

ASTM Standards

Method

 5442
 5443
 5453

Originally designed for
 D-5442-93

ASTM

ASTM D-5442 (Reapproved 1998) Analysis of Petroleum Waxes by GC

Quantitative Wax Standard

D-5442-PAK

At stated Wt. % in Cyclohexane

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

Column Resolution Standard

D-5442-CR-PAK

At stated Wt. % in Cyclohexane
 5 x 1 mL
 16 comps.
 2 comps.

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

Standards of Interest

See ASTM Methods D-3710, D-5307, D-6352 for additional calibration standards for hydrocarbon analysis or page 15 for new proposed methods.

Retention Time Standard Mix 1

D-5442-RT1

Equal parts by weight

500 mg
 12 comps.

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

Retention Time Standard Mix 2

D-5442-RT2

Equal parts by weight

500 mg
 16 comps.

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

ASTM D-5443 (Reapproved 1998)

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

Originally designed for
 D-5443-93

Hydrocarbon Test Mixture

D-5443-93-HTM

At stated Wt. %

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

Standards of Interest

See pages 6-11 for a comprehensive line of Certified Sulfur Calibration Standards, Petrocheck, & Petrotest quality control products, pages 1-2.

ASTM D-5453

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

Originally designed for
 D-5453-00

D-5453
 Meets
 EPA Guidelines
 for RFG
 Analysis

Low Level Sulfur Set

D-5453-LL-SET

The set contains the following 5 standards in Isooctane

Cat. No.	Description	Unit
D-5453-LL-BL	Sulfur Blank	2 mL
D-5453-LL-01	Sulfur @ 0.5 ng/μL	2 mL
D-5453-LL-02	Sulfur @ 2.5 ng/μL	2 mL
D-5453-LL-03	Sulfur @ 5.0 ng/μL	2 mL
D-5453-LL-04	Sulfur @ 10.0 ng/μL	2 mL

Real World Sulfur in Various Gasoline & Fuels

QC Samples

SBPT-LSGAS

Parameter Method Approx. Range

Sulfur	D-5453-00	0 - 50 μg/g
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Technical Note

Due to the wide variety of recommended solvents and starting materials mentioned in the preparation of the sulfur standards, please review the current product offering listed for certified sulfur standards. Should AccuStandard's current sulfur standard line be missing the necessary standards for your application, please use our custom quotation request form to indicate your required formulation. For ppb Sulfur measurements, see page 6-11.

Mid Level Sulfur Set

D-5453-ML-SET

The set contains the following 5 standards in Isooctane

Cat. No.	Description	Unit
D-5453-ML-BL	Sulfur Blank	2 mL
D-5453-ML-01	Sulfur @ 5.0 ng/μL	2 mL
D-5453-ML-02	Sulfur @ 25 ng/μL	2 mL
D-5453-ML-03	Sulfur @ 50 ng/μL	2 mL
D-5453-ML-04	Sulfur @ 100 ng/μL	2 mL
D-5453-ML-05	Sulfur @ 200 ng/μL	2 mL

High Level Sulfur Set

D-5453-HL-SET

The set contains the following 5 standards in Isooctane

Cat. No.	Description	Unit
D-5453-HL-BL	Sulfur Blank	2 mL
D-5453-HL-01	Sulfur @ 100 ng/μL	2 mL
D-5453-HL-02	Sulfur @ 250 ng/μL	2 mL
D-5453-HL-03	Sulfur @ 500 ng/μL	2 mL
D-5453-HL-04	Sulfur @ 1000 ng/μL	2 mL

Method 5480
5482
5501
5580



ASTM Standards

ASTM

ASTM D-5480 Engine Oil Volatility by GC

Originally designed for D-5480-95

Stock Column Resolution Standard

D-5480-CR-PAK 5 x 1 mL
Each comp. at 10 µg/mL in CS₂ 5 comps.

D-5480-CR-100X-PAK 5 x 1 mL
Each comp. at 1000 µg/mL in CS₂ 5 comps.

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

Internal Standard Solution

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

n-Decane *n*-Dodecane
n-Undecane

Tetracosane (Solution A)

D-5480-C40-5ML 1 x 5 mL
D-5480-C40-5ML-PAK 5 x 5 mL
500 µg/mL in CS₂

n-Tetracosane

Standards of Interest

Alternative *n*-Paraffin standards are available on page 15 for further method development work or more Detailed Hydrocarbon Analysis (DHA).

ASTM D-5482 & D-5191 Vapor Pressure Standards

Originally designed for D-5482-99 & D-5191-99

Vapor Pressure Quality Control Samples

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

Technical Note

Consists of pure solvents with known vapor pressure.

ASTM D-5501 Ethanol Content of Denatured Fuel Ethanol by GC

Denatured Fuel Ethanol Calibration Set

Originally designed for D-5501-94

D-5501-94-SET set of 7 x 1 mL

Cat. No.	Comp.1	Wt./ Wt. %	Comp.2	Wt./ Wt. %	Comp.3	Wt./ Wt. %	Unit
D-5501-94-01	Ethanol	92	Methanol	0.6	Heptane	7.4	1 x 1 mL
D-5501-94-02	Ethanol	93	Methanol	0.5	Heptane	6.5	1 x 1 mL
D-5501-94-03	Ethanol	94	Methanol	0.4	Heptane	5.6	1 x 1 mL
D-5501-94-04	Ethanol	95	Methanol	0.3	Heptane	4.7	1 x 1 mL
D-5501-94-05	Ethanol	96	Methanol	0.2	Heptane	3.8	1 x 1 mL
D-5501-94-06	Ethanol	97	Methanol	0.1	Heptane	2.9	1 x 1 mL
D-5501-94-07	Ethanol	98	Methanol	0.05	Heptane	1.95	1 x 1 mL

Technical Note

Additional Oxygenate calibration, check standards, and independent reference standards can be found in ASTM method D-4815 (page 24) or D-5622-94 (page 37). 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 D-5580 Benzene, Toluene, Ethylbenzene, m/p-Xylene, o-Xylene, C, and Heavier Aromatics, & Total Aromatics in Finished Gasoline by GC

Originally designed for D-5580-00

Aromatics Quantitative Calibration Mixes (without Internal Standard)

D-5580-95-CAL-SET-10ML set of 5 x 10 mL of 6 component mix

Analyte	Analyte Calibration range	Std. 1 Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %
Benzene	0.10 - 5.00	0.10	0.50	1.00	2.00	5.00
Toluene	1.00 - 15.00	15.00	10.00	5.00	2.50	1.00
Ethylbenzene	0.50 - 10.00	0.50	1.00	2.50	5.00	10.00
<i>o</i> -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

Aromatics Quantitative Calibration Mixes (with Internal Standard)

D-5580-95-CAL-IS-SET set of 5 x 1 mL of 7 component mix

Analyte	Analyte Calibration range	Std. 1 Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %
Benzene	0.09 - 4.50	0.09	0.45	0.90	1.80	4.50
Toluene	0.90 - 13.50	13.50	9.00	4.50	2.25	0.90
Ethylbenzene	0.45 - 9.00	0.45	0.90	2.25	4.50	9.00
<i>o</i> -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 Std.)		10.00	10.00	10.00	10.00	10.00
Isooctane		74.16	68.40	72.90	72.45	72.90

ASTM D-5580-00 Continued on the Next Page

ASTM Standards

Method 5580



ASTM

ASTM D-5580-00 Continued

Benzene, Toluene, Ethylbenzene, m/p-Xylene, o-Xylene, C₈ & Heavier Aromatics, and Total Aromatics in Finished Gasoline by GC

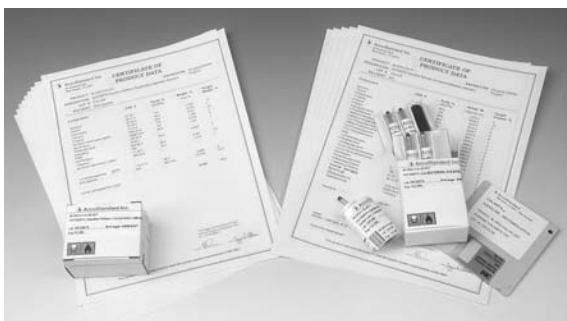
Originally designed for D-5580-00

<p>Valve Timing Calibration Mix (with Internal Standard)</p> <p>M-GRA-VT/IS-AS M-GRA-VT/IS-AS-PAK Each at stated conc.</p> <p>1 x 1 mL 5 x 1 mL 6 comps.</p> <table border="1"> <thead> <tr> <th colspan="2">Wt./Wt. %</th> </tr> </thead> <tbody> <tr><td>Benzene</td><td>4.5</td></tr> <tr><td>Toluene</td><td>4.5</td></tr> <tr><td>Ethylbenzene</td><td>9.0</td></tr> <tr><td>o-Xylene</td><td>9.0</td></tr> <tr><td>2-Hexanone (Internal Std.)</td><td>10.0</td></tr> <tr><td>Isooctane</td><td>63.0</td></tr> </tbody> </table>	Wt./Wt. %		Benzene	4.5	Toluene	4.5	Ethylbenzene	9.0	o-Xylene	9.0	2-Hexanone (Internal Std.)	10.0	Isooctane	63.0	<p>Valve Timing Calibration Mix (without Internal Standard)</p> <p>M-GRA-VT-AS-10ML M-GRA-VT-AS-10ML-PAK Each at stated conc.</p> <p>1 x 10 mL 5 x 10 mL 5 comps.</p> <table border="1"> <thead> <tr> <th colspan="2">Wt./Wt. %</th> </tr> </thead> <tbody> <tr><td>Benzene</td><td>5.0</td></tr> <tr><td>Toluene</td><td>5.0</td></tr> <tr><td>Ethylbenzene</td><td>10.0</td></tr> <tr><td>o-Xylene</td><td>10.0</td></tr> <tr><td>Isooctane</td><td>70.0</td></tr> </tbody> </table>	Wt./Wt. %		Benzene	5.0	Toluene	5.0	Ethylbenzene	10.0	o-Xylene	10.0	Isooctane	70.0																																						
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<p>Internal Standard</p> <p>M-GRA-IS-AS-5ML M-GRA-IS-AS-5ML-PAK</p> <p>1 x 5 mL 5 x 5 mL</p> <p>2-Hexanone (Neat)</p>	<p>Selectivity Check Standard</p> <p>M-GRA-SCS-AS M-GRA-SCS-AS-PAK Each at stated conc.</p> <p>1 x 1 mL 5 x 1 mL 2 comps.</p> <table border="1"> <thead> <tr> <th colspan="2">Wt./Wt. %</th> </tr> </thead> <tbody> <tr><td>n-Dodecane</td><td>1.5</td></tr> <tr><td>Isooctane</td><td>98.5</td></tr> </tbody> </table>	Wt./Wt. %		n-Dodecane	1.5	Isooctane	98.5																																																										
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Technical Note

ASTM D-5580 Gasoline Refinery Quality Control Standard

AccuStandard was requested by the Petrochemical Industry to manufacture the following QA/QC standards for ASTM Method D-5580. The configuration of your instrument valve time switching and the pre-column incorporated determines which QA/QC standard provides optimum performance when analyzing gasolines samples by Method D-5580. Use of the D-5580 standards in conjunction with the real world gasoline **AccuPetroTest & AccuPetroCheck** Consensus Value Reference Material (see pages 1-2) can provide added assurance that the analytical results being generated by the laboratory are reproducible and the analytical system is performing to method specifications.



