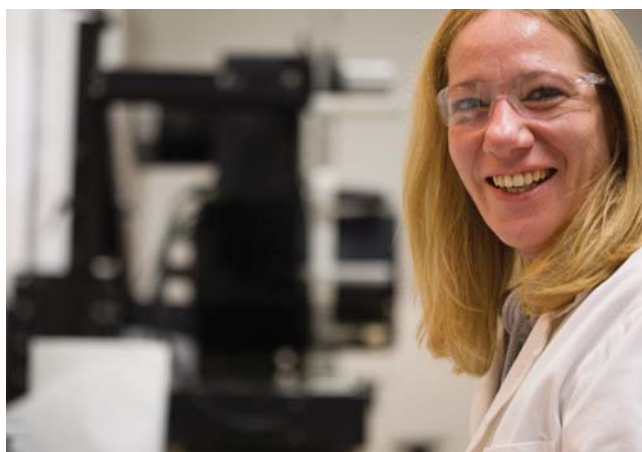
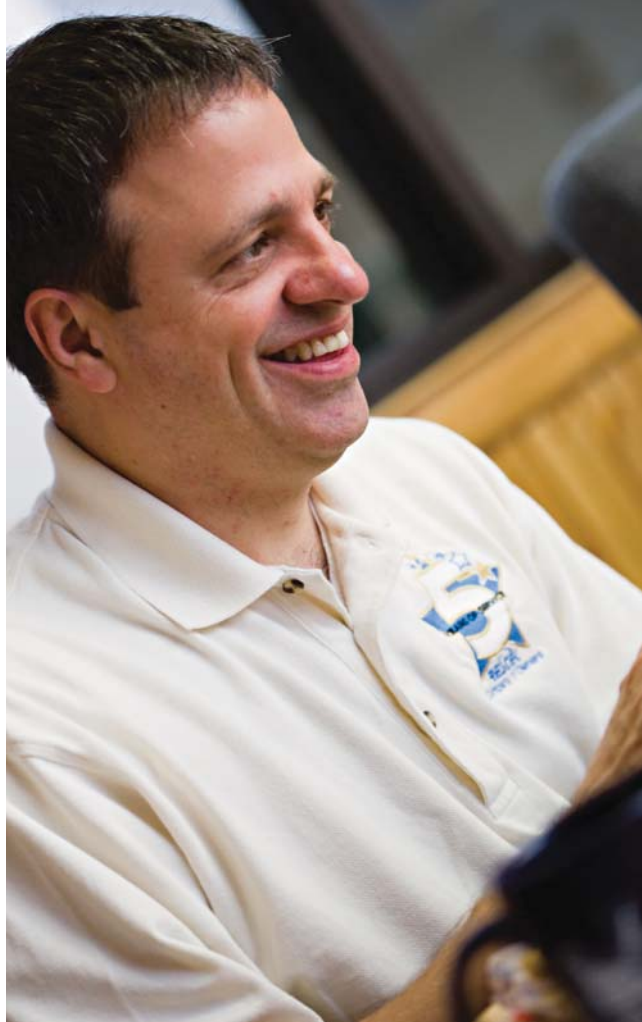


ANALYTICAL REFERENCE MATERIALS OTHER MATERIALS

ASTM Methods	469-471
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Top: Dave Krantz, Vice President of Operations
Bottom: Ann Glace, Manufacturing Technician



ASTM Methods

Method	Type
E1387	Fire Debris
E1618	Fire Debris
D2887-01	Simulated Distillation Petrochemical
D2887	Simulated Distillation Petrochemical
D3710-95	Simulated Distillation Petrochemical
D4059-96	PCB Standards in Oil
D5197	Formaldehyde and Other Carbonyl Compounds in Air
D5836-03	Air: Isocyanates & Oxazoladines
D6042-96	Plastic Container Testing
D6352-98	Polywax® Standards
D6584-00	Biodiesel
D6730-01	Determination of Individual Components in Spark Ignition Engine Fuels

NEW!

ASTM E1387 and E1618 (Fire Debris Analysis)

These materials also can be used for underground storage tank monitoring.

E1387 Column Resolution Check Mix (13 components)

<i>n</i> -hexane (C6)	<i>n</i> -eicosane (C20)
<i>n</i> -octane (C8)	2-ethyltoluene
<i>n</i> -decane (C10)	3-ethyltoluene
<i>n</i> -dodecane (C12)	toluene
<i>n</i> -tetradecane (C14)	1,2,4-trimethylbenzene
<i>n</i> -hexadecane (C16)	<i>p</i> -xylene
<i>n</i> -octadecane (C18)	

2,000 µg/mL each in methylene chloride, 1mL/ampul
cat. # 31224 (ea.)

E1618 Test Mix (13 components)

Components in this mix (0.5 µL/mL or 0.05% volume/volume each) are at 10X the concentration of the final test solution specified in ASTM 1618 and ASTM 1387.

<i>n</i> -hexane (C6)	<i>n</i> -eicosane (C20)
<i>n</i> -octane (C8)	2-ethyltoluene
<i>n</i> -decane (C10)	3-ethyltoluene
<i>n</i> -dodecane (C12)	toluene
<i>n</i> -tetradecane (C14)	1,2,4-trimethylbenzene
<i>n</i> -hexadecane (C16)	<i>p</i> -xylene
<i>n</i> -octadecane (C18)	

0.05% volume/volume each in methylene chloride, 1mL/ampul
cat. # 31613 (ea.)

free data

Available on Our Website: Lot Certificates, Data Packs, and MSDSs

For complete information detailing manufacturing and testing for Restek inventoried reference standards, visit our website at www.restek.com/datapacks. To view certificates and/or an MSDS, enter the catalog number of the product in the Search feature. For a free data pack (Adobe® PDF file), enter the catalog number and lot number of the product.

ASTM Simulated Distillation Petrochemical Mixtures

American Society for Testing and Materials (ASTM International) Method D2887-01 is used to determine the boiling range distribution of petroleum products and fractions having a final boiling point of 538°C (1,000°F) or lower; a boiling range greater than 55°C (131°F) and a vapor pressure sufficient low to permit sampling at ambient temperature.

ASTM D2887-01 Calibration Mix (20 components)

<i>n</i> -pentane (C5)	<i>n</i> -hexadecane (C16)
<i>n</i> -hexane (C6)	<i>n</i> -heptadecane (C17)
<i>n</i> -heptane (C7)	<i>n</i> -octadecane (C18)
<i>n</i> -octane (C8)	<i>n</i> -eicosane (C20)
<i>n</i> -nonane (C9)	<i>n</i> -tricosane (C24)
<i>n</i> -decane (C10)	<i>n</i> -octacosane (C28)
<i>n</i> -undecane (C11)	<i>n</i> -dotriacontane (C32)
<i>n</i> -dodecane (C12)	<i>n</i> -hexatriacontane (C36)
<i>n</i> -tetradecane (C14)	<i>n</i> -tetracontane (C40)
<i>n</i> -pentadecane (C15)	<i>n</i> -tetratetracontane (C44)

1% weight each in carbon disulfide, 1g solution/ampul*
cat. # 31674 (ea.)

5% w/w in carbon disulfide, 1g /ampul**
cat. # 31675 (ea.)

No data pack available.

*This standard may only be shipped by FedEx ground, and only within the US.

**The 5% w/w blend of neat hydrocarbons can be shipped in the US (overnight) and to our international customers.

ASTM Methods D2887 and D3710-95

These calibration mixtures are made using pure, highly characterized neat material, prepared using NIST-traceable balance and weights. Each ampul is supplied with a data sheet indicating the exact concentration, and a sample chromatogram.

D2887 Calibration Mix (17 components)

Compound	Conc. (% w/w)	Compound	Conc. (% w/w)
<i>n</i> -hexane (C6)	6	<i>n</i> -octadecane (C18)	5
<i>n</i> -heptane (C7)	6	<i>n</i> -eicosane (C20)	2
<i>n</i> -octane (C8)	8	<i>n</i> -tricosane (C24)	2
<i>n</i> -nonane (C9)	8	<i>n</i> -octacosane (C28)	1
<i>n</i> -decane (C10)	12	<i>n</i> -dotriacontane (C32)	1
<i>n</i> -undecane (C11)	12	<i>n</i> -hexatriacontane (C36)	1
<i>n</i> -dodecane (C12)	12	<i>n</i> -tetracontane (C40)	1
<i>n</i> -tetradecane (C14)	12	<i>n</i> -tetratetracontane (C44)	1
<i>n</i> -hexadecane (C16)	10		

Packaged 1mL/ampul

cat. # 31222 (ea.)

No data pack available.

D3710-95 Calibration Mix (16 components)

Compound	Conc. (% vol/vol)	Compound	Conc. (% vol/vol)
<i>n</i> -pentane (C5)	8	<i>n</i> -pentadecane (C15)	2
<i>n</i> -hexane (C6)	6	2-methylbutane	10
<i>n</i> -heptane (C7)	10	2-methylpentane	6
<i>n</i> -octane (C8)	5	2,4-dimethylpentane	6
<i>n</i> -decane (C10)	4	toluene	12
<i>n</i> -dodecane (C12)	4	<i>p</i> -xylene	14
<i>n</i> -tridecane (C13)	2	<i>n</i> -propylbenzene	5
<i>n</i> -tetradecane (C14)	2	<i>n</i> -butylbenzene	4

Packaged 1mL/ampul

cat. # 31223 (ea.)

No data pack available.

ASTM Methods

ASTM Method D4059-96 (PCB Standards in Oil)

ASTM Method D4059-96 is used for determining PCB concentrations in various types of transformer oil, using GC/ECD detection. The analyst must dilute transformer oil samples in a solvent prior to injection. The oil in the sample has been shown to quench the ECD. Calibration mixtures of PCBs in transformer oil must be prepared and diluted identically to eliminate the detector quenching bias resulting when samples are analyzed.

We prepare these solutions in a mineral oil-based transformer oil (Exxon® Univolt® N-61), which has been tested to ensure it is PCB-free.

PCB-Free Transformer Oil

Neat, 5mL	cat. # 32424 (ea.)
Neat, 50mL	cat. # 32425 (ea.)

No data pack available.

Aroclor Standards

Volume is 1mL/ampul.

Compound	Solvent	Conc.	cat.# (ea.)	price
Aroclor 1016	TO	50mg/kg	32075	
Aroclor 1016	TO	500mg/kg	32076	
Aroclor 1221	TO	50mg/kg	32077	
Aroclor 1221	TO	500mg/kg	32078	
Aroclor 1232	TO	50mg/kg	32079	
Aroclor 1232	TO	500mg/kg	32080	
Aroclor 1242	TO	50mg/kg	32081	
Aroclor 1242	TO	500mg/kg	32082	
Aroclor 1248	TO	50mg/kg	32083	
Aroclor 1248	TO	500mg/kg	32084	
Aroclor 1254	TO	50mg/kg	32085	
Aroclor 1254	TO	500mg/kg	32086	
Aroclor 1260	TO	50mg/kg	32087	
Aroclor 1260	TO	500mg/kg	32088	

TO = transformer oil (PCB-free)

ASTM Method D5197 (Formaldehyde and Other Carbonyl Compounds in Air)

CARB 1004 Aldehyde/Ketone-DNPH Calibration Standard

(13 components)

acetaldehyde-2,4-DNPH	hexaldehyde-2,4-DNPH
acetone-2,4-DNPH	methacrolein-2,4-DNPH
acrolein-2,4-DNPH	methyl ethyl ketone-2,4-DNPH
benzaldehyde-2,4-DNPH	propionaldehyde-2,4-DNPH
<i>n</i> -butyraldehyde-2,4-DNPH	<i>m</i> -tolualdehyde-2,4-DNPH
crotonaldehyde-2,4-DNPH	valeraldehyde-2,4-DNPH
formaldehyde-2,4-DNPH	

3µg/mL each in acetonitrile, 1mL/ampul

cat. # 33093 (ea.)

