS-13-5X	50 mL
Cobalt (Co)	WM-NMS-14	50 mL	WM-NMS-14-5X	50 mL
Copper (Cu)	WM-NMS-15	50 mL	WM-NMS-15-5X	50 mL
Gold (Au)	WM-NMS-22	50 mL	----------	----
Iron (Fe)	WM-NMS-27	50 mL	WM-NMS-27-5X	50 mL
Lead (Pb)	WM-NMS-29	50 mL	WM-NMS-29-5X	50 mL
Lithium (Li)	WM-NMS-30	50 mL	WM-NMS-30-5X	50 mL
Magnesium (Mg)	WM-NMS-32	50 mL	WM-NMS-32-5X	50 mL
Manganese (Mn)	WM-NMS-33	50 mL	WM-NMS-33-5X	50 mL
Mercury (Hg)	WM-NMS-34	50 mL	WM-NMS-34-5X	50 mL
Molybdenum (Mo)	WM-NMS-35	50 mL	WM-NMS-35-5X	50 mL
Palladium (Pd)	WM-NMS-40	50 mL	WM-NMS-40-5X	50 mL
Phosphorus (P)	WM-NMS-41	50 mL	WM-NMS-41-5X	50 mL
Platinum (Pt)	WM-NMS-42	50 mL	WM-NMS-42-5X	50 mL
Potassium (K)	WM-NMS-43	50 mL	WM-NMS-43-5X	50 mL
Selenium (Se)	WM-NMS-51	50 mL	WM-NMS-51-5X	50 mL
Silicon (Si)	WM-NMS-52	50 mL	WM-NMS-52-5X	50 mL
Silver (Ag)	WM-NMS-53	50 mL	WM-NMS-53-5X	50 mL
Sodium (Na)	WM-NMS-54	50 mL	WM-NMS-54-5X	50 mL
Strontium (Sr)	WM-NMS-55	50 mL	WM-NMS-55-5X	50 mL
Thallium (Tl)	WM-NMS-60	50 mL	WM-NMS-60-5X	50 mL
Tin (Sn)	WM-NMS-63	50 mL	WM-NMS-63-5X	50 mL
Titanium (Ti)	WM-NMS-64	50 mL	WM-NMS-64-5X	50 mL
Vanadium (V)	WM-NMS-67	50 mL	WM-NMS-67-5X	50 mL
Yttrium (Y)	WM-NMS-69	50 mL	WM-NMS-69-5X	50 mL
Zinc (Zn)	WM-NMS-70	50 mL	WM-NMS-70-5X	50 mL
Zirconium (Zr)	WM-NMS-71	50 mL	WM-NMS-71-5X	50 mL

Premium Sulfur-Free

Sulfur below detection limits for most element

No Metallic Sulfonates

Stabilized

Ready-to-Use

All elements are provided in mineral oil except for Mercury, Palladium and Platinum which are provided in xylene.

Technical Note

Sulfur below detection limits for most elements. Sulfur content otherwise noted on certificate. For use with X-ray fluorescence (XRF), plasma emission (ICP or DCP), rotating disk (RDE), or atomic absorption (AA) spectroscopy. May be blended together to prepare multi-element standards. Solutions are stabilized with proprietary chelation and stabilization solution and are ready for use.

21 Wear Metal Multi-Element (Premium Sulfur-Free)

Conc.	Cat. No.	Unit
10 µg/g	WM-21-NMS-1X-1	100 mL
30 µg/g	WM-21-NMS-3X-1	100 mL
50 µg/g	WM-21-NMS-5X-1	100 mL
100 µg/g	WM-21-NMS-10X-1	100 mL
300 µg/g	WM-21-NMS-30X-1	100 mL
500 µg/g	WM-21-NMS-50X-1	100 mL
900 µg/g	WM-21-NMS-90X-1	100 mL
100 mL Set	**WM-21-NMS-1-SET**	**7 x 100 mL**