Exclusive Aromatic Chemical Reference Material Benefits from AccuStandard

Every analyte in each solution is individually weighed
Actual weights and weight percents are available with all ASTM/EPA solutions



ASTM Standards

Originally designed for D-5599-95

ASTM D-5599 Oxygenates in Gas by GC & O-FID

Oxygenates Calibration Curve with Internal Standard

M-GRO-CAL/IS-SET
M-GRO-CAL/IS-SET-PAK

set of 8 x 1 mL
5 x (8 x 1) mL
of 15 Comp. Mix

Every analyte in each solution is individually weighed

Actual weights and weight percents are provided with all ASTM/EPA Solutions

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

Oxygenates Calibration Curve without Internal Standard

M-GRO-CAL-SET

set of 8 x 10 mL
of 14 Comp. Mix

Analyte Calibration range	Std. 1 Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %	Std. 6 Wt. %	Std. 7 Wt. %	Std. 8 Wt. %
Methanol 0.1 - 5.0	---	0.1	2.5	---	5	0.5	1	---
Ethanol 1.0 - 12.0	12	---	3	---	8	5	1	---
Isopropanol 0.1 - 2.0	2	1	---	0.1	0.3	---	0.5	---
t-Butanol 0.1 - 2.0	0.5	0.1	1	---	2	0.3	---	---
Propanol 0.2 - 2.0	2	---	0.7	0.2	1	---	0.4	---
MtBE 1.0 - 17.0	5	17	---	---	1	2.5	10	---
sec-Butanol 0.1 - 2.5	1	---	0.5	0.1	---	2.5	0.7	---
Diisopropyl ether 0.1 - 2.0	---	0.5	0.3	0.1	2	1	---	---
iso-Butanol 0.1 - 2.0	2	0.5	---	1	0.1	0.3	---	---
EtBE 1.0 - 18.0	---	3.5	18	7.5	---	1	12	---
t-Pentanol 0.1 - 2.0	0.3	1	---	0.5	0.1	2	---	---
Butanol 0.1 - 2.0	1	---	0.3	---	0.5	0.1	2	---
TAME 1.0 - 18.0	---	3.5	1	18	7.5	12	---	---
RFA Gasoline	74.2	64.8	64.7	64.5	64.5	64.8	64.4	100
Total oxygenates	25.8	27.2	27.3	27.5	27.5	27.2	27.6	0

Technical Note

Oxygenate Calibration Curves ISTD-Free and Larger Packaging Size

AccuStandard has received requests from the Petroleum Industry to formulate our D-5599 Oxygenate product without internal standard (ISTD) and package it in a larger volume. We have met those requests by introducing the M-GRO-CAL-SET calibration curve. This curve is manufactured without incorporating an internal standard and is packaged in **Ready-to-Use** 10 mL sample volume.

The 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.



Technical Note

AccuStandard's M-GRO oxygenate calibration curve has been successfully used by Petroleum Refineries and supporting laboratories for both ASTM Method D-5599 and ASTM Method D-4815. In addition, AccuStandard's certified oxygenate chemical reference materials provide the following features and benefits for superior performance and value.

Benefits from AccuStandard's Oxygenates

Features:	Benefits:
Analytes checked for chemical purity & water content	The use & validation of the highest purity neat standards enhance the integrity of the standard.
Analyzed by independent Laboratories	Independent product validation of certified values.
Certified method specific calibration standards	Increased confidence in analytical results.
Elimination of standards preparation	Time is utilized quantifying samples.
Internal Standards incorporated	Ready-to-Inject Standards.
Weights and weight percents provided	Ease of use in performing back calculations.
All necessary solutions included	Provides single source for sample analysis.
Variations in Packaging size	Meet laboratory sample volumes.
Economical	Time is spent on analysis rather than preparing stds.
7 stds. used to generate 5 point curve	Generate a 5 point curve in 30% less time than competitors' 10 standard set.

ASTM Standards

Method

5599



ASTM

ASTM D-5599
Continued

Oxygenates in Gasoline by GC & O-FID

Originally designed for
D-5599-95



ASTM/EPA Oxygenate Quality Control Standards

Daily Quality Control Standard (without Internal Standard)

M-GRO-QC-10ML		1 x 10 mL	
M-GRO-QC-10ML-PAK		5 x 10 mL	
Compound Oxygenate	Target Wt. %	Compound Oxygenate	Target Wt. %
Methanol	1	iso-Butanol	1
Ethanol	1	EtBE	3
Isopropanol	1	t-Pentanol	1
t-Butanol	1	Butanol	1
Propanol	1	TAME	3
MtBE	3		
sec-Butanol	1	RFA Gasoline	79
Di-isopropyl ether	3		
		14 comps.	100

Revised Daily Quality Control Standard (without Internal Standard)

M-GRO-QC-R-10ML		1 x 10 mL	
M-GRO-QC-R-10ML-PAK		5 x 10 mL	
Compound Oxygenate	Target Wt. %	Compound Oxygenate	Target Wt. %
Methanol	1	iso-Butanol	1
Ethanol	1	EtBE	3
Isopropanol	1	t-Pentanol	1
t-Butanol	1	Butanol	1
Propanol	1	TAME	3
MtBE	3		
sec-Butanol	1	RFA Gasoline	81
Di-isopropyl ether	1		
		14 comps.	100

Technical Note

The Daily Quality Control Standard M-GRO-QC-R was developed in response to your requests for a QC mix bracketed by the Calibration Curve.

AccuStandard reduced the diisopropyl ether content from 3 Wt. % to 1 Wt. % to meet the method specifications.

Daily Quality Control Standard (with Internal Standard)

M-GRO-QC/IS-5ML		1 x 5 mL	
M-GRO-QC/IS-5ML-PAK		5 x 5 mL	
Compound Oxygenate	Target Wt. %	Compound Oxygenate	Target Wt. %
Methanol	1	Di-isopropyl ether	3
Ethanol	1	iso-Butanol	1
Isopropanol	1	EtBE	3
t-Butanol	1	t-Pentanol	1
Propanol	1	Butanol	1
MtBE	3	TAME	3
sec-Butanol	1		
		RFA Gasoline	79

1,2-Dimethoxyethane (ISTD) is combined with the above 14 comps. in a 4 to 100 weight ratio
15 comps. 100

Revised Daily Quality Control Standard (with Internal Standard)

M-GRO-QC-R/IS-5ML		1 x 5 mL	
M-GRO-QC-R/IS-5ML-PAK		5 x 5 mL	
Compound Oxygenate	Target Wt. %	Compound Oxygenate	Target Wt. %
Methanol	1	Di-isopropyl ether	1
Ethanol	1	iso-Butanol	1
Isopropanol	1	EtBE	3
t-Butanol	1	t-Pentanol	1
Propanol	1	Butanol	1
MtBE	3	TAME	3
sec-Butanol	1		
		RFA Gasoline	81

1,2-Dimethoxyethane (ISTD) is combined with the above 14 comps. in a 4 to 100 weight ratio
15 comps. 100

Technical Note

Additional Oxygenate calibration, check standards, and independent reference standards can be found in ASTM method D-4815 (page 24) or D-5622 (page 37). 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.

Gasoline Refinery Blank (with Internal Standard)

M-GRO-BLNK/IS-10ML		1 x 10mL	
M-GRO-BLNK/IS-10ML-PAK		5 x 10mL	
2 comps.			
Wt. %			
1,2- Dimethoxyethane (ISTD)		4	
RFA Gasoline		96	

O-FID/EPA Gasoline Refinery Internal Standard

M-GRO-IS-5ML		1 x 5 mL	
M-GRO-IS-5ML-PAK		5 x 5 mL	
1,2- Dimethoxyethane (ISTD)			

O-FID Gasoline Refinery Blank

M-GRO-BLNK-10ML		1 x 10mL	
M-GRO-BLNK-10ML-PAK		5 x 10mL	
RFA Gasoline (neat)			



Oxygenates Using O-FID

EPA O-FID Oxygenate Petrochemical Standards

AccuStandard has formulated this second oxygenate version to meet the specific analyte requirements set forth in the EPA methodology.

Originally designed for D-5599-95

ASTM

ASTM D-5599 EPA Gasoline Refinery Oxygenates Calibration Curves

EPA O-FID Quantitative Calibration Mixes (without Internal Standard)

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

set of 5 x 10 mL
5 comps.

	Analyte Calibr. range	Std. 1 Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %
Methanol	0.30 - 12.00	6.00	12.00	3.00	0.30	9.00
Ethanol	0.30 - 12.00	0.30	3.00	6.00	9.00	12.00
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

EPA O-FID Quantitative Calibration Mixes (with Internal Standard)

M-GRO-CAL-IS/EPA-SET

set of 5 x 1 mL
6 comps.

	Analyte Calibr. range	Std. 1 Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %
Methanol	0.29 - 11.40	5.70	11.40	2.85	0.29	8.55
Ethanol	0.29 - 11.40	0.29	2.85	5.70	8.55	11.40
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

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

5 x 10 mL

5 comps.

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

EPA O-FID Quantitative Calibration Check Standard (with Internal Standard)

M-GRO-EPA-CC/IS-5ML

1 x 5 mL

M-GRO-EPA-CC/IS-5MLPAK

5 x 5 mL

6 comps.

	Wt./Wt. %		Wt./Wt. %
Methanol	3.80	Methyl tert-butyl ether	11.40
Ethanol	7.60	RFA gasoline	67.45
tert-Butanol	4.75	DME (internal standard)	5.0

EPA O-FID Spiking Solution

M-GRO-EPA-SP-5ML

1 x 5 mL

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

5 x 5 mL

4 comps.

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

Internal Standard

M-GRO-IS-5ML

1 x 10 mL

M-GRO-IS-5ML-PAK

5 x 10 mL

1,2-Dimethoxyethane (ISTD)

Oxygenate Free Gasoline Refinery Blank

M-GRO-BLNK-10ML

1 x 10 mL

M-GRO-BLNK-10ML-PAK

5 x 10 mL

RFA Gasoline (neat)

For our complete line of Organic Standards, request a copy of our Catalog.



Technical Note

Additional Oxygenate calibration, check standards, and independent reference standards can be found in ASTM method D-4815 (page 24) or D-5622 (page 37). 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.

Cross Reference Table

ASTM IP ISO DIN JIS AFNOR sorted by ASTM Method see beginning of Catalog

ASTM Standards

Method

5600
5622



Originally designed for
D-5600-98

ASTM D-5600 Trace Metals in Petroleum Coke by ICP-AES

Multi-Element Calibration Standard

D-5600-01-1 1 x 100 mL
500 µg/mL each in 2-5% HNO₃ tr. HF 12 comps.

Aluminum	Magnesium	Sodium
Barium	Manganese	Titanium
Calcium	Nickel	Vanadium
Iron	Silicon	Zinc

Standards of Interest

Individual ICP Standards are on pages 67-72.

Hydrochloric Acid Diluent

D-5600-BLH-5 1 x 500 mL
D-5600-BLH-L 1 x 1 L

20% HCl in ASTM Type II water

Lithium Borate Diluent

D-5600-LIB-1 1 x 100 mL
D-5600-LIB-5 1 x 500 mL

2.0% Lithium Borate in 10% HCl

Technical Note

D-5600 Ready-to-Aspirate Standards

AccuStandard has formulated the following stock standards for ASTM Method D-5600. We have prepared numerous **Ready-to-Aspirate** ICP multi-element solutions. Should your company want to eliminate the preparation process for Inorganic standards contact our Technical Department for a quote on a **Ready-to-Aspirate** working level Inorganic standard.

ASTM

ASTM D-5622 Total Oxygen in Gasoline & MeOH Fuels by Reductive Pyrolysis

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

* Each Set includes M-GRO-BLNK-10ML

Oxygenate Free Gasoline Refinery Blank

M-GRO-BLNK-10ML 1 x 10 mL

RFA Gasoline (neat)

Standards of Interest

See ASTM Methods D-4815 (page 24) and D-5599 (pages 34-36) for additional oxygenate calibration standards.

Technical Note

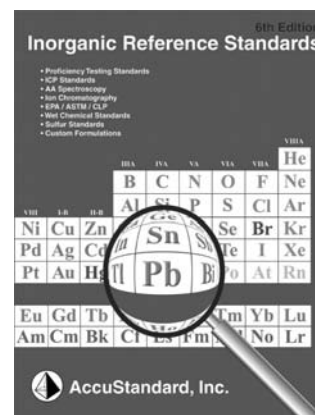
Use M-GRO-BLNK-10ML as an oxygenate free RFA gasoline matrix to make up your own oxygenate standards or call our Technical Dept. to have a Standard custom made for you.

Originally designed for
D-5622-95

Technical Note

AccuStandard's Oxygenate reference fuel line was designed as a cost effective alternative for Petrochemical Laboratories. All oxygenate blends come with a certificate to maintain traceability links to NIST SRMs (when available). By packaging the standard in 10 mL sealed ampules your laboratory will realize cost savings. The 10 mL size avoids having special packaging and hazardous material fees billed to your invoice.

For our complete line of Inorganic Standards, request a copy of our Inorganics Catalog.





ASTM Standards

ASTM D-5623 Sulfur Compounds in Light Petroleum Liquids by GC and Sulfur Selective Detection

Originally designed for D-5623-94

ASTM

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

ASTM-P-0091-10X-SET
Approx. 2.0 mg/mL each in Toluene

set of 22 x 1 mL

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

Custom Ampulling for Bulk Quantity Requirements

- Fill Volumes from 0.2 mL to 20 mL
- Flammables
- QC Services available

AccuStandard has the resources and equipment to meet your custom packaging requirements. Our full automated filler-sealer can accommodate a fill range from 0.2 to 20 mL, and ampule sizes from 1 mL to 20 mL.

AccuStandard has extensive experience with Round Robin samples for ASTM committees.

Call our Technical Department for a quotation.