DNPH Reference Materials

Volume is 1mL/ampul. Concentration is µg/mL.

Compound	Solvent	Conc.	cat.# (ea.)	price
acetaldehyde-2,4-DNPH	ACN	100	33074	
acetone-2,4-DNPH	ACN	100	33075	
acrolein-2,4-DNPH	ACN	100	33076	
benzaldehyde-2,4-DNPH	ACN	100	33077	
2-butanone-2,4-DNPH	ACN	100	33078	
<i>n</i> -butyraldehyde-2,4-DNPH	ACN	100	33079	
crotonaldehyde-2,4-DNPH	ACN	100	33080	
2,5-dimethylbenzaldehyde-2,4-DNPH	ACN	100	33081	
formaldehyde-2,4-DNPH	ACN	100	33082	
glycolaldehyde-2,4-DNPH	ACN	100	33091	
hexaldehyde-2,4-DNPH	ACN	100	33083	
isobutyraldehyde-2,4-DNPH	ACN	100	33084	
isovaleraldehyde-2,4-DNPH	ACN	100	33085	
methacrolein-2,4-DNPH	ACN	100	33095	
propionaldehyde-2,4-DNPH	ACN	100	33086	
<i>m</i> -tolualdehyde-2,4-DNPH	ACN	100	33088	
<i>o</i> -tolualdehyde-2,4-DNPH	ACN	100	33087	
<i>p</i> -tolualdehyde-2,4-DNPH	ACN	100	33089	
valeraldehyde-2,4-DNPH	ACN	100	33090	

ACN = acetonitrile

ASTM Method D5836-03 / OSHA 42, OSHA 47, NIOSH 5522 (Analysis of Isocyanates in Indoor Air by HPLC)

ASTM D5836 and OSHA 42 are test methods for determining 2,4-toluene diisocyanate (2,4-TDI) and 2,6-TDI in the workplace atmosphere. OSHA 47 is for 4,4'-methylenediphenyl isocyanate (4,4'-MDI) in indoor air, and NIOSH Method 5522 is an analysis for 2,4-TDI, 2,6-TDI, 4,4'-MDI, and 1,6-hexamethylene diisocyanate (1,6-HDI) in air. Restek offers the 1, -(2-pyridyl)piperazine (1-2pp) derivative.

Isocyanates Singles

Volume is 1mL/ampul. Concentration is µg/mL.

Compound	Solvent	Conc.	cat.# (ea.)	price
2,6-TDIP	DMSO	1,000	33000	
2,4-TDIP	DMSO	1,000	33001	
1,6-HDIP	DMSO	1,000	33002	
4,4'-MDIP	DMSO	1,000	33003	

DMSO = dimethyl sulfoxide

Formaldehyde Oxazoladine

2,000µg/mL in toluene, 1mL/ampul

cat. # 33004 (ea.)

ASTM Method D6042-96 (Plastic Container Testing)

American Society for Testing and Materials (ASTM International) Method D6042-96—*Test Method for Determination of Phenolic Antioxidants and Erucamide Slip Additives in Polypropylene Homopolymer Formulations Using Liquid Chromatography*—is a “consensus” or “referee” method used among plastic manufacturers and the pharmaceutical companies that purchase plastic containers. Plastic container manufacturers use this test to ensure the quality of their product to their pharmaceutical customers. Pharmaceutical companies also specify this test and provide their own lists of target compounds and concentration limits in purchase agreements.

This test calls for isopropanol extraction, HPLC separation, and UV detection. Restek offers a variety of reversed phase HPLC columns suitable for these separations. Restek also designed an analytical reference material to validate this method. This mixture contains the common antioxidants and slips listed in ASTM D6042-96, along with BHT.

ASTM D6042-96 Calibration Mix (7 components)

BHT	Irganox 3114
erucamide slip	Irganox 1010
vitamin E	Irganox 1076
Irgafos 168	

50µg/mL each in isopropanol, 1mL/ampul

cat. # 31628 (ea.)

No data pack available.

ASTM D6042-96 Internal Standard Mix

Tinuvin P

51.8µg/mL in isopropanol, 1mL/ampul

cat. # 31629 (ea.)

No data pack available.

ASTM Method D6042-96 (Plastic Container Testing)

cont'd

Other Additives—Available from Restek as Custom Formulations

Similar methods for extractables in plastic pharmaceutical containers are cited in the United States Pharmacopeia (USP), British Pharmacopoeia (BP), European Pharmacopoeia (EP), and Japanese Pharmacopoeia (JP). Customers may also have formulation-specific or product-specific test mixtures. Please contact us for a custom mixture. Our current inventory of raw materials includes these popular antioxidants. We have many more that are not listed and can obtain most compounds you may need.

• Ethanox 323	• Irganox L64	• Ultranox 626	• Vanlube PCX
• Ethanox 330	• Irganox L109	• Vanlube 81	• Vanlube SL
• Ethanox 702	• Irganox L134	• Vanlube 848	• Vanlube SS
• Ethanox 703	• Irganox L135	• Vanlube 7723	
• Irganox L06	• Irganox 1035	• Vanlube AZ	
• Irganox L57	• Santanox R	• Vanlube NA	

ASTM Method D6352-98 (Polywax® Standards)

These high molecular weight hydrocarbon waxes are useful for simulated distillation and other high-temperature GC work.

Volume is 1mL/ampul.

Compound	qty.	cat.# (ea.)	price
Polywax 500	1g	36224	
Polywax 655	1g	36225	
Polywax 850	1g	36226	
Polywax 1000	1g	36227	

No data pack available.

ASTM Method D6584-00 and EN14105 (Biodiesel)

Determining Free and Total Glycerin in B-100 Biodiesel Methyl Esters by GC

In the manufacture of biodiesel fuel, triglycerides are split into their monoalkyl ester components via transesterification. The fatty acid monoalkyl esters can be used as fuel in diesel engines. Amounts of free glycerin and total glycerin indicate the quality of the conversion of the oil or fat to monoalkyl esters. D6584-00 is a test method for quantitative determination of free glycerin, total glycerin, and mono-, di-, and triglycerides in biodiesel fuel methyl esters by GC, after silylation of the sample with N-methyl-N-(trimethylsilyl) trifluoroacetamide (MSTFA).

(s)-(-)-1,2,4-Butanetriol

(s)-(-)-1,2,4-butanetriol

1,000µg/mL in pyridine, 1mL/ampul

cat. # 33024 (ea.)

1,000µg/mL in pyridine, 5mL/ampul

cat. # 33032 (ea.)

Diiolein

diiolein (1,3-di[*cis*-octadecenoyl]glycerol)

5,000µg/mL in pyridine, 1mL/ampul

cat. # 33022 (ea.)

Glycerin

glycerin

500µg/mL in pyridine, 1mL/ampul

cat. # 33020 (ea.)

ASTM Method D6584-00 and EN14105 (Biodiesel)

cont'd

Monolein

monolein (1-mono[*cis*-9-octadecenoyl]-rac-glycerol)

5,000µg/mL in pyridine, 1mL/ampul

cat. # 33021 (ea.)

Monopalmitin

monopalmitin

5,000µg/mL in pyridine, 1mL/ampul

cat. # 33026 (ea.)

Tricaprin

tricaprin (1,2,3-tricaprinoylglycerol)

8,000µg/mL in pyridine, 1mL/ampul

cat. # 33025 (ea.)

8,000µg/mL in pyridine, 5mL/ampul

cat. # 33033 (ea.)

Triolein

triolein (1,2,3-tri[*cis*-octadecenoyl]glycerol)

5,000µg/mL in pyridine, 1mL/ampul

cat. # 33023 (ea.)

ASTM Method D6730-01 (Determination of Individual Components in Spark Ignition Engine Fuels)

Oxy Set-Up Blend

ASTM method D6730-01 is specifically designed for the determination of the individual hydrocarbons present in spark ignition fuels, as well as fuel blends containing oxygenates such as methyl *tert*-butyl ether, ethyl *tert*-butyl ether, *tert*-butanol, ethanol, etc.

NEW!

Gravimetrically prepared and NIST-traceable.

benzene	1.00%	1-methylcyclopentane	0.50%
<i>tert</i> -butanol	0.50%	1-methyl-2-ethylbenzene	0.50%
cyclohexane	28.9%	1-methylnaphthalene	0.25%
<i>n</i> -decane	1.00%	5-methylnonane	0.20%
2,3-dimethylbutane	0.50%	naphthalene	0.50%
<i>trans</i> -1,2-dimethylcyclopentane	0.50%	<i>n</i> -nonane	2.00%
2,3-dimethylheptane	0.20%	<i>n</i> -octane	2.00%
dodecane	0.25%	<i>n</i> -pentane	2.00%
ethanol	8.00%	1,2,3,5-tetramethylbenzene	0.25%
ethylbenzene	25.0%	toluene	7.00%
3-ethylpentane	0.20%	tridecane	0.25%
<i>n</i> -heptane	2.00%	2,2,3-trimethylpentane	
<i>n</i> -hexane	2.00%	2,3,3-trimethylpentane	0.50%
2-methyl-2-butene	2.50%	undecane	0.50%
methyl <i>tert</i> -butyl ether	10.0%	<i>p</i> -xylene	1.00%

2mL prescored ampul

cat. # 33034 (ea.) enquire

Diesel/Biodiesel 80:20 Blend Standard

The biodiesel component is methyl soyate.

diesel/biodiesel 80:20

5,000µg/mL in methylene chloride, 1mL/ampul

cat. # 31880 (ea.)

also available

Restek offers a full range of derivatization reagents in 10 x 1g and 25g package sizes. See [page 484](#).

Petroleum Standards

Petroleum Standards

These petroleum standards are gravimetrically prepared, NIST-traceable by weight, and verified by one or more analytical methods.

Sulfur Simulated Distillation Standard

SSDS

30 ppm total sulfur by weight from ethanethiol
 60 ppm total sulfur by weight from 1-propanethiol
 30 ppm total sulfur by weight from 1-butanethiol
 60 ppm total sulfur by weight from 1-pentanethiol
 30 ppm total sulfur by weight from 1-hexanethiol
 60 ppm total sulfur by weight from 1-heptanethiol
 30 ppm total sulfur by weight from 3,5-dimethylbenzenethiol
 60 ppm total sulfur by weight from 1-octanethiol
 30 ppm total sulfur by weight from 1-nonanethiol
 60 ppm total sulfur by weight from 1-decanethiol
 30 ppm total sulfur by weight from 1-pentadecanethiol
 60 ppm total sulfur by weight from 1-hexadecanethiol
 30 ppm total sulfur by weight from 1-octadecanethiol
 Balance: toluene/isooctane 1/15
 1mL pre-scored amber ampul.

cat. # 33049 (ea.) enquire

Speciated Sulfur System Suitability Checkout Standard

SSSSCS

0.50 ppm total sulfur by weight from dimethylsulfide
 35.0 ppm total sulfur by weight from tertiary butyl mercaptan
 50.0 ppm total sulfur by weight from thiopene
 15.0 ppm total sulfur by weight from dimethyl disulfide
 25.0 ppm total sulfur by weight from benzothiopene
 Balance: isooctane
 1mL pre-scored amber ampul.

cat. # 33050 (ea.) enquire

also available

Custom ULSD and LSD calibration standards are also available in 100mL, 200mL, 500mL, and 1 liter bottles.