21 Wear Metal in Mineral oil at the stated concentration

Silver (Ag)	Copper (Cu)	Phosphorus (P)
Aluminum (Al)	Iron (Fe)	Lead (Pb)
Boron (B)	Magnesium (Mg)	Silicon (Si)
Barium (Ba)	Manganese (Mn)	Tin (Sn)
Calcium (Ca)	Molybdenum (Mo)	Titanium (Ti)
Cadmium (Cd)	Sodium (Na)	Vanadium (V)
Chromium (Cr)	Nickel (Ni)	Zinc (Zn)

Suitable for ASTM D4628, D4927, D4951, D5056, D5185, D6443, D6481

Technical Note

For analysis by XRF, AA, ICP or AE for applications for which sulfur interference is undesirable. Prepared with sulfur-free organometallics that do not contain metallic sulfonates. Solutions are stabilized with proprietary chelation and stabilization solution and are ready for use. Additional stabilizers may be required in some cases. For additional information contact Technical Service.

Recommended Internal Standard

Organometallic (Internal Standard)

WM-NMS-14	1000 µg/g	50 mL
WM-NMS-14-5X	5000 µg/g	50 mL

Cobalt (Sulfur-free)

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

Trace Metals Standard
D-3605-91-R1-1 — **1 x 100 mL**

250 µg/mL each in 75 cSt Hydrocarbon oil — 4 comps.

Sodium (Na)	Calcium (Ca)
Lead (Pb)	Vanadium (V)

ASTM D5708 & D5863 — Sulfur and Metals in Oil

Test Method A - ICP with an Organic Solvent Specimen Solution

Sulfur and Metals in Mineral Oil
ASTM-P-0102-SET — **12 x 100 mL**

Cat. No.	S (Wt. %)	Fe (µg/g)	Ni (µg/g)	V (µg/g)	Unit
ASTM-P-0102-01	0.00	0.00	0.00	0.00	100 mL
ASTM-P-0102-02	0.50	300	10.0	500	100 mL
ASTM-P-0102-03	1.00	500	100	25.0	100 mL
ASTM-P-0102-04	0.00	100	80.0	250	100 mL
ASTM-P-0102-05	2.00	200	40.0	100	100 mL
ASTM-P-0102-06	2.50	400	5.00	400	100 mL
ASTM-P-0102-07	3.00	0.00	60.0	300	100 mL
ASTM-P-0102-08	3.50	500	0.00	200	100 mL
ASTM-P-0102-09	0.00	100	100	0.00	100 mL
ASTM-P-0102-10	4.50	300	50.0	250	100 mL
ASTM-P-0102-11	5.00	200	20.0	500	100 mL
ASTM-P-0102-12	5.50	50.0	100	50.0	100 mL

Sulfur and Metals in Residual Fuel Oil
ASTM-P-0103-SET — **12 x 100 mL**

Cat. No.	S (Wt. %)	Fe (µg/g)	Ni (µg/g)	V (µg/g)	Unit
ASTM-P-0103-01	0.00	0.00	0.00	0.00	100 mL
ASTM-P-0103-02	0.50	300	10.0	500	100 mL
ASTM-P-0103-03	1.00	500	100	25.0	100 mL
ASTM-P-0103-04	0.00	100	80.0	250	100 mL
ASTM-P-0103-05	2.00	200	40.0	100	100 mL
ASTM-P-0103-06	2.50	400	5.00	400	100 mL
ASTM-P-0103-07	3.00	0.00	60.0	300	100 mL
ASTM-P-0103-08	3.50	500	0.00	200	100 mL
ASTM-P-0103-09	0.00	100	100	0.00	100 mL
ASTM-P-0103-10	4.50	300	50.0	250	100 mL
ASTM-P-0103-11	5.00	200	20.0	500	100 mL
ASTM-P-0103-12	5.50	50	100	50.0	100 mL

Stock Multi-Element Standard in Mineral Oil
D-5863-95B-10X-1 — **100 mL**

At stated conc. (µg/g) in 20 cst Mineral Oil — 3 comps.