We can reduce your costs by using the Cozzoli Auto Filling/Sealing Machine to package just the right size product for your application.

ASTM Standards

Method 5599



ASTM

WEAR METALS

ASTM D-5708 Nickel, Vanadium, & Iron in Crude Oils & Residual Fuels by ICP-AES

Originally designed for D-5708-95a

Test Method A - ICP with an Organic Solvent Specimen Solution

Sulfur and Metals in Mineral Oil

ASTM-P-0102-SET

100 mL

Cat. No.	Sulfur Conc. (Wt. %)	Iron Conc. (µg/g)	Nickel Conc. (µg/g)	Vanadium Conc. (µg/g)	100 mL
ASTM-P-0102-01	0.00	0	0	0	
ASTM-P-0102-02	0.50	300	10	500	
ASTM-P-0102-03	1.00	500	100	25	
ASTM-P-0102-04	-	100	80	250	
ASTM-P-0102-05	2.00	200	40	100	
ASTM-P-0102-06	2.50	400	5	400	
ASTM-P-0102-07	3.00	0	60	300	
ASTM-P-0102-08	3.50	500	0	200	
ASTM-P-0102-09	-	100	100	0	
ASTM-P-0102-10	4.50	300	50	250	
ASTM-P-0102-11	5.00	200	20	500	
ASTM-P-0102-12	5.50	50	100	50	

Stock Multi-Element in Mineral Oil

D-5708-A-10X 4 oz.
100 µg/g in 20 cSt mineral oil
3 comps.

Iron
Nickel
Vanadium

Standards of Interest

See Table of Contents for the Wear Metals Group pages.

Sulfur and Metals in Residual Fuel Oil

ASTM-P-0103-SET

100 mL

Cat. No.	Sulfur Conc. (Wt. %)	Iron Conc. (µg/g)	Nickel Conc. (µg/g)	Vanadium Conc. (µg/g)	100 mL
ASTM-P-0103-01	0.00	0	0	0	
ASTM-P-0103-02	0.50	300	10	500	
ASTM-P-0103-03	1.00	500	100	25	
ASTM-P-0103-04	-	100	80	250	
ASTM-P-0103-05	2.00	200	40	100	
ASTM-P-0103-06	2.50	400	5	400	
ASTM-P-0103-07	3.00	0	60	300	
ASTM-P-0103-08	3.50	500	0	200	
ASTM-P-0103-09	-	100	100	0	
ASTM-P-0103-10	4.50	300	50	250	
ASTM-P-0103-11	5.00	200	20	500	
ASTM-P-0103-12	5.50	50	100	50	

Test Method B - ICP after Acid Decomposition of Sample

Stock Multi-Element Aqueous Standard

D-5708-B-10X-1
D-5708-B-10X-5

Each at 100 µg/mL in 2-5% HNO₃

Iron
Nickel

Vanadium

100 mL
500 mL
3 comps.

Working Level Multi-Element Aqueous Standard

D-5708-B-5

Each at 10 µg/mL in 2-5% HNO₃

Iron
Nickel

Vanadium

500 mL
3 comps.

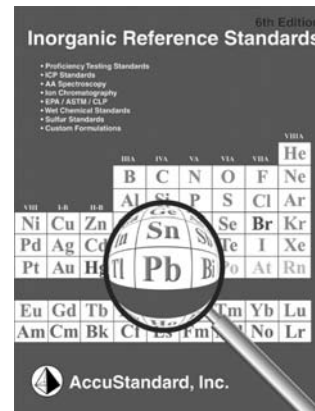
Nitric Acid Blank

CLP-BLN-5
CLP-BLN-L

5% HNO₃ in ASTM Type I Water

500 mL
L (2 x 500 mL)

For our complete line of Inorganic Standards, request a copy of our Inorganics Catalog



AccuStandard is an active member in ASTM and strives to keep abreast of ASTM method revisions. If our listed formulation does not meet the most recent method revision, please contact Technical Support, ext. 117 for an updated product.



ASTM Standards

ASTM

ASTM D-5762 Nitrogen in Petroleum & Petroleum Products by Boat-Inlet Chemiluminescence

Stock Nitrogen Standard

D-5762-95-500X-PAK

5 x 1 mL

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

Originally designed for D-5762-98

Nitrogen Calibration Set

D-5762-95-CAL-SET

6 x 1 mL

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

Technical Note

Nitrogen introduced using Acridine.

Low level Nitrogen Calibration Set

ASTM-P-0070-SET

6 x 1 mL

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

Technical Note

Nitrogen introduced using Acridine.

Low level Nitrogen & Sulfur Calibration Set

ASTM-P-0071-SET

4 x 1 mL

Cat. No.	Description	Unit
ASTM-P-0071-BL	Benzene Blank	1 x 1 mL
ASTM-P-0071-01	Nitrogen @ 0.25 µg/g & Sulfur @ 0.25 µg/g in Benzene	1 x 1 mL
ASTM-P-0071-10X	Nitrogen @ 0.50 µg/g & Sulfur @ 0.50 µg/g in Benzene	1 x 1 mL
ASTM-P-0071-03	Nitrogen @ 1.00 µg/g & Sulfur @ 1.00 µg/g in Benzene	1 x 1 mL

Technical Note

The Nitrogen is introduced using Aniline and the Sulfur is introduced using *n*-Butyl sulfide.

AccuPetroCheck and AccuPetroTest Real World Gasoline QC Standards

In cooperation with ASTM D-02 subcommittee 3 and 4, AccuStandard ampulled 21 **Real World** gasoline reference fuels. Consensus Values have been determined for these reference fuels by various ASTM Round Robins to provide Petrochemical Laboratories with a source of well characterized gasoline standards for use in QA/QC applications and as Single Blind test samples over an extended period of time. As new ASTM D-02.03 and D-02.04 Test methods are promulgated they require **mandatory Quality Control** testing of real world samples. AccuStandard's AccuPetroTest & AccuPetroCheck standards are being successfully used to achieve these new Quality Control requirements.

QC Standards

CARB Low Sulfur RFG QC Standard

ASTM-FUEL-QCS-01-PAK

5 x 15 mL

Parameter	Method	Value	Conc.
Total Aromatics	D-1319	24.5	Vol.%
Total Olefins	D-1319	5.3	Vol.%
Total Saturates	D-1319	58.3	Vol.%
Sulfur	D-2622	0.0057	Wt.%
Sulfur	D-4294	0.0078	Wt.%
Sulfur	D-5453	55.76	µg/g
Sulfur	D-6344	59.31	µg/g
Benzene	D-5769	0.80	Vol.%
Toluene	D-5769	4.92	Vol.%
Total Aromatics	D-5769	23.42	Vol.%
Benzene	D-6227	0.78	Vol.%
Total Olefins	D-6550	5.3	Vol.%

Conventional Gasoline QC Standard

ASTM-FUEL-QCS-02-PAK

5 x 15 mL

Parameter	Method	Value	Conc.
Total Aromatics	D-1319	34.6	Vol.%
Total Olefins	D-1319	12.4	Vol.%
Total Saturates	D-1319	62.8	Vol.%
Sulfur	D-2622	0.0338	Wt.%
Sulfur	D-4294	0.0368	Wt.%
Sulfur	D-5453	317.36	µg/g
Sulfur	D-6344	338.78	µg/g
Benzene	D-5769	0.55	Vol.%
Toluene	D-5769	5.53	Vol.%
Total Aromatics	D-5769	32.51	Vol.%
Benzene	D-6227	0.52	Vol.%
Total Olefins	D-6550	12.4	Vol.%

AccuPetroCheck QC Standards

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

Petrochemical Standards



ASTM

AccuPetroTest

Sulfur in Diesel Fuel QC Standard SBPT-SDF 2 x 15 mL Parameter Method Approx. Range Sulfur 20 - 11000 mg/kg See ASTM Methods D-2622, D-3120, D-3246-92, D-4294, D-5453, for Sulfur Calibration Standards		Sulfur in White Mineral Oil QC Standard SBPT-SWMO 2 x 15 mL Parameter Method Approx. Range Sulfur 20 - 11000 mg/kg See ASTM Methods D-2622, D-3120, D-3246-92, D-4294, D-5453 for Sulfur Calibration Standards	
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Sulfur Single Blind AccuPetroTest Alternative Matrices Standards

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

AccuPetroTest Gasoline

Low Sulfur QC Sample SBPT-LSGAS 2 x 15 mL Parameter Method Approx. Range Sulfur 5453 0 - 50 µg/g			Olefin QC Sample SBPT-OLEFINSFC 2 x 15 mL Parameter Method Approx. Range Olefins 6550 1 - 40 Vol.%		
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AccuPetroTest Gasoline QC

Olefins QC Sample SBPT-OLEFIN 2 x 15 mL Parameter Method Approx. Range Total Aromatics D-1319 8-60 Vol.% Total Olefins D-1319 1 - 40 Vol.% Total Saturates D-1319 30-80 Vol.% See ASTM Method D-1319 for Sulfur Calibration Standards			Sulfur QC Sample SBPT-SGAS 2 x 15 mL Parameter Method Approx. Range Sulfur D-2622 0.0001 - 0.0930 Wt.% Sulfur D-4294 0.0016 - 0.0930 Wt.% Sulfur D-5453 4.0 - 500 µg/g Sulfur D-XXXX 1.0 - 1000 µg/g See ASTM Methods D-2622, D-3120, D-3246-92, D-4294, D-5453 for Sulfur Calibration Standards		
Aromatics QC Sample SBPT-AROM 2 x 15 mL Parameter Method Approx. Range Total Aromatics D-5769 8 - 60 Vol.% See ASTM Methods D-3606, D-5580-95, D-5769-95 for Benzene Calibration Standards			Benzene/Toluene QC Sample SBPT-BENZ 2 x 15 mL Parameter Method Approx. Range Benzene D-5769 0.1 - 2.0 Vol.% Toluene D-5769 1.0 - 15 Vol.% See ASTM Methods D-3606, D-5580-95, D-5769-95 for Benzene Calibration Standards		

AccuPetroTest Single Blind Standards

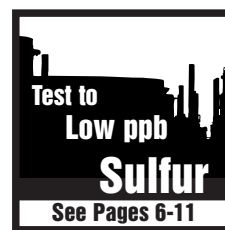
Petrochemical Laboratories looking to test the performance of the laboratory for a specific parameter can order the Single Blind AccuPetroTest sample for the parameter of interest. Two real world gasoline samples will be sent for the test parameter requested and a separate sealed envelope containing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

AccuPetroTest Gasoline

Comprehensive Single Blind Gasoline QC Sample SBPT-COMP 2 x 15 mL			
Parameter	Method	Approx. Range	Conc.
Total Aromatics	D-1319	8 - 60	Vol. %
Total Olefins	D-1319	1 - 40	Vol. %
Total Saturates	D-1319	30 - 80	Vol. %
Sulfur	D-2622	0.0001 - 0.0930	Wt. %
Sulfur	D-4294	0.0016 - 0.0930	Wt. %
Sulfur	D-5453	0.5 - 500	µg/g
Sulfur	D-6344	1.0 - 1000	µg/g
Benzene	D-5769	0.1 - 2.0	Vol. %
Toluene	D-5769	1.0 - 15	Vol. %
Total Aromatics	D-5769	8 - 60	Vol. %
Benzene	D-6277	0.1 - 2.0	Vol. %
Total Olefins	D-6550	1 - 40	Vol. %

Technical Note

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



Conducting a Petrochemical Round Robin for a new ASTM method?
 Select AccuStandard to prepare the necessary samples for the Round Robin study.

Method 5769



ASTM Standards

ASTM Method D-5769-98

Benzene, Toluene, and Total Aromatics in Finished Gasoline by GC/MS

Originally designed for D-5769-98

ASTM

ASTM D-5769 Benzene, Toluene & Total Aromatics in Finished Gasoline by GC/MS

All of your standards requirements for ASTM Method D-5769 have been put together in the following 10 pages. These standards and methods are used in the monitoring of Total Aromatics according to the latest methods and amendments to the US Clean Air Act.

A set of Amendments, containing more stringent specifications became effective January 1, 1995 limiting the volatility and composition of reformulated gasoline.

The D-02 Committee of the American Society of Testing Materials, developed a standard test method D-5769 for the determination of the analyte composition by GC/MS of reformulated gasoline.

Aromatic Product Line yields the following important benefits

Features:

Purity and Identity of all analytes verified under identical operating conditions

Certified method specific calibration standards

Eliminates preparation of calibration standards

Internal Standards Incorporated

Weights and weight percents provided

Includes all necessary solutions

Variations in packaging size

Low Cost

Flexibility

Only 5 standards needed for a 5 Point Curve ...

