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NEW!

Compound Index for Reference Standards

See **pages 730–736.**

World-Class Certified

10 CRITICAL STEPS

Whether it's a stock, off-the-shelf reference standard or a one-of-a-kind, custom-formulated solution, there are 10 critical steps that Restek takes to separate our certified reference materials (CRMs) from the competition. For every CRM produced in Restek's ISO-accredited labs, we always:

1 Review Customer & Method Requirements

To determine which organic reference standards we should develop as stock products, Restek experts closely monitor government regulations and methods from around the globe and also actively engage with our customers and distributors. Once a product is chosen based on regulatory changes, customer needs, and our 20+ years of experience, a veteran Restek chemist formulates a stable standard containing an ideal mix of compounds and concentrations. All formulations are then subjected to a thorough review of accuracy, compatibility, and solubility by a second chemist.

2 Verify Compatibility & Stability

All raw materials used in our reference standards are held to strict purity criteria, and compound compatibility is scrutinized during both formulation and review. We also conduct on-going, long-term stability and short-term shipping stability studies in accordance with ISO Guide 34 and ISO Guide 35 to ensure reliability and accurate shelf-life reporting.

3 Characterize Raw Materials Thoroughly

Restek's Quality Control (QC) lab confirms the chemical identity and purity of mixture components and solvents using one or more of the following techniques: GC-FID, HPLC, GC-ECD, GC-MS, LC-MS, refractive index, and melting point.

4 Calibrate Analytical Balances

All analytical balances are verified at seven mass levels daily using NIST* traceable weights and are also calibrated yearly by an ISO/IEC 17025:2005–accredited provider to guarantee accurate measurement.

5 Deactivate Glassware & Ampuls

Restek reference standards are prepared using Class A volumetric flasks and/or Class A pipettes. Ampuls and vials used in preparation and packaging are deactivated to prevent the loss of target analytes.

6 Maintain ISO Accreditation

In 2011, the reference standard manufacturing and QC testing laboratories in Restek's state-of-the-art Bellefonte, PA, facility earned ISO Guide 34 and ISO/IEC 17025 accreditation. These accreditations—in addition to ISO 9001 registration, which we have maintained since 1994—serve as recognition that Restek and our labs meet the world-class quality standards established by the International Organization for Standardization (ISO). On-site manufacturing as well as raw material, qualitative, and quantitative analyses are completed in these ISO-accredited labs. *Restek's ISO-accredited labs offer a full line of both stock and custom CRMs.*

* National Institute of Standards and Technology

What are Certified Reference Materials (CRMs)?

A CRM is a reference standard that meets the following set of strict criteria defined under ISO Guide 34 and ISO/IEC 17025:

- All raw materials in the standard must be characterized via qualified methods on qualified instruments.
- The reference standard must be produced in an ISO-accredited lab under documented procedures.
- The reference standard must fall under at least one of the chemical classes for which the lab has been approved under its scope of accreditation.

To learn more about Restek's ISO quality credentials and to view our certificates (including scopes of accreditation), visit **www.restek.com/iso**

Reference Materials (CRMs)

7 Offer a Variety of Documentation

Our fully compliant certified reference materials (CRMs) are available with three levels of documentation:

Gravimetric: Product supplied with the gravimetric records detailing exact amount of each raw material used, purity of each material used, total volume prepared, calculated concentration, and a unique lot number.

Qualitative: A single sample withdrawn from the packaged units is tested by the appropriate technique to verify mixture composition. Product supplied with a certificate of composition showing a chromatogram of the standard with each peak identified, raw material purity, and gravimetric concentration.

Quantitative: A sample of the packaged unit is analyzed in triplicate and the peak areas are statistically compared to a previous lot (if available) or a second independently prepared lot. Unless otherwise specified, the acceptance criteria are as follows: The coefficient of variation (CV) will not exceed 5% for the peak areas of the triplicate injections of the sample. The percent difference of the average peak areas of the sample compared to the previous or second lot will not exceed 10% (13% for gases). A detailed data pack is available at www.restek.com containing gravimetric documentation, all quantitative assay raw data, and statistics. All raw material purity and identification results are available upon request.