Call our Analytical Reference Department at 800-356-1688 or 814-353-1300, or your Restek representative for details.

EPA Ultra Low & Low Sulfur Diesel Standards and Samples in Diesel Fuel to Meet EPA Requirements for Lab Qualification

EPA Ultra Low Sulfur Diesel Precision Sample # 1

EPA Section 80.580-80.585 Title 40, Chapter 1, Part 80

Homogenous commercially available diesel fuel with sulfur content of 5-15 ppm.
 1 x 200mL amber bottle.

cat. # 33051 (ea.) enquire

EPA Low Sulfur Diesel Precision Sample # 2

EPA Section 80.580-80.585 Title 40, Chapter 1, Part 80

Homogenous commercially available diesel fuel with sulfur content of 200-500 ppm.
 1 x 200mL amber bottle.

cat. # 33052 (ea.) enquire

EPA Ultra Low Sulfur Diesel Accuracy Standard # 1

EPA Section 80.520(a)(1) and 80.510(b)

1-10 ppm total sulfur in a diesel fuel matrix for motor vehicle diesel and diesel additives subject to the 15 ppm sulfur standard.
 1 x 200mL amber bottle.

cat. # 33053 (ea.) enquire

EPA Ultra Low Sulfur Diesel Accuracy Standard # 2

EPA Section 80.520(a)(1) and 80.510(b)

10-20 ppm total sulfur in a diesel fuel matrix for motor vehicle diesel and diesel additives subject to the 15 ppm sulfur standard.
 1 x 200mL amber bottle.

cat. # 33054 (ea.) enquire

EPA Low Sulfur Diesel Accuracy Standard # 3

EPA Section 80.520(c) and 80.510(c)

100-200 ppm total sulfur in a diesel fuel matrix for motor vehicle diesel and diesel additives subject to the 500 ppm sulfur standard.
 1 x 200mL amber bottle.

cat. # 33055 (ea.) enquire

EPA Low Sulfur Diesel Accuracy Standard # 4

EPA Section 80.520(c) and 80.510(c)

400-500 ppm total sulfur in a diesel fuel matrix for motor vehicle diesel and diesel additives subject to the 500 ppm sulfur standard.
 1 x 200mL amber bottle.

cat. # 33056 (ea.) enquire

Ultra Low & Low Sulfur in Diesel Fuel Calibration Kits

EPA Section 80.580-80.585 Title 40, Chapter 1, Part 80

Cal Kit ULSD 1 - 20

Blank

1.0 ppm total sulfur from di-*n*-butylsulfide in diesel fuel
 2.5 ppm total sulfur from di-*n*-butylsulfide in diesel fuel
 5.0 ppm total sulfur from di-*n*-butylsulfide in diesel fuel
 10.0 ppm total sulfur from di-*n*-butylsulfide in diesel fuel
 15.0 ppm total sulfur from di-*n*-butylsulfide in diesel fuel
 20.0 ppm total sulfur from di-*n*-butylsulfide in diesel fuel

Set of seven 20mL bottles.

cat. # 33060 (kit) enquire

Low Sulfur in Gasoline Calibration Standards *cont'd***Cal Kit SG 50 - 125**

Blank

50 ppm sulfur from di-*n*-butylsulfide in gasoline by weight
 65 ppm sulfur from di-*n*-butylsulfide in gasoline by weight
 80 ppm sulfur from di-*n*-butylsulfide in gasoline by weight
 95 ppm sulfur from di-*n*-butylsulfide in gasoline by weight
 110 ppm sulfur from di-*n*-butylsulfide in gasoline by weight
 125 ppm sulfur from di-*n*-butylsulfide in gasoline by weight

Set of seven 5mL amber bottles.

cat. # 33045 (kit) enquire

**Cal Kit ULSD 20 - 100**

Blank

20.0 ppm total sulfur from di-*n*-butylsulfide in diesel fuel
 35.0 ppm total sulfur from di-*n*-butylsulfide in diesel fuel
 50.0 ppm total sulfur from di-*n*-butylsulfide in diesel fuel
 75.0 ppm total sulfur from di-*n*-butylsulfide in diesel fuel
 100 ppm total sulfur from di-*n*-butylsulfide in diesel fuel

Set of six 20mL bottles.

cat. # 33061 (kit) enquire

**Check Standard SG 75**75 ppm sulfur from di-*n*-butylsulfide in gasoline by weight.

Set of five 5mL amber bottles.

cat. # 33046 (ea.) enquire

Cal Kit SG 110 - 500

Blank

110 ppm sulfur from di-*n*-butylsulfide
 200 ppm sulfur from di-*n*-butylsulfide
 300 ppm sulfur from di-*n*-butylsulfide
 400 ppm sulfur from di-*n*-butylsulfide
 500 ppm sulfur from di-*n*-butylsulfide

Set of six 5mL amber bottles.

cat. # 33047 (kit) enquire

**Cal Kit LSD 100 - 500**

Blank

100 ppm total sulfur from di-*n*-butylsulfide in diesel fuel
 200 ppm total sulfur from di-*n*-butylsulfide in diesel fuel
 300 ppm total sulfur from di-*n*-butylsulfide in diesel fuel
 400 ppm total sulfur from di-*n*-butylsulfide in diesel fuel
 500 ppm total sulfur from di-*n*-butylsulfide in diesel fuel

Set of six 20mL bottles.

cat. # 33062 (kit) enquire

**Check Standard SG 175**175 ppm sulfur from di-*n*-butylsulfide in gasoline by weight.

Set of five 5mL amber bottles.

cat. # 33048 (ea.) enquire

Low Sulfur in Gasoline Calibration Standards

EPA Section 80.190-80.415 Title 40, Chapter 1, Part 80

Cal Kit SG 10 - 50

Blank

10 ppm sulfur from di-*n*-butylsulfide in gasoline by weight
 20 ppm sulfur from di-*n*-butylsulfide in gasoline by weight
 30 ppm sulfur from di-*n*-butylsulfide in gasoline by weight
 40 ppm sulfur from di-*n*-butylsulfide in gasoline by weight
 50 ppm sulfur from di-*n*-butylsulfide in gasoline by weight

Set of six 5mL amber bottles.

cat. # 33043 (kit) enquire



Sulfur in Isooctane Calibration Kits and Check Standards

ASTM Methods D3120, D4045, D5453, D6920

Cal Kit SISO 0.125 - 2.5ppm

Blank

0.125 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane
 0.25 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane
 0.50 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane
 1.00 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane
 2.50 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane

Calibration kit for total sulfur by weight from di-*n*-butylsulfide in isooctane
 0.125-2.5ppm range. Set of six 1mL pre-scored ampuls.

cat. # 33035 (kit) enquire

**Check Standard SG 25**25 ppm sulfur from di-*n*-butylsulfide in gasoline by weight.

Set of five 5mL amber bottles.

cat. # 33044 (ea.) enquire

Check Standard SISO 0.750.75ppm total sulfur by weight from di-*n*-butylsulfide in isooctane.

Set of five 1mL pre-scored ampuls.

cat. # 33036 (ea.) enquire

also available

Custom ULSD and LSD calibration standards are also available in 100mL, 200mL, 500mL, and 1 liter bottles.

Call our Analytical Reference Department at 800-356-1688 or 814-353-1300, or your Restek representative for details.

please note

These petroleum standards are gravimetrically prepared, NIST-traceable by weight, and verified by one or more analytical methods.

Petroleum Standards

Sulfur in Isooctane Calibration Kits and Check Standards *cont'd***Cal Kit SISO 2.5 - 50 ppm**

Blank

2.50 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane
 5.00 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane
 10.00 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane
 15.00 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane
 20.00 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane
 25.00 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane
 50.00 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane

Calibration kit for total sulfur by weight from di-*n*-butylsulfide in isooctane
 2.5-50 ppm range. Set of eight 1mL pre-scored ampuls.

cat. # 33037 (kit) enquire

**Check Standard SISO 30**

30 ppm total sulfur by weight from di-*n*-butylsulfide in isooctane.
 Set of five 1mL pre-scored ampuls.

cat. # 33038 (ea.) enquire

Cal Kit SISO 50 - 1000 ppm

Blank

50 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane
 75 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane
 100 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane
 250 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane
 500 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane
 1000 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane

Calibration kit for total sulfur by weight from di-*n*-butylsulfide in isooctane
 50-1000 ppm range. Set of seven 1mL pre-scored ampuls.

cat. # 33039 (kit) enquire

**Check Standard SISO 300**

300 ppm total sulfur by weight from di-*n*-butylsulfide in isooctane.
 Set of five 1mL pre-scored ampuls.

cat. # 33040 (ea.) enquire

Cal Kit SISO 1000 - 6000

Blank

1000 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane
 1500 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane
 2000 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane
 4000 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane
 6000 w/w ppm total sulfur from di-*n*-butylsulfide in isooctane

Calibration kit for total sulfur by weight from di-*n*-butylsulfide in isooctane
 1000 - 6000 ppm range. Set of six 1mL pre-scored ampuls.

cat. # 33041 (kit) enquire

**Check Standard SISO 3000**

3000 ppm total sulfur by weight from di-*n*-butylsulfide in isooctane.
 Set of five 1mL pre-scored ampuls.

cat. # 33042 (ea.) enquire

also available

Custom total sulfur & total nitrogen in isooctane check standards also available.

Call our Analytical Reference Department at 800-356-1688 or 814-353-1300, or your Restek representative for details.