No charge disk deliverable calibration curve (CALAMTS™)

Benefits:

Impurity interferences in analyte retention time window are compensated.

Increased confidence in analytical results.

Time is utilized quantifying actual samples.

Saves time.

Ease of use in performing back calculations.

Complete single source for reference materials.

Meet laboratory sample volumes and demands.

More economical to purchase than to prepare standards.

Meet your lab requirements/method changes.

Generate a full calibration curve in 1/2 the time of the two set version composed of 10 standards.



ASTM Standards

Method 5769



ASTM

ASTM D-5769 Benzene, Toluene & Total Aromatics in Finished Gasoline by GC/MS

Originally designed for D-5769-95

Standards Designed for ASTM D-5769 as published in the 1997 Annual Book of ASTM Standards, Vol. 05.03 Petroleum Products and Lubricants (III): D-4636-latest; Catalysts

The following **M-GRA** catalog numbers contain the necessary calibration curves, daily quality control, and internal standards designed to meet the promulgated GC/MS Aromatic method listed in the 1997 ASTM Book of Standards.

AccuStandard offers two different versions of the **M-GRA** catalog numbers: **M-GRA three component internal standard version**, and the **M-GRA four component internal standard version**.

The **three component internal standard version** contains the necessary deuterated analytes for full qualitative and quantitative analysis of the 25 components listed in the published version.

The **four component internal standard version** was designed at the request of the petroleum refinery laboratories. This four internal standard version incorporates not only the Benzene-d₆, Ethyl benzene-d₁₀, Naphthalene-d₈, but also Toluene-d₈. Incorporating the Toluene-d₈ as the internal standard for the quantification of gasolines with higher Toluene levels has improved analytical results for this analyte.

Incorporation of a 6th Calibration Standard

A **6th calibration standard** has been formulated for the M-GRA product line to improve the linearity at the high end of the calibration curve see page 44. This sixth standard can be especially important in the quantification of gasoline samples containing high toluene levels. The formulation contains an analyte concentration between the high level standard and the next level, which is standard two. Use of the sixth standard provides an additional calibration point that is desirable when the calibration curve is developed using a quadratic fit.

Aromatics Kits for analysis by GC/MS

M-GRA-K1
(Original Formulations)

Kit includes:	Units	Function
M-GRA-CAL/IS-SET	5 x 1 mL	5 Pt. Curve w/ 3 ISTD's
M-GRA-QC/IS-5ML	1 x 5 mL	Daily QC w/ 3 ISTD's
M-GRA-IS-5ML	1 x 5 mL	Internal Std. 3 comps.
M-GRA-ST	1 x 1 mL	Sensitivity Test Solution

See page 44 for product description with analytes & conc.

For your added convenience we have provided the following Aromatics Kits to meet the analytical requirements for this method.

M-GRA-K2
(Developed for improved high concentration linearity)

Kit includes:	Units	Function
M-GRA-CAL/IS-SET	5 x 1 mL	5 Pt. Curve w/ 3 ISTD's
M-GRA-ADD/IS	1 x 1 mL	6th Std. for revision 5 F
M-GRA-QC/IS-5ML	1 x 5 mL	Daily QC w/ 3 ISTD's
M-GRA-IS-5ML	1 x 5 mL	Internal Std. 3 comps.
M-GRA-ST	1 x 1 mL	Sensitivity Test Solution

See page 44 for product description with analytes & conc.

M-GRA-K4
(Used to meet the Toluene-d₈ internal standard version recommended by a network of major petroleum refineries)

Kit includes:	Units	Function
M-GRA-CAL-R/IS-R-SET	5 x 1 mL	5 Pt. Curve w/ 4 ISTD's
M-GRA-ADD/IS-R	1 x 1 mL	6th Standard for rev. 5 F
M-GRA-QC-R/IS-R-5ML	1 x 5 mL	Daily QC w/ 4 ISTD's
M-GRA-IS-R-10ML	1 x 10 mL	Internal Std. 4 comps.
M-GRA-ST	1 x 1 mL	Sensitivity Test Solution

See page 45 for product description with analytes & conc.

Cross Reference Table

ASTM IP ISO DIN JIS AFNOR sorted by
ASTM Method see beginning of Catalog



ASTM Standards

ASTM

ASTM D-5769 Calibration Curve with 3 Component Deuterated Internal Standard Added

Originally designed for D-5769-95

Aromatics Calibration Standards Kit (3 Internal Standard Version)

M-GRA-CAL/IS-SET

set of 5 x 1 mL

Optional Sixth Standard with 3 Comp. Deuterated Internal Standard Added

M-GRA-ADD/IS

1 x 1 mL

Core Calibr. Mix 24 Comps.	Std. 1 Target Vol. %	Std. 2 Vol. %	Std. 3 Vol. %	Std. 4 Vol. %	Std. 5 Vol. %	Core Calibr. Mix 24 Comps.	Optional Std. 6 Target Vol. %
Benzene	3	1.50	0.75	0.375	0.1875	Benzene	2.25
Toluene	19	9.50	4.75	2.375	1.1875	Toluene	15
Ethylbenzene	5	2.50	1.25	0.625	0.3125	Ethylbenzene	3.75
<i>m</i> -Xylene	6	3.00	1.50	0.750	0.3750	<i>m</i> -Xylene	4.50
<i>p</i> -Xylene	6	3.00	1.50	0.750	0.3750	<i>p</i> -Xylene	4.50
<i>o</i> -Xylene	6	3.00	1.50	0.750	0.3750	<i>o</i> -Xylene	4.50
Isopropylbenzene	3	1.50	0.75	0.375	0.1875	Isopropylbenzene	2.25
<i>n</i> -Propylbenzene	3	1.50	0.75	0.375	0.1875	<i>n</i> -Propylbenzene	2.25
1-Methyl-3-ethylbenzene	3	1.50	0.75	0.375	0.1875	3-Ethyltoluene	2.25
1-Methyl-4-ethylbenzene	3	1.50	0.75	0.375	0.1875	4-Ethyltoluene	2.25
1,3,5-Trimethylbenzene	3	1.50	0.75	0.375	0.1875	1,3,5-Trimethylbenzene	2.25
1-Methyl-2-ethylbenzene	3	1.50	0.75	0.375	0.1875	2-Ethyltoluene	2.25
1,2,4-Trimethylbenzene	5	2.50	1.25	0.625	0.3125	1,2,4-Trimethylbenzene	3.75
1,2,3-Trimethylbenzene	3	1.50	0.75	0.375	0.1875	1,2,3-Trimethylbenzene	2.25
Indan	3	1.50	0.75	0.375	0.1875	Indan	2.25
1,4-Diethylbenzene	3	1.50	0.75	0.375	0.1875	1,4-Diethylbenzene	2.25
<i>n</i> -Butylbenzene	3	1.50	0.75	0.375	0.1875	<i>n</i> -Butylbenzene	2.25
1,2-Diethylbenzene	3	1.50	0.75	0.375	0.1875	1,2-Diethylbenzene	2.25
1,2,4,5-Tetramethylbenzene	2	1.00	0.50	0.250	0.1250	1,2,4,5-Tetramethylbenzene	4.0
1,2,3,5-Tetramethylbenzene	2	1.00	0.50	0.250	0.1250	1,2,3,5-Tetramethylbenzene	1.5
Naphthalene	2	1.00	0.50	0.250	0.1250	Naphthalene	1.5
Pentamethylbenzene	2	1.00	0.50	0.250	0.1250	Pentamethylbenzene	1.5
1-Methylnaphthalene	2	1.00	0.50	0.250	0.1250	1-Methylnaphthalene	1.5
2-Methylnaphthalene	2	1.00	0.50	0.250	0.1250	2-Methylnaphthalene	1.5
Isooctane	--	Bal	Bal	Bal	Bal	Isooctane	Bal



Disk Deliverable (At no additional charge)

Eliminates hand keyed-in data.

CALAMTSTM

(Disk containing "Calibration Amounts")

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

Internal Standard (M-GRA-IS)

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

Internal Standard (M-GRA-IS)

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

Daily Quality Control Standard (without Internal Standard)

M-GRA-QC-10ML 1 x 10 mL
M-GRA-QC-10ML-PAK 5 x 10 mL

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

Daily Quality Control Standard (with Internal Standard)

M-GRA-QC/IS-5ML 1 x 5 mL
M-GRA-QC/IS-5ML-PAK 5 x 5 mL

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

Technical Note

Use with any M-GRA Calibration Curve.

Includes M-GRA-IS (3 Comp. Internal Standards mix) combined with the above 13 Comp. Core QC Mix: M-GRA-QC in a 5 to 100 weight ratio. 16 comps.

ASTM/EPA Sensitivity Test Solution

M-GRA-ST 1 x 1 mL
M-GRA-ST-PAK 5 x 1 mL
100 µg/mL in Isooctane

1,4-Diethyl benzene

3 Comp. Deuterated Internal Std. Mix

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

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

ASTM Standards

Method 5769



Originally designed for D-5769-95

ASTM

ASTM D-5769 Calibration Curve with 4 Component Deuterated Internal Standard Added

Aromatics Calibration Standards Kit (4 Internal Standard Version)

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

set of 5 x 1 mL

Optional Sixth Standard with 4 Comp. Deuterated Internal Standard Added

M-GRA-ADD/IS-R

1 x 1 mL

Core Calibr. Mix 24 Comps.	Std. 1 Target Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %	Core Calibr. Mix 24 Comps.	Optional Std. 6 Target Wt. %
Benzene	3.13	1.78	0.95	0.490	0.2490	Benzene	2.48
Toluene	19.65	11.11	5.90	3.058	1.5547	Toluene	16.29
Ethylbenzene	5.12	2.92	1.55	0.805	0.4090	Ethylbenzene	4.07
<i>m</i> -Xylene	6.27	3.50	1.86	0.962	0.4891	<i>m</i> -Xylene	4.87
<i>p</i> -Xylene	6.33	3.50	1.86	0.962	0.4891	<i>p</i> -Xylene	4.87
<i>o</i> -Xylene	6.51	3.56	1.89	0.980	0.4981	<i>o</i> -Xylene	4.96
Isopropylbenzene	3.06	1.74	0.93	0.480	0.2439	Isopropylbenzene	2.43
<i>n</i> -Propylbenzene	3.04	1.74	0.93	0.480	0.2440	<i>n</i> -Propylbenzene	2.43
3-Ethyltoluene	3.08	1.75	0.93	0.481	0.2446	3-Ethyltoluene	2.44
4-Ethyltoluene	3.05	1.74	0.93	0.479	0.2437	4-Ethyltoluene	2.43
1,3,5-Trimethylbenzene	3.07	1.75	0.93	0.481	0.2448	1,3,5-Trimethylbenzene	2.44
2-Ethyltoluene	3.14	1.78	0.95	0.490	0.2492	2-Ethyltoluene	2.48
1,2,4-Trimethylbenzene	5.18	2.95	1.57	0.812	0.4130	1,2,4-Trimethylbenzene	4.11
1,2,3-Trimethylbenzene	3.19	1.81	0.96	0.498	0.2530	1,2,3-Trimethylbenzene	2.52
Indan	3.46	1.95	1.04	0.536	0.2726	Indan	2.71
1,4-Diethylbenzene	3.04	1.74	0.93	0.480	0.2439	1,4-Diethylbenzene	2.43
<i>n</i> -Butylbenzene	3.05	1.74	0.92	0.479	0.2434	<i>n</i> -Butylbenzene	2.42
1,2-Diethylbenzene	3.22	1.78	0.95	0.490	0.2489	1,2-Diethylbenzene	2.48
1,2,4,5-Tetramethylbenzene	2.10	1.20	0.64	0.329	0.1674	1,2,4,5-Tetramethylbenzene	4.44
1,2,3,5-Tetramethylbenzene	2.09	1.20	0.64	0.330	0.1679	1,2,3,5-Tetramethylbenzene	1.67
Naphthalene	2.35	1.34	0.71	0.369	0.1877	Naphthalene	1.87
Pentamethylbenzene	2.16	1.23	0.66	0.340	0.1727	Pentamethylbenzene	1.72
1-Methylnaphthalene	2.32	1.34	0.71	0.369	0.1877	1-Methylnaphthalene	1.87
2-Methylnaphthalene	2.41	1.37	0.73	0.378	0.1922	2-Methylnaphthalene	1.91
Isooctane	----	43.47	69.96	84.441	92.0905	Isooctane	17.67

Technical Note

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

Internal Standard

(M-GRA-IS-R) Mix Ratio

Benzene-d ₆	(2 mL)	16.57	16.57	16.57	16.57	16.57
Ethylbenzene-d ₁₀	(2 mL)	16.76	16.76	16.76	16.76	16.76
Naphthalene-d ₈	(1 gm)	8.78	8.78	8.78	8.78	8.78
Toluene-d ₈	(7 mL)	57.88	57.88	57.88	57.88	57.88

Internal Standard

(M-GRA-IS-R) Mix Ratio

Benzene-d ₆	(2 mL)	16.57
Ethylbenzene-d ₁₀	(2 mL)	16.76
Naphthalene-d ₈	(1 mL)	8.78
Toluene-d ₈	(7 mL)	57.88

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

Daily Quality Control Standard (without Internal Standard)

M-GRA-QC-10ML

M-GRA-QC-10ML-PAK

1 x 10 mL

5 x 10 mL

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

Daily Quality Control Standard (with Internal Standard M-GRA-IS-R)

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

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

1 x 5 mL

5 x 5mL

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

Includes M-GRA-IS-R (4 Comp. Internal Standards Mix) combined with the above 13 Comp. Core QC Mix: M-GRA-QC in a 12 to 100 weight ratio. 17 comps.