Sodium (Na)	50	Vanadium (V)	150
Nickel (Ni)	200		

Stock Multi-Element Standard in Mineral Oil
D-5863-00A-10X-1 — **100 mL**

At stated conc. (µg/g) in 20 cst Mineral Oil — 3 comps.

Nickel (Na)	100	Iron (Fe)	10
Vanadium (V)	500	Sodium (Na)	20

ISO/CD 14597 — Vanadium and Nickel Standards with Manganese (Internal Standard)

Vanadium Standards - Low Range for ISO/CD 14597 with 0.05% Manganese Internal Standard in Xylene-Mineral Oil
ASTM-P-0104-SET — **9 x 100 mL**

Cat. No.	Vanadium Conc. (Wt.%)	Unit
ASTM-P-0104-01	0.0005	100 mL
ASTM-P-0104-02	0.0025	100 mL
ASTM-P-0104-03	0.0050	100 mL
ASTM-P-0104-04	0.0075	100 mL
ASTM-P-0104-05	0.0100	100 mL
ASTM-P-0104-06	0.0125	100 mL
ASTM-P-0104-07	0.0150	100 mL
ASTM-P-0104-08	0.0175	100 mL
ASTM-P-0104-09	0.0200	100 mL

Vanadium Standards - High Range for ISO/CD 14597 with 0.05% Manganese Internal Standard in Xylene-Mineral Oil
ASTM-P-0105-SET — **7 x 100 mL**

Cat. No.	Vanadium Conc. (Wt.%)	Unit
ASTM-P-0105-01	0.0000	100 mL
ASTM-P-0105-02	0.0300	100 mL
ASTM-P-0105-03	0.0400	100 mL
ASTM-P-0105-04	0.0500	100 mL
ASTM-P-0105-05	0.0600	100 mL
ASTM-P-0105-06	0.0800	100 mL
ASTM-P-0105-07	0.1000	100 mL

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
ASTM-P-0106-SET — **7 x 100 mL**

Cat. No.	Nickel Conc. (Wt.%)	Unit
ASTM-P-0106-01	0.0000	100 mL
ASTM-P-0106-02	0.0005	100 mL
ASTM-P-0106-03	0.0010	100 mL
ASTM-P-0106-04	0.0025	100 mL
ASTM-P-0106-05	0.0050	100 mL
ASTM-P-0106-06	0.0075	100 mL
ASTM-P-0106-07	0.0100	100 mL

Technical Note

Concentrations for the sets on pages 61-64 are targets. Actual production lots may vary.

ASTM D4628, D4927, D4951, D6443 — Lubricating Oil Calibration Curve

ASTM-P-0118-SET — 10 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-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

ASTM D4927, D6443, D6481 — Lubricating Oil Calibration Curve

ASTM-P-0108-SET — 17 x 100 mL

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

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

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	0.000	0.000	0.000	0.000	0.000
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	0.600	0.100	0.005	0.175	0.060

ASTM-P-0113-SET — 17 x 100 mL

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	0.000	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

ASTM D4927, D6443, D6481 — Lubricating Oil Calibration Curve (continued)