Total Sulfur & Total Nitrogen in Isooctane Calibration Kits

ASTM Methods D3120, D4045, D4629, D5453, D5762,
 D6069, D6920

Cal Kit SNISO 0.125 - 5.0

Blank

0.125 w/w ppm total sulfur from thiophene & total nitrogen
 from pyridine in isooctane
 0.25 w/w ppm total sulfur from thiophene & total nitrogen
 from pyridine in isooctane
 0.50 w/w ppm total sulfur from thiophene & total nitrogen
 from pyridine in isooctane
 1.00 w/w ppm total sulfur from thiophene & total nitrogen
 from pyridine in isooctane
 2.50 w/w ppm total sulfur from thiophene & total nitrogen
 from pyridine in isooctane
 5.00 w/w ppm total sulfur from thiophene & total nitrogen
 from pyridine in isooctane

Set of seven 1mL pre-scored amber ampuls.

cat. # 33057 (kit) enquire

**Cal Kit SNISO 5.0 - 50.0**

Blank

5.00 w/w ppm total sulfur from thiophene & total nitrogen
 from pyridine in isooctane
 10.0 w/w ppm total sulfur from thiophene & total nitrogen
 from pyridine in isooctane
 25.0 w/w ppm total sulfur from thiophene & total nitrogen
 from pyridine in isooctane
 50.0 w/w ppm total sulfur from thiophene & total nitrogen
 from pyridine in isooctane

Set of five 1mL pre-scored amber ampuls.

cat. # 33058 (kit) enquire

**Cal Kit SNISO 50.0 - 1000**

Blank

50.0 w/w ppm total sulfur from thiophene & total nitrogen
 from pyridine in isooctane
 75.0 w/w ppm total sulfur from thiophene & total nitrogen
 from pyridine in isooctane
 100 w/w ppm total sulfur from thiophene & total nitrogen
 from pyridine in isooctane
 250 w/w ppm total sulfur from thiophene & total nitrogen
 from pyridine in isooctane
 500 w/w ppm total sulfur from thiophene & total nitrogen
 from pyridine in isooctane
 1000 w/w ppm total sulfur from thiophene & total nitrogen
 from pyridine in isooctane

Set of seven 1mL pre-scored amber ampuls.

cat. # 33059 (kit) enquire



free data

Available on Our Website: Lot Certificates, Data Packs, and MSDSs

For complete information detailing manufacturing and testing for Restek inventoried reference standards, visit our website at www.restek.com/datapacks. To view certificates and/or an MSDS, enter the catalog number of the product in the Search feature. For a free data pack (Adobe® PDF file), enter the catalog number and lot number of the product.

Sulfur in Mineral Oil Calibration Kits and Check Standards

ASTM Methods D2622, D3120, D4045, D4294, D5453, D6212, D6313, D6428, D6445, D7039

Cal Kit SMO 2 - 20

Blank
 2.00 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil
 5.00 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil
 7.00 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil
 10.00 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil
 15.00 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil
 20.00 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil

Set of seven 100mL bottles.

cat. # 33063 (kit) enquire

**Cal Kit SMO 1000 - 25000**

Blank
 1000 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil
 2500 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil
 5000 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil
 1.00% total sulfur by weight from di-*n*-butylsulfide in mineral oil
 1.50% total sulfur by weight from di-*n*-butylsulfide in mineral oil
 2.00% total sulfur by weight from di-*n*-butylsulfide in mineral oil
 2.50% total sulfur by weight from di-*n*-butylsulfide in mineral oil

Set of eight 100mL bottles.

cat. # 33069 (kit) enquire

**Check Standard SMO 11**

11.0 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil.
 1 liter bottle.

cat. # 33064 (ea.) enquire

Check Standard SMO 30003000 w/w ppm total sulfur from di-*n*-butylsulfide. 1 liter bottle.

cat. # 33070 (ea.) enquire

Cal Kit SMO 10 - 100

Blank
 10.0 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil
 25.0 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil
 50.0 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil
 100 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil

Set of five 100mL bottles.

cat. # 33065 (kit) enquire

**Cal Kit SMO 25000 - 50000**

Blank
 2.50% total sulfur by weight from di-*n*-butylsulfide in mineral oil
 3.00% total sulfur by weight from di-*n*-butylsulfide in mineral oil
 3.50% total sulfur by weight from di-*n*-butylsulfide in mineral oil
 4.00% total sulfur by weight from di-*n*-butylsulfide in mineral oil
 4.50% total sulfur by weight from di-*n*-butylsulfide in mineral oil
 5.00% total sulfur by weight from di-*n*-butylsulfide in mineral oil

Set of seven 100mL bottles.

cat. # 33071 (kit) enquire

**Check Standard SMO 30**

30.0 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil.
 1 liter bottle.

cat. # 33066 (ea.) enquire

Check Standard SMO 37000

3.70% total sulfur by weight from di-*n*-butylsulfide in mineral oil.
 1 liter bottle.

cat. # 33072 (ea.) enquire

Cal Kit SMO 100 - 1000

Blank
 100 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil
 200 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil
 300 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil
 400 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil
 500 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil
 600 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil
 750 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil
 1000 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil

Set of nine 100mL bottles.

cat. # 33067 (kit) enquire

please **note**

These petroleum standards are gravimetrically prepared, NIST-traceable by weight, and verified by one or more analytical methods.

Check Standard SMO 350

350 w/w ppm total sulfur from di-*n*-butylsulfide in mineral oil.
 1 liter bottle.

cat. # 33068 (ea.) enquire

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Index	Type
Weathered Petrochemical Standards	Forensics
Blood Alcohol Standards	Forensics
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Exempt Drug Standards	Forensics
USP 467 Standards	Residual Solvents
European Pharmacopoeia Standards	Residual Solvents

Weathered Petrochemical Standards

These solutions are prepared from a single source (one refinery) product. The weathered materials indicate the percent weight loss from the original material. Samples of regular and premium grade unleaded gasoline were blended in equal volumes.

There are four general types of mineral spirits, classified according to boiling point range (BPR):

- Type I (Stoddard solvent) BPR 149–182°C
- Type II (high flash point) BPR 177–196°C
- Type III (odorless) BPR 149–196°C
- Type IV (low dry point) BPR 149–174°C

Stoddard Solvent Standard

10,000µg/mL in P&T methanol, 1mL/ampul
cat. # 30487 (ea.)

We prepare our mineral spirits solutions from an equal volume blend of Type I, II, and III mineral spirits.

Volume is 1mL/ampul unless otherwise noted. Concentration is µg/mL.

Compound	Solvent	Conc.	cat.# (ea.)	price
unleaded gasoline: unweathered	PTM	5,000	30096	
unleaded gasoline: 25% weathered	PTM	5,000	30097	
unleaded gasoline: 50% weathered	PTM	5,000	30098	
unleaded gasoline: 75% weathered	PTM	5,000	30099	
unleaded gasoline: 99% weathered	PTM	5,000	30436	
Compound	Solvent	Conc.	cat.# (ea.)	price
kerosene: unweathered	D	5,000	31229	
kerosene: 25% weathered	D	5,000	31230	
kerosene: 50% weathered	D	5,000	31231	
kerosene: 75% weathered	D	5,000	31232	
Compound	Solvent	Conc.	cat.# (ea.)	price
diesel fuel #2: unweathered	D	5,000	31233	
diesel fuel #2: 25% weathered	D	5,000	31234	
diesel fuel #2: 50% weathered	D	5,000	31235	
diesel fuel #2: 75% weathered	D	5,000	31236	
Compound	Solvent	Conc.	cat.# (ea.)	price
mineral spirits: unweathered	D	5,000	31225	
mineral spirits: unweathered	D	50,000	31260	
mineral spirits: unweathered (5mL)	D	50,000	31261	
mineral spirits: 25% weathered	D	5,000	31226	
mineral spirits: 50% weathered	D	5,000	31227	
mineral spirits: 75% weathered	D	5,000	31228	

D = methylene chloride
PTM = P&T methanol

please note

We can custom prepare weathered accelerants for fire debris analysis.

Please complete the custom reference material request form at www.restek.com/solutions.

We'll be glad to work with you!

Weathered Petrochemical Standards cont'd

Weathered Gasoline Kit

30096: Unleaded Gasoline Standard
30097: Unleaded Gas Standard: 25% Weathered
30098: Unleaded Gas Standard: 50% Weathered
30099: Unleaded Gas Standard: 75% Weathered

Contains 1mL each of these mixtures.

cat. # 30100 (kit)



Weathered Gasoline Kit #2

30096: Unleaded Gasoline Standard
30097: Unleaded Gas Standard: 25% Weathered
30098: Unleaded Gas Standard: 50% Weathered
30099: Unleaded Gas Standard: 75% Weathered
30436: Unleaded Gas Standard: 99% Weathered

Contains 1mL each of these mixtures.

cat. # 30437 (kit)



Weathered Kerosene Kit

31229: Kerosene Standard
31230: Kerosene Standard: 25% Weathered
31231: Kerosene Standard: 50% Weathered
31232: Kerosene Standard: 75% Weathered

Contains 1mL each of these mixtures.

cat. # 31238 (kit)



Weathered Diesel Fuel #2 Kit

31233: Diesel Fuel #2 Standard
31234: Diesel Fuel #2 Standard: 25% Weathered
31235: Diesel Fuel #2 Standard: 50% Weathered
31236: Diesel Fuel #2 Standard: 75% Weathered

Contains 1mL each of these mixtures.

cat. # 31239 (kit)



Weathered Mineral Spirits Kit

31225: Mineral Spirits Standard
31226: Mineral Spirits Standard: 25% Weathered
31227: Mineral Spirits Standard: 50% Weathered
31228: Mineral Spirits Standard: 75% Weathered

Contains 1mL each of these mixtures.

cat. # 31237 (kit)



Blood Alcohol Standards

Blood Alcohol Mix Resolution Control Standard (8 components)

Use to verify the retention time for each compound normally included in a blood alcohol test, and to verify that the compounds are resolved from and do not interfere with one another. Concentration of ethanol is NIST-traceable.

acetaldehyde
acetone
acetone
ethanol (NIST certified value)

ethyl acetate
isopropanol
methanol
methyl ethyl ketone

0.100g/dL each in water, 1mL/ampul

cat. # 36256 (ea.)

Blood Alcohol Standards *cont'd*

We have developed calibration mixtures for performing multi-point instrument calibrations so that laboratories can construct calibration curves. The data pack (which can be downloaded from our website at www.restek.com/datapacks) includes a Certificate of Analysis, raw material testing results, statistical QA results, analytical balance printout, and gravimetric weight of each analyte. Ethanol in these mixes is National Institute of Standards and Technology (NIST)-traceable.

Compound	qty.	cat.#	price
0.010g/dL forensic ethanol solution			
1mL/ampul	5-pk.	36276	
1mL/ampul	10-pk.	36278	
5mL/ampul	ea.	36277	
0.015g/dL forensic ethanol solution			
1mL/ampul	5-pk.	36232	
1mL/ampul	10-pk.	36332	
5mL/ampul	ea.	36240	enquire
20mL/ampul	ea.	36248	
0.02g/dL forensic ethanol solution			
1mL/ampul	5-pk.	36233	
1mL/ampul	10-pk.	36333	
5mL/ampul	ea.	36241	enquire
20mL/ampul	ea.	36249	
0.025g/dL forensic ethanol solution			
1mL/ampul	5-pk.	36234	
1mL/ampul	10-pk.	36334	
5mL/ampul	ea.	36242	
20mL/ampul	ea.	36250	enquire
0.04g/dL forensic ethanol solution			
1mL/ampul	5-pk.	36235	
1mL/ampul	10-pk.	36335	
5mL/ampul	ea.	36243	
20mL/ampul	ea.	36251	
0.05g/dL forensic ethanol solution			
1mL/ampul	5-pk.	36257	
1mL/ampul	10-pk.	36259	
5mL/ampul	ea.	36258	
20mL/ampul	ea.	36260	
0.08g/dL forensic ethanol solution			
1mL/ampul	5-pk.	36262	
1mL/ampul	10-pk.	36264	
5mL/ampul	ea.	36263	
20mL/ampul	ea.	36265	
0.1g/dL forensic ethanol solution			
1mL/ampul	5-pk.	36236	
1mL/ampul	10-pk.	36336	
5mL/ampul	ea.	36244	
20mL/ampul	ea.	36252	
0.15g/dL forensic ethanol solution			
1mL/ampul	5-pk.	36237	
1mL/ampul	10-pk.	36337	
5mL/ampul	ea.	36245	
20mL/ampul	ea.	36253	
0.16g/dL forensic ethanol solution			
1mL/ampul	5-pk.	36417	
1mL/ampul	10-pk.	36418	
5mL/ampul	ea.	36419	
20mL/ampul	ea.	36420	
0.2g/dL forensic ethanol solution			
1mL/ampul	5-pk.	36238	
1mL/ampul	10-pk.	36338	
5mL/ampul	ea.	36246	
20mL/ampul	ea.	36254	

did you **know?**

Resolve blood alcohol samples in less than 3 minutes with our Rtx®-BAC1 and Rtx®-BAC2 columns. For more information on these columns or to find out what's new for clinical/forensic analyses, visit www.restek.com/CFT.