4 Comp. Deuterated Internal Std. Mix

M-GRA-IS-R-10ML

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

1 x 10 mL

5 x 10 mL

4 comps.

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

ASTM/EPA Sensitivity Test Solution

M-GRA-ST

M-GRA-ST-PAK

1 x 1 mL

5 x 1 mL

100 µg/mL in Isooctane

1,4-Diethyl benzene

Technical Note

Use with any M-GRA Calibration Curve.

Standards of Interest

For the mandatory real world QC samples stipulated in the Method, see pages 1-2



ASTM Standards

ASTM

ASTM D-5769 Version with No Internal Standard

Originally designed for D-5769-98

The following D-5769 and M-GRA Standards were formulated to address proposed and promulgated changes to ASTM Method D-5769-98 Aromatics by GC/MS. Many of these changes were evaluated and/or adopted due to the results generated from the 1997 Round Robin, which used a select group of 21 gasolines ampulized by AccuStandard.

AccuStandard is committed to staying abreast of ASTM committee D-02 method developments. We ask that you contact us when your analytical group finds a beneficial procedure or modification.

Modifications

- ✓ A **Sixth Standard** was added to meet the latest D-5769 method requirements and provide improved linearity at the high end of the Calibration curve
- ✓ The **Calibration Curve** was packaged in two convenient sizes without the internal standard. This packaging scheme allows for the addition of any ISTD formulation or oxygenate components.
- ✓ The **Quality Control Standard** was reformulated in the latest D-5769 revision. The formulation changes include reducing the 1,2,4,5-Tetramethylbenzene weight ratio and adding Naphthalene.
- ✓ The **Benzene Target Weight %** has been increased to meet the latest D-5769 method requirements.
- ✓ **Pentamethylbenzene** has now been removed from the analyte list.



Disk Deliverable
(At no additional charge)

Eliminates hand keyed-in data.

CALAMTS®

(Disk containing "Calibration Amounts")

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

Calibration Curve with No Internal Std. Added

D-5769-CAL-SET-5ML
D-5769-CAL-SET-10ML

Set of 5 x 5 mL
Set of 5 x 10 mL

Optional Sixth Standard

D-5769-ADD-5ML 1 x 5 mL
D-5769-ADD-10ML 1 x 10 mL

Core Calibr. Mix 23 Comps.	Std. 1 Target Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %	Core Calibration Mix 23 Comps.	Target Wt. %
Benzene	5.25	2.95	1.575	0.8144	0.4143	Benzene	4.16
Toluene	19.67	11.06	5.898	3.0505	1.5519	Toluene	16.41
Ethylbenzene	5.18	2.91	1.552	0.8026	0.4083	Ethylbenzene	4.10
<i>m</i> -Xylene	6.19	3.48	1.856	0.9598	0.4883	<i>m</i> -Xylene	4.91
<i>p</i> -Xylene	6.19	3.48	1.856	0.9598	0.4883	<i>p</i> -Xylene	4.91
<i>o</i> -Xylene	6.30	3.54	1.890	0.9776	0.4973	<i>o</i> -Xylene	5.00
Isopropylbenzene	3.09	1.74	0.925	0.4786	0.2435	Isopropylbenzene	2.45
<i>n</i> -Propylbenzene	3.09	1.74	0.926	0.4787	0.2435	<i>n</i> -Propylbenzene	2.45
3-Ethyltoluene	3.10	1.74	0.928	0.4801	0.2442	3-Ethyltoluene	2.45
4-Ethyltoluene	3.08	1.73	0.925	0.4782	0.2433	4-Ethyltoluene	2.44
1,3,5-Trimethylbenzene	3.10	1.74	0.929	0.4804	0.2444	1,3,5-Trimethylbenzene	2.46
2-Ethyltoluene	3.15	1.77	0.945	0.4890	0.2488	2-Ethyltoluene	2.50
1,2,4-Trimethylbenzene	5.23	2.94	1.567	0.8104	0.4123	1,2,4-Trimethylbenzene	4.14
1,2,3-Trimethylbenzene	3.20	1.80	0.960	0.4965	0.2526	1,2,3-Trimethylbenzene	2.54
Indan	3.45	1.94	1.034	0.5350	0.2722	Indan	2.73
1,4-Diethylbenzene	3.09	1.74	0.925	0.4786	0.2435	1,4-Diethylbenzene	2.45
<i>n</i> -Butylbenzene	3.08	1.73	0.923	0.4776	0.2430	<i>n</i> -Butylbenzene	2.44
1,2-Diethylbenzene	3.15	1.77	0.945	0.4885	0.2485	1,2-Diethylbenzene	2.50
1,2,4,5-Tetramethylbenzene	2.12	1.19	0.635	0.3284	0.1671	1,2,4,5-Tetramethylbenzene	1.68
1,2,3,5-Tetramethylbenzene	2.12	1.19	0.637	0.3295	0.1676	1,2,3,5-Tetramethylbenzene	1.68
Naphthalene	2.37	1.34	0.712	0.3683	0.1874	Naphthalene	1.88
1-Methylnaphthalene	2.37	1.34	0.712	0.3683	0.1874	1-Methylnaphthalene	1.88
2-Methylnaphthalene	2.43	1.37	0.730	0.3773	0.1919	2-Methylnaphthalene	1.93
Isooctane	-----	43.77	70.015	84.4922	92.1105	Isooctane	19.92

4 Comp. Deuterated Internal Std. Mix

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

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

Daily Quality Control Standard (without Internal Standard)

D-5769-QC-10ML 1 x 10 mL
D-5769-QC-10ML-PAK 5 x 10 mL

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

3 Comp. Deuterated Internal Std. Mix

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

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

ASTM Standards

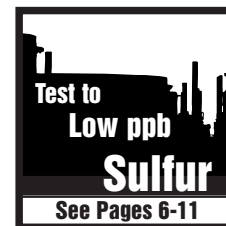
Method 5769



ASTM

ASTM D-5769 Version with 3 Internal Standards

Originally designed for D-5769-98



Calibration Curve with a 3 Comp. Deuterated Internal Standard added D-5769-CAL/IS-SET 5 x 1 mL						Optional Sixth Standard with a 3 Comp. Deuterated Internal Standard added D-5769-ADD/IS 1 x 1 mL	
Core Calibr. Mix 24 Comps.	Std. 1 Target Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %	Core Calibration Mix 24 Comps.	Target Wt. %
Benzene	5.25	2.95	1.575	0.8144	0.4143	Benzene	4.16
Toluene	19.67	11.06	5.898	3.0505	1.5519	Toluene	16.41
Ethylbenzene	5.18	2.91	1.552	0.8026	0.4083	Ethylbenzene	4.10
<i>m</i> -Xylene	6.19	3.48	1.856	0.9598	0.4883	<i>m</i> -Xylene	4.91
<i>p</i> -Xylene	6.19	3.48	1.856	0.9598	0.4883	<i>p</i> -Xylene	4.91
<i>o</i> -Xylene	6.30	3.54	1.890	0.9776	0.4973	<i>o</i> -Xylene	5.00
Isopropylbenzene	3.09	1.74	0.925	0.4786	0.2435	Isopropylbenzene	2.45
<i>n</i> -Propylbenzene	3.09	1.74	0.926	0.4787	0.2435	<i>n</i> -Propylbenzene	2.45
3-Ethyltoluene	3.10	1.74	0.928	0.4801	0.2442	3-Ethyltoluene	2.45
4-Ethyltoluene	3.08	1.73	0.925	0.4782	0.2433	4-Ethyltoluene	2.44
1,3,5-Trimethylbenzene	3.10	1.74	0.929	0.4804	0.2444	1,3,5-Trimethylbenzene	2.46
2-Ethyltoluene	3.15	1.77	0.945	0.4890	0.2488	2-Ethyltoluene	2.50
1,2,4-Trimethylbenzene	5.23	2.94	1.567	0.8104	0.4123	1,2,4-Trimethylbenzene	4.14
1,2,3-Trimethylbenzene	3.20	1.80	0.960	0.4965	0.2526	1,2,3-Trimethylbenzene	2.54
Indan	3.45	1.94	1.034	0.5350	0.2722	Indan	2.73
1,4-Diethylbenzene	3.09	1.74	0.925	0.4786	0.2435	1,4-Diethylbenzene	2.45
<i>n</i> -Butylbenzene	3.08	1.73	0.923	0.4776	0.2430	<i>n</i> -Butylbenzene	2.44
1,2-Diethylbenzene	3.15	1.77	0.945	0.4885	0.2485	1,2-Diethylbenzene	2.50
1,2,4,5-Tetramethylbenzene	2.12	1.19	0.635	0.3284	0.1671	1,2,4,5-Tetramethylbenzene	1.68
1,2,3,5-Tetramethylbenzene	2.12	1.19	0.637	0.3295	0.1676	1,2,3,5-Tetramethylbenzene	1.68
Naphthalene	2.37	1.34	0.712	0.3683	0.1874	Naphthalene	1.88
1-Methylnaphthalene	2.37	1.34	0.712	0.3683	0.1874	1-Methylnaphthalene	1.88
2-Methylnaphthalene	2.43	1.37	0.730	0.3773	0.1919	2-Methylnaphthalene	1.93
Isooctane	-----	43.77	70.015	84.4922	92.1105	Isooctane	19.92

Internal Standard M-GRA-IS Compound Benzene-d₆, Ethylbenzene-d₁₀, Naphthalene-d₈ Mix ratio 2 mL, 2 mL, 1 gm The 3 Comp. Internal Standard Mix (M-GRA-IS) is combined with the 24 Comp. Core Calibration Curve Mixes above in a 5 to 100 weight ratio to formulate these 27 Comp. calibration solutions.

Daily Quality Control Standard (with Internal Standard)

Compound	Wt. Ratio	Compound	Wt. Ratio
<i>n</i> -Hexane	12	Toluene	9
<i>n</i> -Heptane	17	Ethylbenzene	3
<i>n</i> -Octane	17	<i>m</i> -Xylene	3
<i>n</i> -Decane	12	<i>o</i> -Xylene	3
<i>n</i> -Dodecane	5	1,2,4-Trimethylbenzene	3
Isooctane	12	1,2,4,5-Tetramethylbenzene	2
Benzene	1	Naphthalene	1
Includes M-GRA-IS (3 component mix) added in 5 to 100 weight ratio			100

3 Comp. Deuterated Internal Std. Mix

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

Sensitivity Test Solution

M-GRA-ST	1 x 1 mL
M-GRA-ST-PAK	5 x 1 mL
100 µg/mL in Isooctane	
1,4-Diethyl benzene	

Resolution Standard

M-GRA-RES	1 x 1 mL
M-GRA-RES-PAK	5 x 1 mL
3 comps.	
1,3,5-Trimethylbenzene	3.0
1-Methyl-2-ethylbenzene	3.0
Isooctane	94

Fragmentation Pattern Standard

M-GRA-FP	1 x 1 mL
M-GRA-FP-PAK	5 x 1 mL
3.0% w/w in Isooctane	
1,2,3-Trimethylbenzene	

Mass Scan Range Standard

M-GRA-MSR	1 x 1 mL
M-GRA-MSR-PAK	5 x 1 mL
3.0% w/w in Isooctane	
Toluene	



ASTM Standards

Originally designed for D-5769-98

ASTM D-5769 4 Internal Standard Version (includes Toluene-d)