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8 Package Securely & Label Clearly

Every Restek CRM is placed in durable, high-quality packaging for dock-to-door protection. Labeling provides critical storage, safety, and shelf life information in an easy-to-read format.

9 Protect Product Quality After Opening

To help preserve the integrity of our CRMs after they are opened, we include a deactivated screw-top vial with each reference standard for worry-free transfer and reliable temporary storage.

10 Manage Warehouse Inventory

To ensure the inventory is available when it's needed, Restek continually analyzes and maintains inventory of more than 1,100 catalog standards as well as multiple lots of the most commonly requested calibration standards. We pull inventory months before its expiration date to eliminate inadvertent delivery of expired or nearly expired reference standards.

www.restek.com/**reference-standards**

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In addition to an extensive selection of reference standards that is in-stock and ready to ship, Restek's custom-formulated solutions also fall under our ISO Guide 34 and ISO/IEC 17025 accreditations. Satisfy all of your certified reference material needs—as well as order GC and LC columns, sample prep supplies, and accessories—using one reliable supplier.

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Reference Standards

Single-Component Solutions

Compound	CAS #	Solvent	Conc.	cat.#
acenaphthene	83-32-9	M	1,000	31267
acenaphthylene	208-96-8	M	1,000	31268
acetaldehyde-2,4-DNPH	1019-57-4	ACN	100	33074
acetochlor	34256-82-1	M	100	33208
acetochlor ESA sodium salt	187022-11-3	M	100	33092
acetochlor OA	184992-44-4	M	100	33094
acetone	67-64-1	Neat		30012
acetone	67-64-1	PTM	5,000	30245
acetonitrile	75-05-8	DMSO	2.05 mg/mL	36281
acetonitrile	75-05-8	PTM	1,000	30495
acetophenone	98-86-2	PTM	5,000	30621
acifluorfen	50594-66-6	M	1,000	32255
acifluorfen methyl ester	50594-67-7	M	1,000	32256
acrolein	107-02-8	PTM	5,000	30645
acrolein	107-02-8	W	5,000	30646
acrylamide	79-06-1	M	1,000	30494
acrylonitrile	107-13-1	PTM	2,000	30246
alachlor	15972-60-8	M	1,000	32204
alachlor	15972-60-8	M	100	33207
alachlor ESA sodium salt	142363-53-9	M	100	33096
alachlor OA	171262-17-2	M	100	33099
aldrin	309-00-2	M	1,000	32205
allyl chloride	107-05-1	PTM	2,000	30248
alprazolam	28981-97-7	PTM	1,000	34042
2-amino-4,6-dinitrotoluene	35572-78-2	ACN	1,000	31670
4-amino-2,6-dinitrotoluene	19406-51-0	ACN	1,000	31671
aminomethyl phosphonic acid (AMPA)	1066-51-9	W	100	32428
ammelide	645-93-2	DEA:W (20:80)	1,000	33249
ammeline	645-92-1	DEA:W (20:80)	1,000	33250
ammonium picrate**	131-74-8	ACN	2,000	31890
amobarbital	64-43-7	PTM	1,000	34028
d-amphetamine	51-63-8	PTM	1,000	34020
tert-amyl alcohol	75-85-4	PTM	10,000	30631
tert-amyl ethyl ether (TAEE)	919-94-8	PTM	2,000	30617
tert-amyl methyl ether (TAME)	994-05-8	PTM	2,000	30629
5-α-androstane	438-22-2	D	2,000	31065
aniline	62-53-3	M	1,000	31470
anthracene	120-12-7	A	1,000	31269
anthracene-d10	1719-06-08	D	2,000	31037
anthracene (5 mL)	120-12-7	ACN	100	33264
antifoam agent for purge-and-trap	N/A	Neat	1 mL	31822
aprobarbital	77-02-1	PTM	1,000	34029
Aramite	140-57-8	H	2,000	31624
Aroclor 1016	12674-11-2	H	1,000	32006
Aroclor 1016	12674-11-2	I	200	32064
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Aroclor 1016	12674-11-2	TO	50 mg/kg	32075
Aroclor 1221	11104-28-2	H	1,000	32007
Aroclor 1221	11104-28-2	I	200	32065
Aroclor 1221	11104-28-2	TO	500 mg/kg	32078
Aroclor 1221	11104-28-2	TO	50 mg/kg	32077
Aroclor 1232	11141-16-5	H	1,000	32008
Aroclor 1232	11141-16-5	I	200	32066
Aroclor 1232	11141-16-5	TO	500 mg/kg	32080
Aroclor 1232	11141-16-5	TO	50 mg/kg	32079
Aroclor 1242	53469-21-9	H	1,000	32009
Aroclor 1242	53469-21-9	I	200	32067
Aroclor 1242	53469-21-9	TO	500 mg/kg	32082
Aroclor 1242	53469-21-9	TO	50 mg/kg	32081
Aroclor 1248	12672-29-6	H	1,000	32010
Aroclor 1248	12672-29-6	I	200	32068
Aroclor 1248	12672-29-6	TO	500 mg/kg	32084
Aroclor 1248	12672-29-6	TO	50 mg/kg	32083
Aroclor 1254	11097-69-1	H	1,000	32011
Aroclor 1254	11097-69-1	I	200	32069
Aroclor 1254	11097-69-1	TO	500 mg/kg	32086
Aroclor 1254	11097-69-1	TO	50 mg/kg	32085
Aroclor 1260	11096-82-5	H	1,000	32012
Aroclor 1260	11096-82-5	I	200	32070
Aroclor 1260	11096-82-5	TO	500 mg/kg	32088
Aroclor 1260	11096-82-5	TO	50 mg/kg	32087
Aroclor 1262	37324-23-5	H	1,000	32409
Aroclor 1268	11100-14-4	H	1,000	32410
atrazine	1912-24-9	A	1,000	32208
aviation gas (5 mL)	8006-69-1	PTM	50,000	30208
aviation gas	8006-69-1	PTM	2,500	30094
aviation gas	8006-69-1	PTM	50,000	30207
azobenzene	103-33-3	D	1,000	31496
barbital	57-44-3	PTM	1,000	34030
bentazon	25057-89-0	M	1,000	32257
benzaldehyde	100-52-7	D	2,000	33017
benzene	71-43-2	DMSO	10 mg/mL	36282
benzene	71-43-2	D	250	35262
benzene	71-43-2	PTM	2,000	30249
benzene-d6	1076-43-3	PTM	2,000	30025