Blood Alcohol Standards *cont'd*

Compound	qty.	cat.#	price
0.3g/dL forensic ethanol solution			
1mL/ampul	5-pk.	36239	
1mL/ampul	10-pk.	36339	
5mL/ampul	ea.	36247	
20mL/ampul	ea.	36255	
0.4g/dL forensic ethanol solution			
1mL/ampul	5-pk.	36266	
1mL/ampul	10-pk.	36268	
5mL/ampul	ea.	36267	
20mL/ampul	ea.	36269	

Bank Dye Standard (MAAQ)

Restek offers this qualitative standard to help investigators in municipal police stations and criminal laboratories fight crime.

1-N-(methylamino)anthraquinone (MAAQ)

100µg/mL in methylene chloride, 1mL/ampul
cat. # 31823 (ea.)

No data pack available.

Explosives Solutions

Single-Component Explosives Solutions

These materials support nitroaromatic, nitramine, and nitroester analyses by GC/ECD (Method 8095).^{1,2} Compounds listed are explosives, manufacturing intermediates or degradation products. Method 8095 mixtures contain the components at concentration ratios appropriate for ECD.

Volume is 1mL/ampul. Concentration is µg/mL.

Compound	Solvent	Conc.	cat.# (ea.)	price
2-amino-4,6-dinitrotoluene	ACN	1,000	31670	enquire
4-amino-2,6-dinitrotoluene	ACN	1,000	31671	enquire
ammonium picrate	ACN	2,000	31890	enquire
3,5-dinitroaniline	ACN	1,000	31661	enquire
1,3-dinitrobenzene	ACN	1,000	31662	enquire
1,4-dinitrobenzene	ACN	2,000	33205	enquire
2,4-dinitrotoluene	ACN	1,000	31663	enquire
2,6-dinitrotoluene	ACN	1,000	31664	enquire
EGDN	M	1,000	31601	enquire
HMX	ACN	1,000	31665	enquire
nitrobenzene	ACN	1,000	31657	enquire
nitroglycerin	M	1,000	31498	enquire
nitroguanidine	M	1,000	31602	enquire
2-nitrotoluene	ACN	1,000	31659	enquire
3-nitrotoluene	ACN	1,000	31660	enquire
4-nitrotoluene	ACN	1,000	31658	enquire
PETN (pentaerythritol tetranitrate)	M	1,000	31600	enquire
picric acid	M	1,000	31499	enquire
propylene glycol dinitrate (PGDN)	M	1,000	31821	enquire
RDX	ACN	1,000	31666	enquire
tetryl	ACN	1,000	31667	enquire
1,3,5-trinitrobenzene	ACN	1,000	31668	enquire
2,4,6-trinitrotoluene	ACN	1,000	31669	enquire

ACN = acetonitrile

M = methanol

References (Not available from Restek.)

¹US Environmental Protection Agency. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*. SW-846, Proposed Draft Update IVB, Office of Solid Waste, Washington, DC, 1999.

²M. E. Walsh, T. Ranney, J. Chromatogr. Sci., Vol. 36, pp. 406-416, August 1998.

Exempted Drug of Abuse Reference Materials

Volume is 1mL/ampul. Concentration is µg/mL.

Compound	CAS#	Solvent	Conc.	cat.# (ea.)	price
Benzodiazepines					
alprazolam	28981-97-7	PTM	1,000	34042	enquire
bromazepam	1812-30-2	PTM	1,000	34043	enquire
chloridiazepoxide	438-41-5	PTM	1,000	34044	enquire
clobazam	22316-47-8	PTM	1,000	34045	enquire
clonazepam	1622-61-3	PTM	1,000	34046	enquire
diazepam	439-14-5	PTM	1,000	34047	enquire
flunitrazepam	1622-62-4	PTM	1,000	34049	enquire
flurazepam	1172-18-5	PTM	1,000	34050	enquire
lorazepam	846-49-1	PTM	1,000	34051	enquire
nitrazepam	146-22-5	PTM	1,000	34053	enquire
oxazepam	604-75-1	PTM	1,000	34054	enquire
prazepam	2955-38-6	PTM	1,000	34055	enquire
temazepam	896-50-4	PTM	1,000	34056	enquire
triazolam	28911-01-5	PTM	1,000	34057	enquire
Cocaine & Metabolites					
cocaethylene	529-38-4	ACN	1,000	34066	enquire
cocaine	53-21-4	PTM	1,000	34015	enquire
benzoylecgonine	519-09-5	PTM	1,000	34016	enquire
ecgonine	5796-31-6	PTM	1,000	34017	enquire
ecgonine methyl ester	38969-40-3	PTM	1,000	34018	enquire
Methadone & Metabolites					
EDDP perchlorate	66729-78-0	M	1,000	34069	enquire
methadone	1095-90-5	PTM	1,000	34005	enquire
Amphetamines & Metabolites					
d-amphetamine	51-63-8	PTM	1,000	34020	enquire
(+)-methamphetamine	51-57-0	PTM	1,000	34021	enquire
3,4-MDA HCl	4764-17-4	M	1,000	34070	enquire
3,4-MDEA HCl	82801-81-8	M	1,000	34072	enquire
3,4-MDMA HCl	42542-10-9	M	1,000	34071	enquire
phenylpropranolamine HCl	154-41-6	M	1,000	34073	enquire
Opiates & Metabolites					
codeine	76-57-3	PTM	1,000	34000	enquire
dextromethorphan HBr monohydrate	125-69-9	M	1,000	34081	enquire
hydrocodone	34195-34-1	PTM	1,000	34002	enquire
hydromorphone	71-68-1	PTM	1,000	34063	enquire
morphine	6211-15-0	PTM	1,000	34006	enquire
oxycodone	124-90-3	PTM	1,000	34007	enquire
oxycodone	76-41-5	PTM	1,000	34065	enquire
Cannabinoid & Metabolites					
cannabidiol	13956-24-1	PTM	1,000	34011	enquire
cannabinol	521-35-7	PTM	1,000	34010	enquire
Δ ⁹ -THC	1972-08-3	M	1,000	34067	enquire
(±)-11-nor-9-carboxy-Δ ⁹ -THC	104874-50-2	M	100	34068	enquire
Barbiturates					
amobarbital	64-43-7	PTM	1,000	34028	enquire
apobarbital	77-02-1	PTM	1,000	34029	enquire
barbital	57-44-3	PTM	1,000	34030	enquire
butabarbital	125-40-6	PTM	1,000	34031	enquire
butalbital	77-26-9	PTM	1,000	34032	enquire
DL-glutethimide	18389-24-7	PTM	1,000	34058	enquire
hexobarbital	56-29-1	PTM	1,000	34033	enquire
mephobarbital	115-38-8	PTM	1,000	34034	enquire
methohexital	151-83-7	PTM	1,000	34035	enquire
pentobarbital	76-74-4	PTM	1,000	34036	enquire
phenobarbital	50-06-6	PTM	1,000	34037	enquire
secobarbital	29071-21-4	PTM	1,000	34038	enquire
talbutal	115-44-6	PTM	1,000	34039	enquire
thiamylal	337-47-3	PTM	1,000	34040	enquire
thiopental	71-73-8	PTM	1,000	34041	enquire

Compound	CAS#	Solvent	Conc.	cat.# (ea.)	price
GHB					
1,4-butanediol	110-63-4	M	1,000	34078	enquire
γ-butyrolactone (GBL)	96-48-0	ACN	1,000	34077	enquire
α-methylene-γ-butyrolactone (AMGBL)	547-65-9	ACN	1,000	34079	enquire
γ-valerolactone	108-29-2	ACN	1,000	34080	enquire
LSD					
LAMPA	40158-98-3	ACN	1,000	34075	enquire
LSD	50-37-3	ACN	25	34089	enquire
LSD	50-37-3	ACN	100	34088	enquire
Other					
benzphetamine	5411-22-3	PTM	1,000	34022	enquire
caffeine	58-08-2	M	1,000	34084	enquire
continine	486-56-6	M	1,000	34086	enquire
fenfluramine	16105-77-4	PTM	1,000	34023	enquire
fentanyl	437-38-7	M	1,000	34082	enquire
nor-fentanyl oxalate	1609-66-1	M	1,000	34083	enquire
levorphanol	5985-38-6	PTM	1,000	34003	enquire
meperidine	50-13-5	PTM	1,000	34004	enquire
meprobamate	57-53-4	PTM	1,000	34059	enquire
methaqualone	340-56-7	PTM	1,000	34064	enquire
methyprylon	125-64-4	PTM	1,000	34060	enquire
nicotine	54-11-5	M	1,000	34085	enquire
pentazocine	64024-15-3	PTM	1,000	34062	enquire
phencyclidine	956-90-1	PTM	1,000	34027	enquire
phendimetrazine	50-58-8	PTM	1,000	34025	enquire
phenmetrazine	1707-14-8	PTM	1,000	34026	enquire
phentermine	1197-21-3	PTM	1,000	34024	enquire
dextro-propoxyphene	1639-60-7	PTM	1,000	34008	enquire
thebaine	115-37-7	PTM	1,000	34009	enquire

ACN = acetonitrile

M = methanol

PTM = purge & trap grade methanol

Forensic Drug Screen Test Mixture

amiodarone	10µg/mL	diazepam	10
amphetamine	10	doxepine	10
caffeine	10	haloperidol	1
codeine	10	morphine	10

In P&T methanol, 1mL/ampul

cat. # 36340 (ea.)

Forensic Drug Screen Internal Standard

D5-diazepam	D5-doxepine
10µg/mL each in P&T methanol, 10mL/ampul	

cat. # 36341 (ea.)

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USP <467>

The United States Pharmacopeia (USP) general chapter <467> Residual Solvents is a widely used compendial method intended for identifying and quantifying residual solvents in drug substances, drug products, and excipients. In an attempt to better mirror the International Conference on Harmonization (ICH) guidelines, the USP has adopted a more comprehensive methodology in residual solvent testing—the current USP30/NF25. The ICH publishes a guideline (Q3C) listing the acceptable amounts of solvent residues that can be present. In the ICH guideline, residual solvents are summarized by class, according to their toxicity. Class 1 compounds are carcinogenic compounds that pose a risk to both the consumer and the environment. The use of these solvents is to be avoided, but if they are used, they must be tightly controlled. Class 2 compounds are nongenotoxic animal carcinogens, and concentrations of these compounds should be limited. Chromatographic analysis is needed for both the Class 1 and Class 2 residual solvents.