ASTM-P-0114-SET — 17 x 100 mL

Cat. No. Nominal Value	Ca (Wt.%)	P (Wt.%)	S (Wt.%)	Zn (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. Nominal Value	Ca (Wt.%)	Mg (Wt.%)	P (Wt.%)	S (Wt.%)	Zn (Wt.%)
ASTM-P-0115-01	0.005	0.100	0.005	0.050	0.050
ASTM-P-0115-02	0.600	0.150	0.000	0.000	0.000
ASTM-P-0115-03	0.000	0.350	0.300	0.000	0.000
ASTM-P-0115-04	1.000	0.225	0.000	1.000	0.000
ASTM-P-0115-05	0.000	0.450	0.000	0.000	0.300
ASTM-P-0115-06	0.005	0.500	0.250	0.800	0.300
ASTM-P-0115-07	0.500	0.325	0.150	0.500	0.150
ASTM-P-0115-08	0.010	0.250	0.200	0.100	0.250
ASTM-P-0115-09	0.050	0.050	0.010	0.400	0.075
ASTM-P-0115-10	0.100	0.400	0.150	0.200	0.200
ASTM-P-0115-11	0.200	0.300	0.200	0.800	0.100
ASTM-P-0115-12	0.400	0.200	0.005	0.800	0.300
ASTM-P-0115-13	0.600	0.375	0.100	0.500	0.050
ASTM-P-0115-14	0.800	0.175	0.010	0.050	0.100
ASTM-P-0115-15	1.000	0.425	0.300	1.000	0.150
ASTM-P-0115-16	0.400	0.275	0.050	0.600	0.250
ASTM-P-0115-17	0.000	0.000	0.000	0.000	0.000

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

ASTM D4927, D6443, D6481, D7751 — Lubricating Oil Calibration Curve

ASTM-P-0119-SET — 22 x 100 mL

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

ASTM D6443 Lubricating Oil Calibration Curve

ASTM-P-0117-SET — **10 x 100 mL**

Cat. No. / Nominal Value	Ca (Wt.%)	Cl (Wt.%)	Cu (Wt.%)	Mg (Wt.%)	P (Wt.%)	S (Wt.%)	Zn (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 D6481 Lubricating Oil Calibration Curve

ASTM-P-0116-SET — **11 x 100 mL**

Cat. No. / Nominal Value	Ca (Wt.%)	P (Wt.%)	S (Wt.%)	Zn (Wt.%)
ASTM-P-0116-01	0.500	1.000	0.500	0.500
ASTM-P-0116-02	2.000	1.000	2.500	2.000
ASTM-P-0116-03	2.000	1.250	1.000	1.500
ASTM-P-0116-04	5.000	0.000	0.000	0.000
ASTM-P-0116-05	4.000	0.500	1.250	0.500
ASTM-P-0116-06	2.500	0.750	4.000	1.000
ASTM-P-0116-07	3.500	0.000	1.500	1.000
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