ASTM

Calibration Curve with a 4 Comp. Deuterated Internal Standard added D-5769-CAL/IS-R-SET						Optional Sixth Standard with a 4 Comp. Deuterated Internal Standard added D-5769-ADD/IS-R	
5 x 1 mL						1 x 1 mL	
Core Calibr. Mix 24 Comps.	Std. 1 Target Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %	Core Calibration Mix 24 Comp.	Target Wt. %
Benzene	5.25	2.95	1.575	0.8144	0.4143	Benzene	4.16
Toluene	19.67	11.06	5.898	3.0505	1.5519	Toluene	16.41
Ethylbenzene	5.18	2.91	1.552	0.8026	0.4083	Ethylbenzene	4.10
<i>m</i> -Xylene	6.19	3.48	1.856	0.9598	0.4883	<i>m</i> -Xylene	4.91
<i>p</i> -Xylene	6.19	3.48	1.856	0.9598	0.4883	<i>p</i> -Xylene	4.91
<i>o</i> -Xylene	6.30	3.54	1.890	0.9776	0.4973	<i>o</i> -Xylene	5.00
Isopropylbenzene	3.09	1.74	0.925	0.4786	0.2435	Isopropylbenzene	2.45
<i>n</i> -Propylbenzene	3.09	1.74	0.926	0.4787	0.2435	<i>n</i> -Propylbenzene	2.45
3-Ethyltoluene	3.10	1.74	0.928	0.4801	0.2442	3-Ethyltoluene	2.45
4-Ethyltoluene	3.08	1.73	0.925	0.4782	0.2433	4-Ethyltoluene	2.44
1,3,5-Trimethylbenzene	3.10	1.74	0.929	0.4804	0.2444	1,3,5-Trimethylbenzene	2.46
2-Ethyltoluene	3.15	1.77	0.945	0.4890	0.2488	2-Ethyltoluene	2.50
1,2,4-Trimethylbenzene	5.23	2.94	1.567	0.8104	0.4123	1,2,4-Trimethylbenzene	4.14
1,2,3-Trimethylbenzene	3.20	1.80	0.960	0.4965	0.2526	1,2,3-Trimethylbenzene	2.54
Indan	3.45	1.94	1.034	0.5350	0.2722	Indan	2.73
1,4-Diethylbenzene	3.09	1.74	0.925	0.4786	0.2435	1,4-Diethylbenzene	2.45
<i>n</i> -Butylbenzene	3.08	1.73	0.923	0.4776	0.2430	<i>n</i> -Butylbenzene	2.44
1,2-Diethylbenzene	3.15	1.77	0.945	0.4885	0.2485	1,2-Diethylbenzene	2.50
1,2,4,5-Tetramethylbenzene	2.12	1.19	0.635	0.3284	0.1671	1,2,4,5-Tetramethylbenzene	1.68
1,2,3,5-Tetramethylbenzene	2.12	1.19	0.637	0.3295	0.1676	1,2,3,5-Tetramethylbenzene	1.68
Naphthalene	2.37	1.34	0.712	0.3683	0.1874	Naphthalene	1.88
1-Methylnaphthalene	2.37	1.34	0.712	0.3683	0.1874	1-Methylnaphthalene	1.88
2-Methylnaphthalene	2.43	1.37	0.730	0.3773	0.1919	2-Methylnaphthalene	1.93
Isooctane	-----	43.77	70.015	84.4922	92.1105	Isooctane	19.92

Internal Standard M-GRA-IS-R

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

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

Daily Quality Control Standard (with Internal Standard)

D-5769-QC/IS-R-5ML 1 x 5 mL
D-5769-QC/IS-R-5ML-PAK 5 x 5 mL
18 comps.

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

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

Sensitivity Test Solution

M-GRA-ST 1 x 1 mL
M-GRA-ST-PAK 5 x 1 mL
100 µg/mL in Isooctane
1,4-Diethyl benzene

Resolution Standard

M-GRA-RES 1 x 1 mL
M-GRA-RES-PAK 5 x 1 mL
3 comps.

Compound	Wt. %
1,3,5-Trimethylbenzene	3.0
1-Methyl-2-ethylbenzene	3.0
Isooctane	94

4 Comp. Deuterated Internal Std. Mix

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

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

Fragmentation Pattern Standard

M-GRA-FP 1 x 1 mL
M-GRA-FP-PAK 5 x 1 mL
3.0 w/w in Isooctane
1,2,3-Trimethylbenzene

ASTM Standards

Method 5769



ASTM

ASTM D-5769 New Proposed / Promulgated Method Modifications

Originally designed for D-5769-98

Calibration Curve with a 3 Comp. Chlorinated Internal Standard added D-5769-CAL/IS-R2-SET 5 x 1 mL						Optional Sixth Standard with a 3 Comp. Chlorinated Internal Standard added D-5769-ADD/IS-R2 1 x 1 mL	
Core Calibr. Mix 24 Comps.	Std. 1 Target Wt. %	Std. 2 Wt. %	Std. 3 Wt. %	Std. 4 Wt. %	Std. 5 Wt. %	Core Calibration Mix 24 Component	Target Wt. %
Benzene	5.25	2.95	1.575	0.8144	0.4143	Benzene	4.16
Toluene	19.67	11.06	5.898	3.0505	1.5519	Toluene	16.41
Ethylbenzene	5.18	2.91	1.552	0.8026	0.4083	Ethylbenzene	4.10
m-Xylene	6.19	3.48	1.856	0.9598	0.4883	m-Xylene	4.91
p-Xylene	6.19	3.48	1.856	0.9598	0.4883	p-Xylene	4.91
o-Xylene	6.30	3.54	1.890	0.9776	0.4973	o-Xylene	5.00
Isopropylbenzene	3.09	1.74	0.925	0.4786	0.2435	Isopropylbenzene	2.45
n-Propylbenzene	3.09	1.74	0.926	0.4787	0.2435	n-Propylbenzene	2.45
3-Ethyltoluene	3.10	1.74	0.928	0.4801	0.2442	3-Ethyltoluene	2.45
4-Ethyltoluene	3.08	1.73	0.925	0.4782	0.2433	4-Ethyltoluene	2.44
1,3,5-Trimethylbenzene	3.10	1.74	0.929	0.4804	0.2444	1,3,5-Trimethylbenzene	2.46
2-Ethyltoluene	3.15	1.77	0.945	0.4890	0.2488	2-Ethyltoluene	2.50
1,2,4-Trimethylbenzene	5.23	2.94	1.567	0.8104	0.4123	1,2,4-Trimethylbenzene	4.14
1,2,3-Trimethylbenzene	3.20	1.80	0.960	0.4965	0.2526	1,2,3-Trimethylbenzene	2.54
Indan	3.45	1.94	1.034	0.5350	0.2722	Indan	2.73
1,4-Diethylbenzene	3.09	1.74	0.925	0.4786	0.2435	1,4-Diethylbenzene	2.45
n-Butylbenzene	3.08	1.73	0.923	0.4776	0.2430	n-Butylbenzene	2.44
1,2-Diethylbenzene	3.15	1.77	0.945	0.4885	0.2485	1,2-Diethylbenzene	2.50
1,2,4,5-Tetramethylbenzene	2.12	1.19	0.635	0.3284	0.1671	1,2,4,5-Tetramethylbenzene	1.68
1,2,3,5-Tetramethylbenzene	2.12	1.19	0.637	0.3295	0.1676	1,2,3,5-Tetramethylbenzene	1.68
Naphthalene	2.37	1.34	0.712	0.3683	0.1874	Naphthalene	1.88
1-Methylnaphthalene	2.37	1.34	0.712	0.3683	0.1874	1-Methylnaphthalene	1.88
2-Methylnaphthalene	2.43	1.37	0.730	0.3773	0.1919	2-Methylnaphthalene	1.93
Isooctane	-----	43.77	70.015	84.4922	92.1105	Isooctane	19.92

Internal Standard	Compound	Mix ratio	The 3 Comp. Internal Standard Mix (M-GRA-IS-R2) is combined with the 24 Comp. Core Calibration Curve mixtures above in a 5 to 100 weight ratio to formulate these 27 Comp. calibration solutions.
M-GRA-IS-R2	Chlorobenzene	2 mL	
	1,2-Dichlorobenzene	2 mL	
	1,2,4-Trichlorobenzene	1 mL	

Daily Quality Control Standard (with Internal Standard)			
D-5769-QC/IS-R2-5ML		1 x 5 mL	
D-5769-QC/IS-R2-5ML-PAK		5 x 5 mL	
17 comps.			
Compound	Wt. Ratio	Compound	Wt. Ratio
n-Hexane	12	Toluene	9
n-Heptane	17	Ethylbenzene	9
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-R2 (3 component mix) added in 5 to 100 weight ratio 100

Sensitivity Test Solution		M-GRA-ST	1 x 1 mL
		M-GRA-ST-PAK	5 x 1 mL
		100 µg/mL in Isooctane	
		1,4-Diethyl benzene	

Fragmentation Pattern Standard		M-GRA-FP	1 x 1 mL
		M-GRA-FP-PAK	5 x 1 mL
		3.0 w/w in Isooctane	
		1,2,3-Trimethylbenzene	

3 Comp. Chlorinated Internal Std. Mix		Resolution Standard	
M-GRA-IS-R2-SET		M-GRA-RES	
M-GRA-IS-R2-25ML		M-GRA-RES-PAK	
set of 25 x 1 mL		1 x 1 mL	
1 x 25 mL		5 x 1 mL	
3 comps.		3 comps.	
Compound	Mix Ratio	Compound	Wt. %
Chlorobenzene	2 mL	1,3,5-Trimethylbenzene	3.0
1,2-Dichlorobenzene	2 mL	1-Methyl-2-ethylbenzene	3.0
1,2,4-Trichlorobenzene	1 mL	Isooctane	94



Disk Deliverable (At no additional charge)

Eliminates hand keyed-in data.

CALAMTS®

(Disk containing "Calibration Amounts")

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

Standards of Interest

For the mandatory real world QC samples stipulated in the Method, see pages 1-2



ASTM Standards

ASTM

ASTM D-5769 Special QA/QC Formulations

Originally designed for D-5769-98

Daily Quality Control Standard (without Internal Standard)

M-GRA-QC-R-10ML 1 x 10 mL
M-GRA-QC-R-10ML-PAK 5 x 10 mL

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

For use with any M-GRA Calibration Curve

Technical Note

Specially formulated Daily Quality Control Standards originally designed in response to client requests for QC mixes that bracket the curve and contain more C9+ analytes to verify the instrument and QC solution integrity.

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Daily Quality Control Standard (with Internal Standard M-GRA-IS)

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

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

Includes M-GRA-IS (3 Comp. Internal Standards Mix) combined with the above 15 Comp. Core QC Mix: M-GRA-QC-R in a 5 to 100 weight ratio

Daily Quality Control Standard (with Internal Std. M-GRA-IS-R)

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

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

Includes M-GRA-IS-R (4 Comp. Internal Standards mix) combined with the above 15 Comp. Core QC Mix: M-GRA-QC-R in a 12 to 100 Wt. ratio

AccuPAK®

- Reduce reordering frequency
- Reduce data entry time for Calibration tables due to Lot No. consistency
- Economical

3 Comp. Deuterated Internal Std. Mix

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

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

4 Comp. Deuterated Internal Std. Mix

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

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

Custom Ampulling for Bulk Quantity Requirements

- Fill Volumes from 0.2 mL to 20 mL
- Flammables
- QC Services available

AccuStandard has the resources and equipment to meet your custom packaging requirements. Our full automated filler-sealer can accommodate a fill range from 0.5 to 20 mL, and ampule sizes from 1 mL to 20 mL.

AccuStandard has extensive experience with Round Robin samples for ASTM committees.

Call our Technical Department for a quotation.



ASTM Standards

Method

5769



Through a collaborative effort involving the instrument manufactures, Petrochemical end users, and Chemical Reference Standard manufacturers, the following proposed D-5769 method is under consideration. A number of end users would like to evaluate this proposed D-5769 method and have asked AccuStandard to make the standards. We have formulated the following certified standards to meet those requests.