USP <467> Singles

Volume is 1mL/ampul.

Compound	Solvent	Conc.	cat.# (ea.)	price
acetonitrile	DMSO	2.05mg/mL	36281	
benzene	DMSO	10mg/mL	36282	
carbon tetrachloride	DMSO	20mg/mL	36283	
chlorobenzene	DMSO	1.8mg/mL	36284	
chloroform	DMSO	0.3mg/mL	36285	
cyclohexane	DMSO	19.4mg/mL	36286	
1,1-dichloroethene	DMSO	40mg/mL	36287	
1,2-dichloroethane	DMSO	25mg/mL	36288	
cis-1,2-dichloroethylene	DMSO	4.67mg/mL	36289	
trans-1,2-dichloroethylene	DMSO	4.67mg/mL	36290	
1,2-dimethoxyethane	DMSO	0.5mg/mL	36291	
N,N-dimethylacetamide	DMSO	5.45mg/mL	36292	
N,N-dimethylformamide	DMSO	4.4mg/mL	36293	
1,4-dioxane	DMSO	1.9mg/mL	36294	
2-ethoxyethanol	DMSO	0.8mg/mL	36295	
ethylbenzene	DMSO	1.84mg/mL	36296	
ethylene glycol	DMSO	3.1mg/mL	36297	
formamide	DMSO	1.1mg/mL	36298	
hexane	DMSO	1.45mg/mL	36299	
methanol	DMSO	15mg/mL	36401	
2-methoxyethanol	DMSO	0.25mg/mL	36402	
methylbutylketone	DMSO	0.25mg/mL	36400	
methylcyclohexane	DMSO	5.9mg/mL	36403	enquire
methylene chloride	DMSO	3mg/mL	36404	
N-methylpyrrolidone	DMSO	2.65mg/mL	36405	
nitromethane	DMSO	0.25mg/mL	36406	
pyridine	DMSO	1mg/mL	36407	
sulfolane	DMSO	0.8mg/mL	36413	
tetrahydrofuran (THF)	DMSO	3.6mg/mL	36408	
tetralin	DMSO	0.5mg/mL	36409	
toluene	DMSO	4.45mg/mL	36410	
1,1,1-trichloroethane	DMSO	50mg/mL	36411	
trichloroethene	DMSO	0.4mg/mL	36412	
m-xylene	DMSO	6.51mg/mL	36414	
o-xylene	DMSO	0.97mg/mL	36415	
p-xylene	DMSO	1.52mg/mL	36416	

DMSO = dimethyl sulfoxide

These mixtures reflect the changes made in USP30/NF25 effective July 1, 2008.

Residual Solvents - Class 1

benzene	10mg/mL	1,1-dichloroethene	40
carbon tetrachloride	20	1,1,1-trichloroethane	50
1,2-dichloroethane	25		
In dimethyl sulfoxide, 1mL/ampul			
cat. # 36279 (ea.)			

Residual Solvents Class 2 - Mix A (15 components)

acetonitrile	2.05mg/mL	methylcyclohexane	5.90
chlorobenzene	1.80	methylene chloride	3.00
cyclohexane	19.40	tetrahydrofuran	3.45
cis-1,2-dichloroethene	4.70	toluene	4.45
trans-1,2-dichloroethene	4.70	m-xylene	6.51
1,4-dioxane	1.90	o-xylene	0.98
ethylbenzene	1.84	p-xylene	1.52
methanol	15.00		
In dimethyl sulfoxide, 1mL/ampul			
cat. # 36271 (ea.)			

Residual Solvents Class 2 - Mix B (8 components)

chloroform	60µg/mL	nitromethane	50
1,2-dimethoxyethane	100	pyridine	200
n-hexane (C6)	290	tetralin	100
2-hexanone	50	trichloroethene	80
In dimethyl sulfoxide, 1mL/ampul			
cat. # 36280 (ea.)			

Residual Solvents Class 2 - Mix C (8 components)

2-ethoxyethanol	800µg/mL	2-methoxyethanol (methyl Cellosolve)	250
ethylene glycol	3,100	N-methylpyrrolidone	2,650
formamide	1,100	sulfolane	800
N,N-dimethylacetamide	5,450		
N,N-dimethylformamide	4,400		
In dimethyl sulfoxide, 1mL/ampul			
cat. # 36273 (ea.)			

also available

For other reference mixes for USP <467> and European Pharmacopoeia, see page 480. Class III solvents are available as custom mixes. Visit www.restek.com/solutions for our custom reference material request form.



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Residual Solvent Analysis

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lit. cat.# PHFL1018



For a list of OVI retention times, see page 691.

USP <467> cont'd

These Class 1 mixtures reflect the changes made in USP24/NF19 effective January 1, 2000, and USP23/NF18 effective January 1, 1995 to December 31, 1999. While these mixtures do not meet the current USP guidelines, many labs still use these mixtures to obtain a detectable benzene peak for the direct injection methods, Method I and Method V.

USP <467> Calibration Mix #7

chloroform	60µg/mL	methylene chloride	600
1,4-dioxane	380	trichloroethene	80
In dimethyl sulfoxide, 1mL/ampul			
cat. # 36009 (ea.)			

USP <467> Calibration Mix #6

chloroform	60µg/mL	methylene chloride	600
1,4-dioxane	380	trichloroethene	80
In methanol, 1mL/ampul			
cat. # 36008 (ea.)			

USP <467> Calibration Mixture #5

benzene	2µg/mL	methylene chloride	600
chloroform	60	trichloroethene	80
1,4-dioxane	380		
In dimethyl sulfoxide, 1mL/ampul			
cat. # 36007 (ea.)			

USP <467> Calibration Mixture #4

benzene	2µg/mL	methylene chloride	600
chloroform	60	trichloroethene	80
1,4-dioxane	380		
In methanol, 1mL/ampul			
cat. # 36006 (ea.)			

USP <467> Calibration Mixture #2

benzene	100µg/mL	methylene chloride	500
chloroform	50	trichloroethene	100
1,4-dioxane	100		
In methanol, 1mL/ampul			
cat. # 36002 (ea.)			

USP <467> Calibration Mixture #3

benzene	100µg/mL	methylene chloride	500
chloroform	50	trichloroethene	100
1,4-dioxane	100		
In dimethyl sulfoxide, 1mL/ampul			
cat. # 36004 (ea.)			

Ethylene Oxide

500µg/mL in dimethyl sulfoxide, 1mL/ampul
cat. # 36005 (ea.)

Ethylene oxide is available in other solvents and concentrations. Request your custom formulation at standards@restek.com.

European Pharmacopoeia Method

The analysis of residual solvents in pharmaceutical products has changed, particularly for products being sold into Europe. The International Conference on Harmonization (ICH) Guidelines for Residual Solvents is becoming the international standard and is being adopted by more pharmacopoeias, including the United States Pharmacopoeia, every year. The ICH method and compound list is more extensive than any method previously used and poses new challenges. Compounds in Class 1 are solvents considered to be of highest risk and to be avoided in pharmaceutical manufacturing. Use of Class 2 compounds is to be limited, as they pose a lower, but present, threat to health. Compounds in Class 3 pose the lowest toxic potential and may be used routinely in manufacturing.

European Pharmacopoeia/ICH Class 1 Mix

benzene	2µg/mL	1,1-dichloroethene	8
carbon tetrachloride	4	1,1,1-trichloroethane	1500
1,2-dichloroethane	5		
Prepared in water:dimethyl sulfoxide (90:10), 1mL/ampul			
cat. # 36228 (ea.)			

European Pharmacopoeia/ICH Class 1 Mix (revised)

benzene	2µg/mL	1,1-dichloroethene	8
carbon tetrachloride	4	1,1,1-trichloroethane	10
1,2-dichloroethane	5		
In water:dimethyl sulfoxide (90:10), 1mL/ampul			
cat. # 36261 (ea.)			

European Pharmacopoeia/ICH Q3C(M) Class 2 Mix C, Revised

2-ethoxyethanol	160µg/mL	N-methylpyrrolidone	530
ethylene glycol	620	sulfolane	160
formamide	220		
2-methoxyethanol (methyl Cellosolve)	50		
In dimethyl sulfoxide, 1mL/ampul			
cat. # 36275 (ea.)			

European Pharmacopoeia/ICH Class 2 Mix B (10 components)

acetonitrile	410µg/mL	methanol	3,000
chloroform	60	nitromethane	50
1,2-dimethoxyethane	100	pyridine	200
N,N-dimethylacetamide	1,090	1,2,3,4-tetrahydronaphthalene (tetraline)	100
1,4-dioxane	380		
2-hexanone	50		
Prepared in water:dimethyl sulfoxide (90:10), 1mL/ampul			
cat. # 36230 (ea.)			

European Pharmacopoeia/ICH Q3C(M) Class 2 Mix A, Revised
(14 components)

chlorobenzene	360µg/mL	methylene chloride	600
cyclohexane	3,880	tetrahydrofuran	720
cis-1,2-dichloroethene	1,870	toluene	890
N,N-dimethylformamide	880	trichloroethene	80
ethylbenzene	369	m-xylene	1,302
n-hexane (C6)	290	o-xylene	195
methylcyclohexane	1,180	p-xylene	304
In dimethyl sulfoxide, 1mL/ampul			
cat. # 36274 (ea.)			

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Organic Acids

Fruit Juice Organic Acid Standard

citric acid	2,000µg/ml	quinic acid	2,000
fumaric acid	10*	tartaric acid	2,000
malic acid	2,000		
In water, 1mL/ampul			
	cat. # 35080 (ea.)		
In water, 5mL/ampul			
	cat. # 35081 (ea.)		

*Fumaric acid is a trace impurity in malic acid, as well as an added component of the mix. The amount of fumaric acid in malic acid will not affect the stated concentration of malic acid, but can represent a significant and variable deviation from the low concentration of fumaric acid stated to be in the mix. All other components of the mix are at the specified concentration.

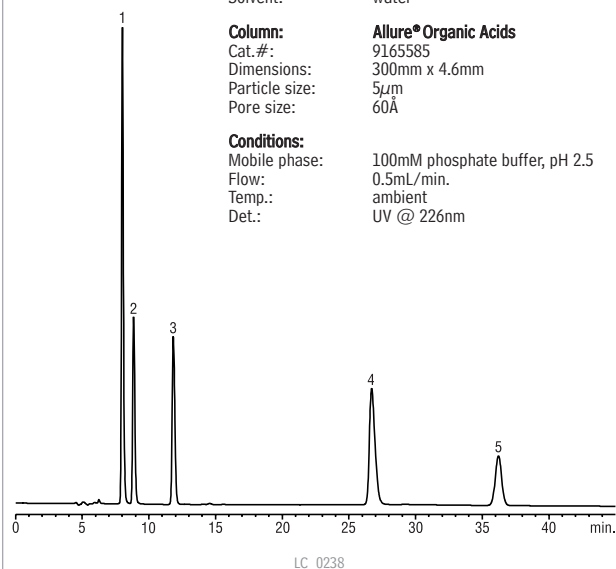
Organic acids on an Allure® Organic Acids HPLC column.