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Compound	CAS #	Solvent	Conc.	cat.#
benzidine	92-87-5	M	1,000	31441
benzo(a)anthracene	56-55-3	M	1,000	31270
benzo(a)pyrene	50-32-8	A	1,000	31271
benzo(b)fluoranthene	205-99-2	A	1,000	31272
benzo(ghi)perylene	191-24-2	D	1,000	31273
benzo(k)fluoranthene	207-08-9	A	1,000	31274
benzoguanamine	91-76-9	pyridine	1,000	33251
benzoguanamine (5 mL)	91-76-9	pyridine	1,000	33252
benzoic acid	65-85-0	D	2,000	31879
benzoic acid	65-85-0	M	1,000	31415
benzoylecgonine	519-09-5	PTM	1,000	34016
benzphetamine	5411-22-3	PTM	1,000	34022
benzyl benzoate	120-51-4	H	5,000	31847
α-BHC	319-84-6	M	1,000	32206
β-BHC	319-85-7	A	1,000	32209
δ-BHC	319-86-8	M	1,000	32217
γ-BHC (lindane)	58-89-9	M	1,000	32226
bis(2-ethylhexyl)adipate	103-23-1	M	1,000	31449
bis(2-ethylhexyl)phthalate	117-81-7	D	1,000	31420
bromazepam	1812-30-2	PTM	1,000	34043
bromobenzene	108-86-1	PTM	2,000	30250
2-bromobutanoic acid	80-58-0	MTBE	2,000	31881
2-bromobutyrate	3196-15-4	MTBE	2,000	31882
2-bromochlorobenzene	694-80-4	PTM	2,000	30228
4-bromochlorobenzene	106-39-8	PTM	2,000	30230
1-bromo-2-chloroethane	107-04-0	PTM	2,000	30469
bromochloromethane	74-97-5	PTM	2,000	30225
2-bromo-1-chloropropane	3017-95-6	PTM	2,000	30226
bromodichloromethane	75-27-4	PTM	2,000	30251
4-bromo-3,5-dimethylphenyl-N-methylcarbamate (BDMC)	3766-81-2	M	100	32274
1-bromo-4-fluorobenzene	460-00-4	A	1,000	31854
4-bromofluorobenzene	460-00-4	PTM	2,000	30026
4-bromofluorobenzene	460-00-4	PTM	2,500	30067
4-bromofluorobenzene	460-00-4	PTM	5,000	30003
4-bromofluorobenzene	460-00-4	PTM	10,000	30082
bromoform	75-25-2	PTM	2,000	30252
bromomethane	74-83-9	PTM	2,000	30253
1-bromo-2-nitrobenzene	577-19-5	A	1,000	32279
2-bromopropionic acid	598-72-1	MTBE	1,000	31653
butabarbital	125-40-6	PTM	1,000	34031
butachlor ESA sodium salt		M	100	33202
1,3-butadiene	106-99-0	PTM	2,000	30622
butalbital	77-26-9	PTM	1,000	34032
1,4-butanediol	110-63-4	M	1,000	34078
(s)-(-)-1,2,4-butanetriol	42890-76-6	pyridine	1,000	33024
(s)-(-)-1,2,4-butanetriol (5 mL)	42890-76-6	pyridine	1,000	33032
1-butanol	71-36-3	PTM	50,000	30474
tert-butanol	75-65-0	PTM	50,000	30470
tert-butanol-d9	25725-11-5	PTM	20,000	30618
2-butanone (MEK)	78-93-3	PTM	5,000	30254
γ-butyrolactone (GBL)	96-48-0	ACN	1,000	34077