Summary Proposed Modifications for D-5769

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

ASTM

ASTM D-5769-XX Calibration Curve with No Internal Standard Added

ASTM-P-0140-SET		Set of 5 x 5 mL				
		ASTM-P-0140-01	ASTM-P-0140-02	ASTM-P-0140-03	ASTM-P-0140-04	ASTM-P-0140-05
Core Calibr. Mix Compound	Level 1 Target Mass %	Level 2 Mass %	Level 3 Mass %	Level 4 Mass %	Level 5 Mass %	
Benzene	5	3	1	0.5	0.1	
Toluene	12	9	6	3	0.5	
Ethylbenzene	5	3.75	2.5	1.25	0.2	
1,3-Dimethylbenzene	10	7.5	5	2.5	0.2	
1,4-Dimethylbenzene	5	3.75	2.5	1.25	0.2	
1,2-Dimethylbenzene	5	3.75	2.5	1.25	0.2	
(1-Methylethyl)-benzene	3	2.25	1.5	0.75	0.2	
1-Methyl-3-ethylbenzene	3	2.25	1.5	0.75	0.2	
1-Methyl-4-ethylbenzene	3	2.25	1.5	0.75	0.2	
1,3,5-Trimethylbenzene	3	2.25	1.5	0.75	0.2	
1-Methyl-2-ethylbenzene	3	2.25	1.5	0.75	0.2	
1,2,4-Trimethylbenzene	6	4.5	3	1.5	0.2	
1,2,3-Trimethylbenzene	3	2.25	1.5	0.75	0.2	
Indan	3	2.25	1.5	0.75	0.2	
1,2-Diethylbenzene	2	1.5	1	0.5	0.2	
Naphthalene ^A	2	1.5	1	0.5	0.1	
2-Methylnaphthalene ^A	2	1.5	1	0.5	0.1	
1-Methylnaphthalene ^A	2	1.5	1	0.5	0.1	
Isooctane (solvent) *	balance	balance	balance	balance	balance	

A = This component is a solid at room temperature

Technical Note

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

4 Comp. Deuterated Internal Std. Mix

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

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

4 Comp. Deuterated Internal Std. Mix

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

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

Performance Evaluation Standard

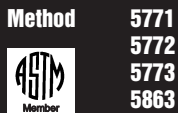
ASTM-P-0140-PES 1 x 1 mL
 ASTM-P-0140-PES-PAK 5 x 1 mL
 11 comps.

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

Composition of Daily QC Standard

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

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



ASTM Standards

ASTM

ASTM D-5771 Cloud Point of Petroleum Products

See page 5 for AccuStandard's comprehensive line of certified Cloud Point Standards.

ASTM D-5772 Cloud Point of Petroleum Products (Linear Cooling Rate Method)

See page 5 for AccuStandard's comprehensive line of certified Cloud Point Standards.

ASTM D-5773 Cloud Point of Petroleum Products (Constant Cooling Rate Method)

See page 5 for AccuStandard's comprehensive line of certified Cloud Point Standards.

WEAR METALS

ASTM D-5863 Nickel, Vanadium, Iron, & Sodium in Crude Oils & Residual Fuels by Flame AA Spectrometry

Originally designed for D-5863-00

Test Method A - Sample Decomposition with Acid for Total Ni, V and Fe Determination

Stock Multi-Element Aqueous Standard

D-5863-95A-10X-1 1 x 100 mL
2-5% HNO₃ 3 comps.

	µg/mL		µg/mL
Iron	100	Vanadium	200
Nickel	200		

Matrix Blank Nitric Acid Blank

CLP-BLN-5 500 mL
CLP-BLN-L **SAVE 33%** L (2 x 500 mL)

5% HNO₃ in ASTM Type I Water

Individual High Concentration Elements in Aqueous Matrix

Element	Matrix	Unit	1,000 µg/mL Conc. Cat. No.
Iron	Fe in HNO ₃	500 mL	ICP-27N-5
Nickel	Ni in HNO ₃	500 mL	ICP-37N-5
Vanadium	V ₂ O ₅ in HNO ₃	500 mL	ICP-67N-5

Test Method B - Sample Dilution with Organic Solvent for the Determination of Ni, V and Na using Oil-Soluble Metals as Calibrants.

Stock Multi-Element Standard in Mineral Oil

D-5863-95B-10X 1 x 4 oz
At stated conc. in 20 cst Mineral Oil 3 comps.

	µg/g		µg/g
Sodium	50	Vanadium	150
Nickel	200		

Standards of Interest

See pages 59-65 for AccuStandard's comprehensive line of Certified Oil Dissolved Wear Metal calibration standards designed for flame AA Applications.

Standards of Interest

See page 73-75 for additional Trace Metal Standards by AA.

ASTM Standards

Method 5901 - 5986


ASTM

ASTM D-5901 Freezing Point Aviation Fuels (Automated Optical Method)

See page 5 for AccuStandard's comprehensive line of Certified Freezing Point Standards.

Standards of Interest

Also see Cloud Point standards used for ASTM Method D-2500 on page 5.

ASTM D-5972 Freezing Point Aviation Fuels (Automated Phase Transition Method)

See page 5 for AccuStandard's comprehensive line of Certified Freezing Point Standards.

ASTM D-5986 Oxygenates, Benzene, Toluene, C₆-C₁₂, Aromatics & Total Aromatics in Finished Gasolines by GC/FTIR

Daily Quality Control Standard (without Internal Standard)

M-GRA-QC-10ML		1 x 10 mL	
M-GRA-QC-10ML-PAK		5 x 10 mL	
Compound	Wt. Ratio	Compound	Wt. Ratio
<i>n</i> -Hexane	12	Toluene	9
<i>n</i> -Heptane	17	Ethylbenzene	3
<i>n</i> -Octane	17	<i>m</i> -Xylene	3
<i>n</i> -Decane	12	<i>o</i> -Xylene	3
<i>n</i> -Dodecane	5	1,2,4-Trimethylbenzene	3
Isooctane	12	1,2,4,5-Tetramethylbenzene	3
Benzene	1		
		13 Comp. Core Mix	100

Technical Note

AccuStandard formulated this quality control standard to meet Section 11 of ASTM D-5986-96 specifications stipulating to "analyze the quality control reference material before every batch of samples. Bracket the samples with the reference materials".

Oxygenate QC samples are available on pages 1-2 or can be custom formulated.

Originally designed for D-5986-96

Standards of Interest

See page 34 for Oxygenate Calibration Curve (Cat. No. M-GRO-CAL-SET) and page 46 for AccuStandard's Aromatic Calibration Curve (Cat. No. D-5769-CAL-SET-5ML).



Cross Reference Table

ASTM IP ISO DIN JIS AFNOR sorted by
 ASTM Method see beginning of Catalog

Method **6160**
6258
6277



ASTM Standards

ASTM D-6160 Polychlorinated Biphenyls (PCBs in Waste Materials by GC)

Originally designed for D-6160-98

ASTM

Aroclor Solutions (Individual and Kit)				<i>in PAK</i>	
Aroclor #	(35 µg/mL in Isooctane) Cat. No.	(35 µg/mL in MeOH) Cat. No.	(35 µg/mL in Hexane) Cat. No.	1 x 1 mL	5 x 1 mL
Aroclor 1016	C-216S	C-216S-M	C-216S-H-10X		Cat. #-PAK
Aroclor 1221	C-221S	C-221S-M	C-221S-H-10X		Cat. #-PAK
Aroclor 1232	C-232S	C-232S-M	C-232S-H-10X		Cat. #-PAK
Aroclor 1242	C-242S	C-242S-M	C-242S-H-10X		Cat. #-PAK
Aroclor 1248	C-248S	C-248S-M	C-248S-H-10X		Cat. #-PAK
Aroclor 1254	C-254S	C-254S-M	C-254S-H-10X		Cat. #-PAK
Aroclor 1260	C-260S	C-260S-M	C-260S-H-10X		Cat. #-PAK
Aroclor 1262	C-262S	C-262S-M	C-262S-H-10X		Cat. #-PAK
Aroclor 1268	C-268S	C-268S-M	C-268S-H-10X		Cat. #-PAK
Kit of all 9 above	Z-008S	Z-008S-M	Z-008S-H-10X		9 x 1 mL

Additional Ready-to-Inject PCB Aroclor Calibration Curves available in our Organic Catalog

Originally designed for D-6258-98

ASTM D-6258 Solvent Red 164 Dye Concentration in Diesel Fuels

Stock Solvent Red 26 Standard			
D-6258-CONC-5ML		1 x 5 mL	
Solvent Red 26 @ 300 µg/mL in Xylene			
D-6258 Calibration Curve			
D-6258-CAL-SET-5ML		set of 6 x 5 mL	
Set includes the following Cat. No.'s			
Cat. No.	Description		Unit
D-6258-BL	Xylene Blank		1 x 5 mL
D-6258-01	Solvent Red 26 Dye @ 3 µg/mL in Xylene		1 x 5 mL
D-6258-02	Solvent Red 26 Dye @ 6 µg/mL in Xylene		1 x 5 mL
D-6258-03	Solvent Red 26 Dye @ 9 µg/mL in Xylene		1 x 5 mL
D-6258-04	Solvent Red 26 Dye @ 12 µg/mL in Xylene		1 x 5 mL
D-6258-05	Solvent Red 26 Dye @ 15 µg/mL in Xylene		1 x 5 mL



Technical Note

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

ASTM D-6277 Benzene in Spark - Ignition Engine Fuels using Mid Infrared Spectroscopy

See page 1 for AccuStandard's QA/QC material reference in the method.



AccuStandard is an active member in ASTM and strives to keep abreast of ASTM method revisions. If our listed formulation does not meet the most recent method revision, please contact Technical Support, ext. 117 for an updated product.

ASTM Standards

Method

6293

6296



ASTM

ASTM D-6293

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

Originally designed for D-6293-98

O-PONA System Validation Mixture

ASTM-P-0080		1 x 1 mL	
ASTM-P-0080-PAK	SAVE 26%	5 x 1 mL	
		33 comps.	
	Wt./Wt. %	Wt./Wt. %	
Cyclopentane	1.5	Benzene	2.5
<i>n</i> -Pentane	1.5	Toluene	2.5
Cyclohexane	2.0	<i>trans</i> -Decahydronaphthelene	3.5
2,3-Dimethylbutane	2.0	<i>n</i> -Tetradecane	2.0
<i>n</i> -Hexane	2.0	Ethylbenzene	3.5
1-Hexene	1.5	<i>o</i> -Xylene	3.0
Methylcyclohexane	3.5	<i>n</i> -Propylbenzene	3.5
4-Methyl-1-hexene	1.5	1,2,4-Trimethylbenzene	3.0
<i>n</i> -Heptane	3.0	1,2,3-Trimethylbenzene	2.0
<i>cis</i> -1,2-Dimethylcyclohexane	4.5	1,2,4,5-Tetramethylbenzene	2.0
Isooctane	4.0	Pentamethylbenzene	2.5
<i>n</i> -Octane	4.0	Ethanol	5.0
1,2,4-Trimethylcyclohexane	3.5	<i>t</i> -Butanol	4.0
<i>n</i> -Nonane	3.0	MtBE	8.0
<i>n</i> -Decane	3.5	ETBE	3.0
<i>n</i> -Undecane	2.0	TAME	5.0
<i>n</i> -Dodecane	2.0		

O-PONA Olefin Mix

ASTM-P-0081	1 x 1 mL
ASTM-P-0081-PAK	5 x 1 mL
<i>At stated conc. in Hexane : Heptane (1:1)</i>	
	5 comps.
	Wt./Wt. %
1-Pentene	5.0
1-Hexene	2.0
1-Heptene	2.0
1-Octene	2.0
1-Nonene	3.0

O-PONA Paraffin Mix

ASTM-P-0082	1 x 1 mL
ASTM-P-0082-PAK	5 x 1 mL
<i>At stated conc. in Hexane : Heptane (1:1)</i>	
	2 comps.
	Wt./Wt. %
<i>n</i> -Nonane	5.0
<i>n</i> -Decane	2.0

O-PONA Paraffin Mix

ASTM-P-0082-R1	1 x 1 mL
ASTM-P-0082-R1-PAK	5 x 1 mL
<i>At stated conc. in Hexane : Heptane (1:1)</i>	
	2 comps.
	Wt./Wt. %
<i>n</i> -Nonane	3.0
<i>n</i> -Decane	3.0

Standards of Interest

For the mandatory real world QC samples stipulated in QA/QC section 8.6 of the method see pages 1-2.

ASTM D-6296

Total Olefins in Spark-Ignition Engine Fuels by Multidimensional GC

Originally designed for D-6296-98

System Setup & Verification Standards

D-6296-VER-SET 2 x 1 mL
Set contains 1 ampule of each Cat. No. listed below
D-6296-VER-SET-PAK **SAVE 23%** 5 x (2 x 1 mL)
5 sets containing 1 ampule of each Cat. No. listed below

System Setup & Verification Standards

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

System Setup & Verification Standards

D-6296-VER2	1 x 1 mL
	2 comps.
	Wt. %
ETBE	5%
Isooctane	95%

Calibration Standard with MTBE

D-6296-CAL1	1 x 1 mL		
D-6296-CAL1-PAK	5 x 1 mL		
	10 comps.		
	Wt. %		
Pentene	1.0	Decene	1.0
Hexene	1.0	Undecane	1.0
Heptene	1.0	Dodecane	1.0
Octene	1.0	Isooctane	87.0
Nonene	1.0	MTBE	5.0

Calibration Standard with ETBE

D-6296-CAL2	1 x 1 mL		
D-6296-CAL2-PAK	5 x 1 mL		
	11 comps.		
	Wt. %		
Pentene	1.0	Decane	1.0
Hexene	1.0	Undecane	1.0
Heptene	1.0	Dodecane	1.0
Octene	1.0	Isooctane	86.0
Nonene	1.0	ETBE	5.0
Decene	1.0		

Isooctane Blank Compensation Standard

D-6296-BL 1 x 5 mL
Isooctane (Neat)



ASTM Standards

ASTM

ASTM D-6304 Determination of Water in Petroleum Products Lubricating oil, and additives by Coulometric Karl Fischer Titration

See page 5 for AccuStandard's comprehensive line of Certified Water Standards, for Karl Fischer Analysis.