Peak List:	Conc. (mg/ml)
1. tartaric acid	1
2. quinic acid	1
3. malic acid	1
4. citric acid	1
5. fumaric acid	0.005

Sample:
Inj.: 10µL standard solution
Solvent: water

Column: Allure® Organic Acids
Cat.#: 9165585
Dimensions: 300mm x 4.6mm
Particle size: 5µm
Pore size: 60Å

Conditions:
Mobile phase: 100mM phosphate buffer, pH 2.5
Flow: 0.5mL/min.
Temp.: ambient
Det.: UV @ 226nm



Fatty Acid Methyl Esters

Marine Oil FAME Mix (20 components)

Chain	Description	% by Weight
C14:0	methyl myristate	6.0
C14:1	methyl myristoleate	1.0
C16:0	methyl palmitate	16.0
C16:1	methyl palmitoleate	5.0
C18:0	methyl stearate	8.0
C18:1	methyl oleate	13.0
C18:1	methyl vaccenate	4.0
C18:2	methyl linoleate	2.0
C18:3	methyl linolenate	2.0
C20:0	methyl arachidate	1.0
C20:1	methyl 11-eicosenoate	9.0
C20:2	methyl 11-14-eicosadienoate	1.0
C20:4	methyl arachidonate	3.0
C20:3	methyl 11-14-17-eicosatrienoate	1.0
C20:5	methyl eicosapentaenoate	10.0
C22:0	methyl behenate	1.0
C22:1	methyl erucate	3.0
C22:6	methyl docosahexaenoate	12.0
C24:0	methyl lingnocerate	1.0
C24:1	methyl nervonate	1.0

cat. # 35066 (100mg)

No data pack available.

cis/trans FAME Mix (8 components)

Description	% by Weight
methyl elaidate (C18:1 trans-9)	10.0
methyl linoleate (C18:2 cis-9,12)	20.0
methyl oleate (C18:1 cis-9)	10.0
methyl petroselinate (C18:1cis-6)	8.0
methyl petroselaideate (C18:1trans-6)	8.0
methyl stearate (C18:0)	20.0
methyl transvaccenate (C18:1 trans-11)	12.0
methyl vaccenate (C18:1 cis-11)	12.0

10mg/mL total in methylene chloride, 1mL/ampul
cat. # 35079 (ea.)

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A highly aqueous mobile phase is needed to force interaction between polar organic acids and the stationary phase in an HPLC column, but conventional C18 phases collapse in 100% aqueous mobile phases. A 300mm Allure® Organic Acids column resolves key organic acids, such as tartaric and quinic acids, using the conditions specified for a two-column analysis in AOAC Method 986.13. Example chromatograms are included in this 2-page note.

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Applications Note
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Fatty Acid Methyl Esters

Fatty Acid Methyl Esters *cont'd*

NLEA FAME Mix (28 components)

Chain	% by Weight	Chain	% by Weight
C4:0	1.5	C18:1(<i>trans</i> -9)	2.5
C6:0	1.5	C18:1(<i>cis</i> -9)	15.0
C8:0	2.0	C18:2(all- <i>trans</i> -9,12)	2.5
C10:0	2.5	C18:2(all- <i>cis</i> -9,12)	10.0
C11:0	2.5	C18:3(all- <i>cis</i> -9,12,15)	5.0
C12:0	5.0	C20:0	2.5
C13:	2.5	C20:1(<i>cis</i> -11)	1.5
C14:0	2.5	C20:5(all- <i>cis</i> -5,8,11,14,17)	2.5
C14:1(<i>cis</i> -9)	1.5	C22:0	2.5
C15:0	1.5	C22:1(<i>cis</i> -13)	1.5
C16:0	10.0	C22:6(all- <i>cis</i> -4,7,10,13,16,19)	2.5
C16:1(<i>cis</i> -9)	5.0	C23:0	1.5
C17:0	2.5	C24:0	2.5
C18:0	5.0	C24:1(<i>cis</i> -15)	2.5

30mg/mL total in methylene chloride, 1mL/ampul
cat. # 35078 (ea.)

No data pack available.

Food Industry FAME Mix (37 components)

Chain	% by Weight	Chain	% by Weight
C4:0	4.0	C18:2(all- <i>cis</i> -9,12)	2.0
C6:0	4.0	C18:3(all- <i>cis</i> -6,9,12)	2.0
C8:0	4.0	C18:3(all- <i>cis</i> -9,12,15)	2.0
C10:0	4.0	C20:0	4.0
C11:0	2.0	C20:1(<i>cis</i> -11)	2.0
C12:0	4.0	C20:2(all- <i>cis</i> -11,14,)	2.0
C13:	2.0	C20:3(all- <i>cis</i> -8,11,14)	2.0
C14:0	4.0	C20:3(all- <i>cis</i> -11,14,17)	2.0
C14:1(<i>cis</i> -9)	2.0	C20:4(all- <i>cis</i> -5,8,11,14)	2.0
C15:0	2.0	C20:5(all- <i>cis</i> -5,8,11,14,17)	2.0
C15:1(<i>cis</i> -10)	2.0	C21:0	2.0
C16:0	6.0	C22:0	4.0
C16:1(<i>cis</i> -9)	2.0	C22:1(<i>cis</i> -13)	2.0
C17:0	2.0	C22:2(all- <i>cis</i> -13,16)	2.0
C17:1(<i>cis</i> -10)	2.0	C22:6(all- <i>cis</i> -4,7,10,13,16,19)	2.0
C18:0	4.0	C23:0	2.0
C18:1(<i>trans</i> -9)	2.0	C24:0	4.0
C18:1(<i>cis</i> -9)	4.0	C24:1(<i>cis</i> -15)	2.0
C18:2(all- <i>trans</i> -9,12)	2.0		

30mg/mL total in methylene chloride, 1mL/ampul
cat. # 35077 (ea.)

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Neat Fatty Acid Methyl Esters

Chain	Description	CAS #	qty.	cat.#	price
C6:0	methyl caproate	106-70-7	100mg	35037	
C7:0	methyl heptanoate	106-73-0	100mg	35038	
C8:0	methyl caprylate	111-11-5	100mg	35039	
C9:0	methyl nonanoate	1731-84-6	100mg	35040	
C10:0	methyl caprate	110-42-9	100mg	35041	
C11:0	methyl undecanoate	1731-86-8	100mg	35042	
C12:0	methyl laurate	111-82-0	100mg	35043	
C13:0	methyl tridecanoate	1731-88-0	100mg	35044	
C14:0	methyl myristate	124-10-7	100mg	35045	
C14:1 Δ 9 <i>cis</i>	methyl myristoleate	56219-06-8	100mg	35046	
C15:0	methyl pentadecanoate	7162-64-1	100mg	35047	
C16:0	methyl palmitate	112-39-0	100mg	35048	
C16:1 Δ 9 <i>cis</i>	methyl palmitoleate	1120-25-8	100mg	35049	
C17:0	methyl heptadecanoate	1731-92-6	100mg	35050	
C18:0	methyl stearate	112-61-8	100mg	35051	
C18:1 Δ 9 <i>cis</i>	methyl oleate	112-62-9	100mg	35052	
C18:2 Δ 9,12 <i>cis</i>	methyl linoleate	112-63-0	100mg	35053	
C18:3 Δ 9,12,15 <i>cis</i>	methyl linolenate	301-00-8	100mg	35054	
C19:0	methyl nonadecanoate	1731-94-8	100mg	35055	
C20:0	methyl arachidate	1120-28-1	100mg	35056	
C20:1 Δ 11 <i>cis</i>	methyl eicosenoate	2390-09-2	100mg	35057	
C20:2 Δ 11,14 <i>cis</i>	methyl eicosadienoate	2463-02-7	100mg	35058	
C20:3 Δ 11,14,17 <i>cis</i>	methyl eicosatrienoate	55682-88-7	100mg	35059	
C20:4 Δ 5,8,11,14 <i>cis</i>	methyl arachidonate	2566-89-4	100mg	35060	
C21:0	methyl heneicosanoate	6064-90-0	100mg	35061	
C22:0	methyl behenate	929-77-1	100mg	35062	
C22:1 Δ 13 <i>cis</i>	methyl erucate	1120-34-9	100mg	35063	
C24:0	methyl lignocerate	2442-49-1	100mg	35064	
C24:1 Δ 15 <i>cis</i>	methyl nervonate	2733-88-2	100mg	35065	

No data pack available.



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Compound	CAS#	cat.#	price
MSTFA (N-methyl-N-trimethylsilyltrifluoroacetamide)			
10-pk. (10x1g)	24589-78-4	35600	
25g vial	24589-78-4	35601	
MSTFA w/1% TMCS (N-methyl-N-trimethylsilyltrifluoroacetamide w/1% trimethylchlorosilane)			
10-pk. (10x1g)	24589-78-4	35602	
25g vial	24589-78-4	35603	
BSTFA (N,O-bis[trimethylsilyl]trifluoroacetamide)			
10-pk. (10x1g)	25561-30-2	35604	
25g vial	25561-30-2	35605	
BSTFA w/1% TMCS (N,O-bis[trimethylsilyltrifluoroacetamide] w/1% trimethylchlorosilane)			
10-pk. (10x1g)	25561-30-2	35606	
25g vial	25561-30-2	35607	
MTBSTFA w/1% TBDMCS (N-methyl-N[<i>tert</i> -butyldimethylsilyl] trifluoroacetamide] w/1% <i>tert</i> -butyldimethylchlorosilane)			
10-pk. (10x1g)	77377-52-7	35608	
25g vial	77377-52-7	35610	
TMCS (trimethylchlorosilane)			
10-pk. (10x1g)	75-77-4	35611	
25g vial	75-77-4	35612	



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- React with alcohols, amines and phenols.
- Frequently used for drugs of abuse confirmation.

Acylation reagents offer the same types of advantages available from silylation reagents: creating less polar, more volatile derivatives. In comparison to silylating reagents, the acylating reagents can more readily target highly polar multi-functional compounds, such as carbohydrates and amino acids. In addition, acylating reagents offer the distinct advantage of introducing electron-capturing groups, thus enhancing detectability during analysis.

Compound	CAS#	cat.#	price
MBTFA (N-methyl-bis-trifluoroacetamide)			
10-pk. (10x1g)	685-27-8	35616	
25g vial	685-27-8	35617	
TFAA (trifluoroacetic acid anhydride)			
10-pk. (10x1g)	407-25-0	35618	
25g vial	407-25-0	35619	
PFAA (pentafluoropropionic acid anhydride)			
10-pk. (10x1g)	356-42-3	35620	
25g vial	356-42-3	35621	
HFAA (heptafluorobutyric acid anhydride)			
10-pk. (10x1g)	336-59-4	35622	
25g vial	336-59-4	35623	
PFPOH (pentafluoropropanol)			
10-pk. (10x1g)	422-05-9	35624	
25g vial	422-05-9	35625	

Alkylation Derivatization Reagents

- Adds alkyl groups to functional hydrogens (H).
- Decreases polarity on compounds containing acidic hydrogens, i.e., phenols, carboxylic acids.
- Forms an ester.

Alkylation reagents reduce molecular polarity by replacing active hydrogens, such as carboxylic acids and phenols. Alkylation reagents can be used alone to form esters and amides or they can be used in conjunction with acylation or silylation reagents. A two-step approach is commonly used in the derivatization of amino acids, where multiple functional groups of these compounds may necessitate protection during derivatization.