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

Catalog Number Index

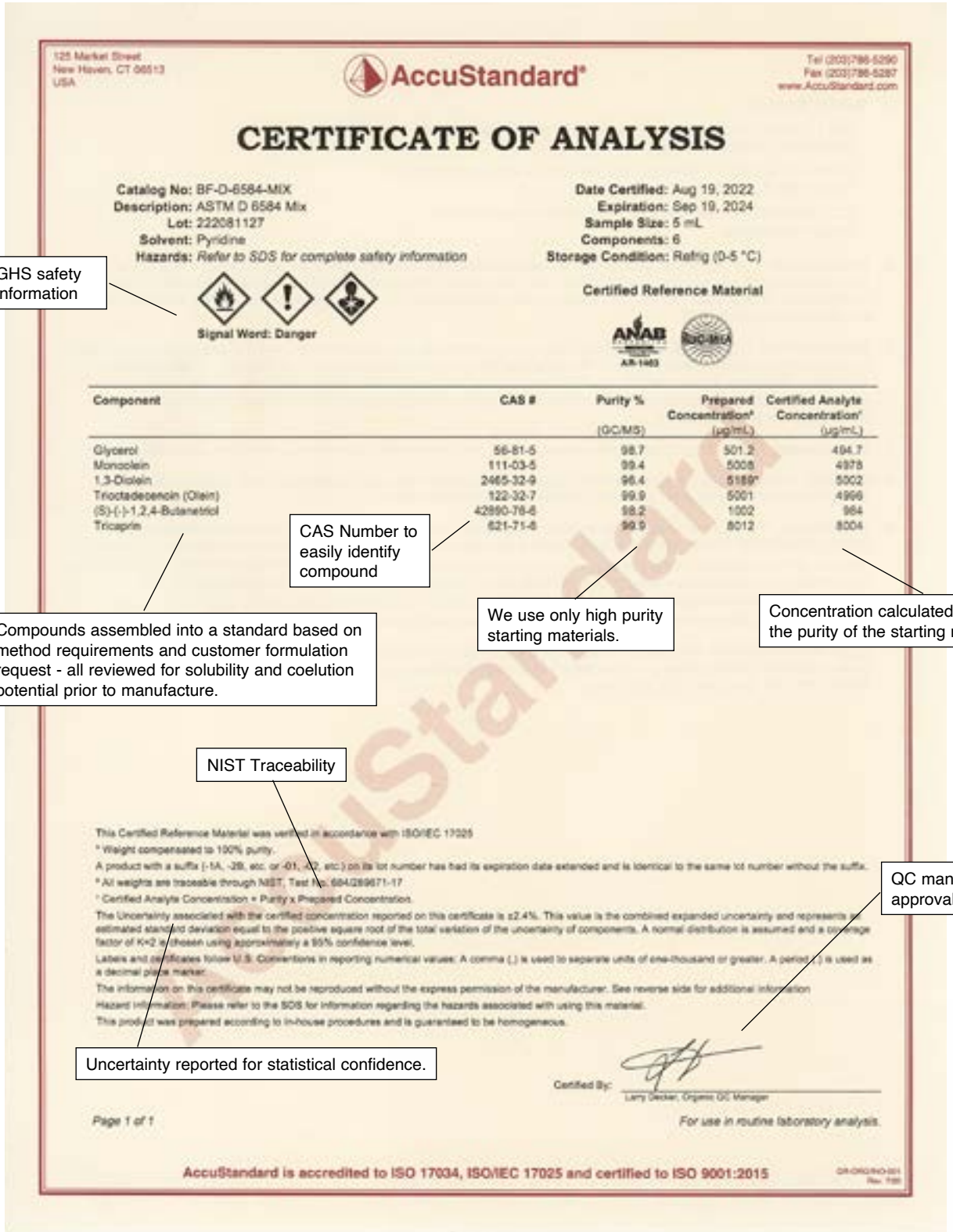
Catalog Number Index

Catalog Number Index

Catalog Number Index

Catalog Number Index

Certification of Anaylsis



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www.AccuStandard.com

CERTIFICATE OF ANALYSIS

Catalog No: BF-D-6584-MIX
Description: ASTM D 6584 Mix
Lot: 222081127
Solvent: Pyridine
Hazards: *Refer to SDS for complete safety information*

Date Certified: Aug 19, 2022
Expiration: Sep 19, 2024
Sample Size: 5 mL
Components: 6
Storage Condition: Refrig (0-5 °C)

Signal Word: Danger

Certified Reference Material

ANAB AR-1483

Component	CAS #	Purity % (GC/MS)	Prepared Concentration[2] (µg/mL)	Certified Analyte Concentration[3] (µg/mL)
Glycerol	56-81-5	98.7	501.2	494.7
Monoolein	111-03-5	99.4	5008	4978
1,3-Diolein	2465-32-9	96.4	5189*	5002
Trioctadecenoin (Olein)	122-32-7	99.9	5001	4996
(S)-(-)-1,2,4-Butanetriol	42890-76-6	98.2	1002	984
Tricaprin	621-71-6	99.9	8012	8004

This Certified Reference Material was verified in accordance with ISO/IEC 17025

* Weight compensated to 100% purity.

A product with a suffix (-1A, -2B, etc. or -01, -02, etc.) on its lot number has had its expiration date extended and is identical to the same lot number without the suffix.

[2] All weights are traceable through NIST, Test No. 684/289671-17

[3] Certified Analyte Concentration = Purity x Prepared Concentration.