ASTM D-6334 Sulfur in Gasoline by Wavelength Dispersive X-Ray Fluorescence

See Sulfur Standards Group listing in the Table of Contents for AccuStandard's comprehensive line of Certified Sulfur Calibration Standards.

ASTM D-6352 Boiling Range Distribution of Petroleum Distillates from 174 to 700°C by GC

Originally designed for D-6352-98

Polywax 500® ASTM-P-0051N-2G 2 grams Polywax 500	Polywax 850® ASTM-P-0137N-2G 2 grams Polywax 850																																																																												
Polywax 655® ASTM-P-0053N-2G 2 grams Polywax 655	Polywax 1000® ASTM-P-0138N-2G 2 grams Polywax 1000																																																																												
Hydrocarbon Window Defining Standard* DRH-008S-R2 1 x 1 mL DRH-008S-R2-PAK 5 x 1 mL 500 µg/mL each in Chloroform 35 comps. <table border="0"> <tr><td>Octane</td><td>Nonadecane</td><td>Triacontane</td></tr> <tr><td>Nonane</td><td>Phytane</td><td>n-Hentriacontane</td></tr> <tr><td>Decane</td><td>Eicosane</td><td>Dotriacontane</td></tr> <tr><td>Undecane</td><td>Heneicosane</td><td>Tritriacontane</td></tr> <tr><td>Dodecane</td><td>Docosane</td><td>Tetracontane</td></tr> <tr><td>Tridecane</td><td>Tricosane</td><td>Pentatriacontane</td></tr> <tr><td>Tetradecane</td><td>Tetracosane</td><td>Hexatriacontane</td></tr> <tr><td>Pentadecane</td><td>Pentacosane</td><td>Heptatriacontane</td></tr> <tr><td>Hexadecane</td><td>Hexacosane</td><td>Octatriacontane</td></tr> <tr><td>Heptadecane</td><td>Heptacosane</td><td>Nonatriacontane</td></tr> <tr><td>Octadecane</td><td>Octacosane</td><td>Tetracontane</td></tr> <tr><td>Pristane</td><td>Nonacosane</td><td></td></tr> </table>	Octane	Nonadecane	Triacontane	Nonane	Phytane	n-Hentriacontane	Decane	Eicosane	Dotriacontane	Undecane	Heneicosane	Tritriacontane	Dodecane	Docosane	Tetracontane	Tridecane	Tricosane	Pentatriacontane	Tetradecane	Tetracosane	Hexatriacontane	Pentadecane	Pentacosane	Heptatriacontane	Hexadecane	Hexacosane	Octatriacontane	Heptadecane	Heptacosane	Nonatriacontane	Octadecane	Octacosane	Tetracontane	Pristane	Nonacosane		Calibration Mix DRH-002N 100 mg DRH-002N-10X 1 gm 17 comps. <table border="0"> <thead> <tr><th colspan="2">Wt. %</th><th colspan="2">Wt. %</th></tr> </thead> <tbody> <tr><td>n-Hexane</td><td>6</td><td>n-Octadecane</td><td>5</td></tr> <tr><td>n-Heptane</td><td>6</td><td>n-Eicosane</td><td>2</td></tr> <tr><td>n-Octane</td><td>8</td><td>n-Tetracosane</td><td>2</td></tr> <tr><td>n-Nonane</td><td>8</td><td>n-Octacosane</td><td>1</td></tr> <tr><td>n-Decane</td><td>12</td><td>n-Dotriacontane</td><td>1</td></tr> <tr><td>n-Undecane</td><td>12</td><td>n-Hexatriacontane</td><td>1</td></tr> <tr><td>n-Dodecane</td><td>12</td><td>n-Tetracontane</td><td>1</td></tr> <tr><td>n-Tetradecane</td><td>12</td><td>n-Tetratetracontane</td><td>1</td></tr> <tr><td>n-Hexadecane</td><td>10</td><td></td><td></td></tr> </tbody> </table>	Wt. %		Wt. %		n-Hexane	6	n-Octadecane	5	n-Heptane	6	n-Eicosane	2	n-Octane	8	n-Tetracosane	2	n-Nonane	8	n-Octacosane	1	n-Decane	12	n-Dotriacontane	1	n-Undecane	12	n-Hexatriacontane	1	n-Dodecane	12	n-Tetracontane	1	n-Tetradecane	12	n-Tetratetracontane	1	n-Hexadecane	10		
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n-Hexadecane	10																																																																												
* Can be shipped by Air and Sea	Column Test Mixture ASTM-D2887 1 x 1 mL 1% v/v in n-Octane 2 comps. <table border="0"> <tr><td>n-Hexadecane</td><td>n-Octadecane</td></tr> </table>	n-Hexadecane	n-Octadecane																																																																										
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Standards of Interest
 Contact AccuStandard's Technical Department regarding the availability of a QA/QC Reference Oil Sample under development in ASTM.

ASTM D-6378 Vapor Pressure (VPx) of Petroleum Products, Hydrocarbons, & Hydrocarbon-Oxygenate Mixtures (Triple Expansion Method)

See pages 29 & 32 for AccuStandard's comprehensive line of Vapor Pressure Standards & Instrument Quality Control Samples.

Method **6443**
6481
6550



ASTM Standards

ASTM

ASTM D-6443 Ca, Cl, Cu, Mg, P, S, Zn in Unused Lubricating Oils & Additives by Wavelength Dispersive X-ray Fluorescence & Spectrometry

Originally designed for D-6443-99

Lubricating Oil, Elements, WLXRF ASTM Method (Nominal Value) Wt.% listed below
ASTM-P-0117-SET 10 x 100 mL

Cat. No.	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

Standards of Interest

See the Wear Metal Group listing in the Table of Contents for a comprehensive line of Certified Oil Dissolved Wear Metal Calibration Standards.

WEAR METALS

ASTM D-6445 Sulfur in Gasoline by ED - XRF

See the Sulfur Standards Group listing in the Table of Contents for AccuStandard's comprehensive line of Certified Sulfur Calibration Standards.

Originally designed for D-6481-99

ASTM D-6481 P, S, Ca and Zn in Lube Oils by ED-XRF

Lubricating Oil, Elements, EDXRF ASTM Method (Nominal Value) Wt.% listed below
ASTM-P-0114-SET 17 x 100 mL

Cat. No.	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

Originally designed for D-6550-00

ASTM D-6550 Olefin Content of Gasolines by SFC

Stock Olefin Calibration Standard

D-6550-CONC 1 x 1 mL

D-6550-CONC-SML 1 x 5 mL

At stated Conc. by Wt. % 15 comps.

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

Technical Note

AccuStandard worked in conjunction with the D-02 technical committee and Shell Oil to develop this stock Olefin Standard proven useful in creating the required calibration curve.

Standards of Interest

See page 2 for consensus value QA/QC material available for this method.

ASTM-FUEL- QCS-01-PAK:40	ASTM-P-0080- PAK:55	10X:38 ASTM-P-0091-20-	ASTM-P-0114- 09:58	ASTM-P-0140- 01:51
ASTM-FUEL- QCS-02-PAK:40	ASTM-P-0081:55 ASTM-P-0081-	10X:38 ASTM-P-0091-21-	ASTM-P-0114- 10:58	ASTM-P-0140- 02:51
ASTM-P-0051N- 2G:56	PAK:55 ASTM-P-0082:55	10X:38 ASTM-P-0091-22-	ASTM-P-0114- 11:58	ASTM-P-0140- 03:51
ASTM-P-0053N- 2G:56	ASTM-P-0082- PAK:55	10X:38 ASTM-P-0102-	ASTM-P-0114- 12:58	ASTM-P-0140- 04:51
ASTM-P-0061- SET:37	ASTM-P-0082- R1:55	SET:39 ASTM-P-0103-	ASTM-P-0114- 13:58	ASTM-P-0140- 05:51
ASTM-P-0062- SET:37	ASTM-P-0082- R1-PAK:55	01:39 ASTM-P-0103-	ASTM-P-0114- 14:58	ASTM-P-0140- IS:51
ASTM-P-0063- SET:37	ASTM-P-0091-01- 10X:38	02:39 ASTM-P-0103-	ASTM-P-0114- 15:58	ASTM-P-0140-IS- PAK:51
ASTM-P-0064- SET:37	ASTM-P-0091-02- 10X:38	03:39 ASTM-P-0103-	ASTM-P-0114- 16:58	ASTM-P-0140- IS2:51
ASTM-P-0065- SET:37	ASTM-P-0091-03- 10X:38	04:39 ASTM-P-0103-	ASTM-P-0114- 17:58	ASTM-P-0140- IS2-PAK:51
ASTM-P-0066- SET:37	ASTM-P-0091-04- 10X:38	05:39 ASTM-P-0103-	ASTM-P-0114- SET:58	ASTM-P-0140- PES:51
ASTM-P-0067- SET:37	ASTM-P-0091-05- 10X:38	06:39 ASTM-P-0103-	ASTM-P-0117- 01:58	ASTM-P-0140- PES-PAK:51
ASTM-P-0068- SET:37	ASTM-P-0091-06- 10X:38	07:39 ASTM-P-0103-	ASTM-P-0117- 02:58	ASTM-P-0140- QC:51
ASTM-P-0069- SET:37	ASTM-P-0091-07- 10X:38	08:39 ASTM-P-0103-	ASTM-P-0117- 03:58	ASTM-P-0140- QC-PAK:51
ASTM-P-0070- 10X:40	ASTM-P-0091-08- 10X:38	09:39 ASTM-P-0103-	ASTM-P-0117- 04:58	ASTM-P-124- 01:32
ASTM-P-0070- 1X:40	ASTM-P-0091-09- 10X:38	10:39 ASTM-P-0103-	ASTM-P-0117- 05:58	ASTM-P-124- 02:32
ASTM-P-0070- 20X:40	ASTM-P-0091-10- 10X:38	11:39 ASTM-P-0103-	ASTM-P-0117- 06:58	ASTM-P-124- 03:32
ASTM-P-0070- 2X:40	ASTM-P-0091- 10X-SET:38	12:39 ASTM-P-0103-	ASTM-P-0117- 07:58	ASTM-P-124- 04:32
ASTM-P-0070- 4X:40	ASTM-P-0091-11- 10X:38	SET:39 ASTM-P-0114-	ASTM-P-0117- 08:58	ASTM-P-124- 05:32
ASTM-P-0070- BL:40	ASTM-P-0091-12- 10X:38	01:58 ASTM-P-0114-	ASTM-P-0117- 09:58	ASTM-P-124- 06:32
ASTM-P-0070- SET:40	ASTM-P-0091-13- 10X:38	02:58 ASTM-P-0114-	ASTM-P-0117- 10:58	C-216S:54 C-216S-H-10X:54
ASTM-P-0071- 01:40	ASTM-P-0091-14- 10X:38	03:58 ASTM-P-0114-	ASTM-P-0117- SET:58	C-216S-M:54 C-221S:54
ASTM-P-0071- 02:40	ASTM-P-0091-15- 10X:38	04:58 ASTM-P-0114-	ASTM-P-0135:57 ASTM-P-0135-	C-221S-H-10X:54 C-221S-M:54
ASTM-P-0071- 03:40	ASTM-P-0091-16- 10X:38	05:58 ASTM-P-0114-	PAK:57 ASTM-P-0136-	C-232S:54 C-232S-H-10X:54
ASTM-P-0071- BL:40	ASTM-P-0091-17- 10X:38	06:58 ASTM-P-0114-	SET:57 ASTM-P-0137N-	C-232S-M:54 C-242S:54
ASTM-P-0071- SET:40	ASTM-P-0091-18- 10X:38	07:58 ASTM-P-0114-	2G:56 ASTM-P-0138N-	C-242S-H-10X:54 C-242S-M:54
ASTM-P-0080:55	ASTM-P-0091-19-	08:58	2G:56	C-248S:54