Esterification is the reaction of an acid with an alcohol in the presence of a catalyst. It is the most popular method of alkylation due to the availability of reagents and ease of use. Alkyl esters are stable, and can be formed quickly and quantitatively. Retention of the derivative can be varied by altering the length of the substituted alkyl group. In addition to the formation of simple esters, alkylation reagents can be used in extraction procedures where biological matrices are present.

Compound	CAS#	cat.#	price
TMPAH			
10-pk. (10x1g)	1899-02-1	35614	
25g vial	1899-02-1	35615	

FAPAS® Food Testing Program*

- External check of quality for laboratories performing food testing.
- Ensures accurate proficiency testing.

Laboratories testing food quality and safety are encouraged to routinely perform proficiency tests. Proficiency testing is an external check of quality. It provides an independent and unbiased assessment of the performance of all aspects of the laboratory, both human and hardware. Each participating laboratory is encouraged to use its normal analytical method, thereby simulating the testing of a routine laboratory sample as closely as possible. While the outcome of the analysis may depend on the choice of method, it also could be affected by the performance of the laboratory equipment or the competence of the analyst. Using proficiency testing, those laboratories performing well can ensure high standards are maintained and those performing unsatisfactorily can implement corrective action rapidly. In an environment in which analytical laboratories compete intensively for work, proficiency testing provides the means by which external customers can compare competence in carrying out specific tests. Together with laboratory accreditation and the use of validated methods, proficiency tests are an important requirement of the EU Additional Measures Directive 93/99/EEC applying to laboratories entrusted with the official control of food.

*Use of Restek calibration mixtures by laboratories participating in the FAPAS program is voluntary and no endorsement of any Restek product has been made by the Central Science Laboratory. To obtain further information regarding the FAPAS program, or to participate, contact fapas@csl.gov.uk.

FAPAS® Series 5 OC Pesticide Mix 1 (19 components)

Equal concentration of all compounds. Suitable for GC/MS analysis.

aldrin	dieldrin
α-BHC	α-endosulfan (I)
β-BHC	β-endosulfan (II)
γ-BHC (lindane)	endosulfan sulfate
α-chlordane (<i>cis</i>)	endrin
γ-chlordane (<i>trans</i>)	heptachlor
4,4'-DDD	heptachlor epoxide (isomer B)
4,4'-DDE	hexachlorobenzene
2,4'-DDT	oxychlordane
4,4'-DDT	

100µg/mL each in acetone, 1mL/ampul

cat. # 32412 (ea.)

FAPAS® Series 9 OP Pesticide Mix 1 (10 components)

Equal concentration of all compounds. Suitable for GC/FPD, GC/NPD, & GC/MS analysis.

chlorpyrifos	fenitrothion
chlorpyrifos-methyl	malathion
diazinon	methacriphos
dichlorvos	phosphamidon
etrimphos	pirimiphos-methyl

100µg/mL each in acetone, 1mL/ampul

cat. # 32413 (ea.)

FAPAS® Series 5 OC Pesticide Mix 2 (19 components)

Varied concentrations. Suitable for GC/ECD analysis.

aldrin	10µg/mL	dieldrin	20
α-BHC	10	α-endosulfan (I)	10
β-BHC	10	β-endosulfan (II)	20
γ-BHC (lindane)	10	endosulfan sulfate	20
α-chlordane (<i>cis</i>)	10	endrin	20
γ-chlordane (<i>trans</i>)	10	heptachlor	10
4,4'-DDD	20	heptachlor epoxide (isomer B)	10
4,4'-DDE	20	hexachlorobenzene	10
2,4'-DDT	20	oxychlordane	10
4,4'-DDT	20		

In acetone, 1mL/ampul

cat. # 32414 (ea.)

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Plastic Container Testing Reference Materials.

See [page 470](#).

Column Test Mixes

Dimethyldichlorosilane (DMDCS) Deactivating Agent

Restek offers dimethyldichlorosilane (DMDCS), for deactivating liners and other glassware. Simply dilute the neat material to a 5% solution in toluene, soak the glass item(s) in the solution for 15 minutes, and rinse with toluene and methanol. DMDCS reacts with active hydroxyl groups on the glass surface to produce a deactivated surface. A detailed procedure is included with the product.

dimethyldichlorosilane (DMDCS)

Neat, 20mL/ampul

cat. # 31840 (ea.)

Fragrance Materials Test Mix

The Fragrance Materials Association (FMA) has proposed a method for analyzing essential oils on polar and nonpolar capillary GC columns. A performance evaluation mixture should be used to aid in detecting inlet problems, stationary phase degradation, loss of resolution, changes in sensitivity, and the presence of reactive sites in the sample pathway. Our test mix is consistent with the mixture proposed by the FMA. The required 5% test solution is made by diluting the 0.5mL of neat mixture to 10mL with acetone. The working solution will be stable for up to one week if transferred to a dark container and stored refrigerated.

benzoic acid	1.0%	geraniol	0.6%
benzyl salicylate	36.2%	hydroxycitronellal (3,7-dimethyl-7-hydroxyoctanal)	5.0%
1,8-cineole (eucalyptol)	0.5%	d-limonene	20.0%
trans cinnamaldehyde	0.5%	thymol	0.3%
cinnamyl acetate	0.3%	vanillin	0.1%
cinnamyl alcohol	0.3%		
ethyl butyrate	36.2%		

Neat, 0.5mL in an amber ampul

cat. # 31807 (ea.)

No data pack available.

**also available**

See pages 627-637 for chromatograms of flavors and fragrances analysis.

Grob Test Mix (Capillary GC)

For use with temperature programmed conditions.

nC10-FAME	0.42mg/mL	2,6-dimethylphenol	0.32
nC11-FAME	0.42	2-ethylhexanoic acid	0.38
nC12-FAME	0.41	nonanal	0.40
2,3-butanediol	0.53	1-octanol	0.36
dicyclohexylamine	0.31	undecane (C11)	0.29
2,6-dimethylaniline	0.32	decane (C10)	0.28

In methylene chloride, 1mL/ampul

cat. # 35000 (ea.)

No data pack available.

Amine Column Test Mix (GC)

For Stabilwax®-DB, Rtx®-5Amine, and Rtx®-35Amine columns.

1,2-butanediol	0.60mg/mL	diethanolamine	1.20
pyridine	0.60	2-nonanol	0.60
decane (C10)	0.60	2,6-dimethylaniline	0.60
diethylenetriamine	1.20	dodecane (C12)	0.60

In methylene chloride:methanol (1:1), 1mL/ampul

cat. # 35002 (ea.)

No data pack available.

Isothermal Column Test Mix (GC)

1,2-hexanediol	0.46mg/mL	1-octanol	0.36
decane (C10)	0.29	nonanal	0.40
undecane (C11)	0.29	2,6-dimethylaniline	0.32
dodecane (C12)	0.29	2,6-dichlorophenol	0.57
tridecane	0.29	naphthalene	0.32

In methylene chloride, 1mL/ampul

cat. # 35003 (ea.)

No data pack available.

HPLC Normal Phase Test Mix #1

benzene	1.00mg/mL	benzyl alcohol	3.00
benzaldehyde	0.04	4-methoxybenzyl alcohol	2.00

In hexane, 1mL/ampul

cat. # 35004 (ea.)

No data pack available.

HPLC Reversed Phase Test Mix #1

benzene	3.00mg/mL	naphthalene	0.50
uracil	0.02	biphenyl	0.06

In methanol:water (75:25), 1mL/ampul

cat. # 35005 (ea.)

No data pack available.

free data**Available on Our Website: Lot Certificates, Data Packs, and MSDSs**

For complete information detailing manufacturing and testing for Restek inventoried reference standards, visit our website at www.restek.com/datapacks. To view certificates and/or an MSDS, enter the catalog number of the product in the Search feature. For a free data pack (Adobe® PDF file), enter the catalog number and lot number of the product.

HPLC OQ Linearity Test Mix Kit

Linear detector responses to concentration variations are an important part of operation qualification (OQ) for HPLC instruments. Our kit of five aqueous solutions of caffeine can be used to generate simple plots of UV response versus concentration. Certificate of Analysis includes caffeine concentration, calculated variance in preparing each mixture, a linearity plot, and coefficient of determination (r^2) for the linear plot.

Caffeine at 5.0, 25.0, 125.0, 250.0, 500.0 $\mu\text{g}/\text{mL}$ in water in a five ampul kit.
1mL each of these mixtures.

cat. # 31805 (kit)

No data pack available.

also available

Individual ampuls of caffeine are available on page 400.

Carbohydrate HPLC Performance Check Mix

Performance qualification (PQ) determines the precision of the HPLC system. Our performance check mix for HPLC/RI consists of five simple sugars in varied concentrations. We prepare the reference material in water, lyophilize it, and pack it dry for enhanced stability.

glucose	2.0mg	maltose	4.5
fructose	2.1	sucrose	4.0
lactose	4.4		

Dry components in 4mL screw-cap vial. Reconstitute in 1mL acetonitrile:water (75:25) to 2.0, 2.1, 4.4, 4.5, 4.0mg/mL, respectively.

cat. # 31809 (ea.)

No data pack available.

HPLC Performance Test Mix

The National Institute of Standards and Technology (NIST) has formulated a mixture that is highly effective for characterizing HPLC columns for efficiency, void volume, methylene selectivity, retentiveness, and activity toward chelators and organic bases. Results can be used for column classification, for column selection, for monitoring column performance over time, or for quality control. We test our material against the NIST 870 standard.

amitriptyline hydrochloride	2,800 $\mu\text{g}/\text{mL}$	quinizarin	94
ethylbenzene	1,700	toluene	1,400
		uracil	28

In methanol, 1mL/ampul

cat. # 31699 (ea.)

OQ Response Linearity Test Standard

<i>n</i> -heptadecane (C17)	1.5 $\mu\text{g}/\text{mL}$	<i>n</i> -docosane (C22)	1,000
<i>n</i> -octadecane (C18)	10	<i>n</i> -tetracosane (C24)	10,000
<i>n</i> -nonadecane (C19)	2		
<i>n</i> -eicosane (C20)	100		

In isoocane, 1mL/ampul

cat. # 33906 (ea.)

NPD Performance Evaluation Standard

azobenzene	6.5 $\mu\text{g}/\text{mL}$	<i>n</i> -octadecane	100
malathion	10		

In isoocane, 1mL/ampul

cat. # 33907 (ea.)

FID Performance Evaluation Standard

<i>n</i> -tetradecane (C14)	<i>n</i> -hexadecane (C16)
<i>n</i> -pentadecane (C15)	

0.03 w/w% each in hexane, 1mL/ampul


cat. # 33908 (ea.)

OQ/PV Headspace Standard

1,2-dichlorobenzene	<i>tert</i> -butyl disulfide
nitrobenzene	

2,000 $\mu\text{g}/\text{mL}$ each in ethanol, 1mL/ampul

cat. # 33909 (ea.)



For Restek's complete line of column test mixes, visit our website at:
www.restek.com/testmixes

did you know?

We have more than 2,000 pure, characterized, neat compounds in our inventory! If you do not see the EXACT mixture you need listed on any of these pages, contact us for a custom standard.