The Uncertainty associated with the certified concentration reported on this certificate is ±2.4%. This value is the combined expanded uncertainty and represents an estimated standard deviation equal to the positive square root of the total variation of the uncertainty of components. A normal distribution is assumed and a coverage factor of K=2 is chosen using approximately a 95% confidence level.

Labels and certificates follow U.S. Conventions in reporting numerical values: A comma (,) is used to separate units of one-thousand or greater. A period (.) is used as a decimal place marker.

The information on this certificate may not be reproduced without the express permission of the manufacturer. See reverse side for additional information.

Hazard Information: Please refer to the SDS for information regarding the hazards associated with using this material.

This product was prepared according to in-house procedures and is guaranteed to be homogeneous.

Certified By:
Larry Decker, Organic QC Manager

Page 1 of 1

For use in routine laboratory analysis.

AccuStandard is accredited to ISO 17034, ISO/IEC 17025 and certified to ISO 9001:2015

GHS safety information

CAS Number to easily identify compound

Compounds assembled into a standard based on method requirements and customer formulation request - all reviewed for solubility and coelution potential prior to manufacture.

We use only high purity starting materials.

Concentration calculated by using the purity of the starting material

NIST Traceability

QC management approval

Uncertainty reported for statistical confidence.

Custom Formulations

Custom Standards offer an efficient and economical option when our listed catalog products do not match your exact testing requirements. With decades of experience in manufacturing Certified Reference Material (CRMs), AccuStandard can formulate quality custom standards that are uniquely made to meet your specific specifications. Our Custom (CRMs) follow our ISO17034 quality guidelines offering convenience but most importantly reliability and confidence. Our commitment to quality goes above and beyond by offering shelf life extension test to all our custom CRMs included in our custom standard service.

Why buy AccuStandard's Custom Standards?

- Fast and knowledgeable quotations
- Experienced technical support to answer your questions
- Formulation is carefully evaluated for stability and compatibility
- Concentrations are certified gravimetrical and verified analytically
- Balances used are calibrated daily against NIST traceable weights
- Certificate of Analysis (COA) provided as well as chromatograms (when requested)

To request a custom formulation visit our website at:

https://www.accustandard.com/custom-quote-request or call to talk with a quotation specialist.

Check out our instructional videos at https://www.accustandard.com/video-library

Usage and Handling

Organic Products (Usage, Handling)

- Check label for proper storage and if it needs to be sonicated prior to use.
- Always tap ampule before opening to ensure no product is in the head.

Inorganic Products (Usage, Handling)

- Shake bottle prior to use and do not pipette directly out of the bottle.
- Use only clean Class A volumetric glassware.
- Keep bottles tightly capped when not being used and store under normal laboratory conditions.

Storage

Expiration dates are determined by short-term and long-term stability studies, experience and knowledge of chemical interactions. As part of our long-term studies, standards are analyzed at the end of their assigned expiration period and sometimes can be recertified for an additional length of time.

All products come with storage conditions listed on the label of the ampule or bottle. Some chemical formulations require refrigeration or freezer storage to inhibit adverse reactions among the components. It is imperative that these conditions are followed to preserve the integrity of the material.

Note: ColdPacks may be recommended or required with certain temperature sensitive products. Some standards are susceptible to change at room temperature or higher. In some of these cases, we may recommend or require that these products ship in a ColdPack (a styrofoam container that has an ice pack). The purpose is to delay the exposure of the product to higher temperatures, and NOT to keep the product frozen. The product will not immediately go out of specification when the ColdPack melts or when the product reaches room temperature. It simply delays exposure to higher temperatures.

Safety Information

Products are designed to be used by trained laboratory personnel.

All products come with a Safety Data Sheet (SDS), which also can be downloaded on our website.

AccuStandard®

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ISO 17034 • 17025 • 9001

AccuStandard.com

Rev. 4/23