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Solvent codes:

A = acetone
ACN = acetonitrile
C = carbon disulfide
Cy = cyclohexane
D = methylene chloride
DEA = diethylamine
DMSO = dimethyl sulfoxide
EA = ethyl acetate
H = hexane
I = isooctane
Ip = isopropanol
M = methanol
MTBE = methyl *tert*-butyl ether
PTM = purge-and-trap grade methanol
T = toluene
TO = transformer oil
W = water (DI)

Compound	CAS #	Solvent	Conc.	cat.#
caffeine	58-08-2	W	5	31804
caffeine	58-08-2	W	25	31803
caffeine	58-08-2	W	125	31802
caffeine	58-08-2	W	250	31801
caffeine	58-08-2	W	500	31800
caffeine	58-08-2	M	1,000	34084
cannabichromene	20675-51-8	PTM	1,000	34092
cannabidiol	13956-29-1	PTM	1,000	34011
cannabigerol	25654-31-3	PTM	1,000	34091
cannabinol	521-35-7	PTM	1,000	34010
ε-caprolactam	105-60-2	D	2,000	31833
carbazole	86-74-8	D	1,000	31836
carbazole	86-74-8	M	1,000	31430
carbon disulfide	75-15-0	PTM	2,000	30258
carbon tetrachloride	56-23-5	DMSO	20 mg/mL	36283
carbon tetrachloride	56-23-5	PTM	2,000	30259
chloral hydrate	302-17-0	ACN	1,000	30609
chlordane	57-74-9	H	1,000	32021
chlordane	57-74-9	I	5,000	32072
chlordane	57-74-9	M	2,000	32016
cis-chlordane	5103-71-9	M	1,000	32207
trans-chlordane	5566-34-7	M	1,000	32227
chlordiazepoxide	438-41-5	PTM	1,000	34044
4-chloroaniline	106-47-8	D	2,000	31211
chlorobenzene	108-90-7	DMSO	1.8 mg/mL	36284
chlorobenzene	108-90-7	PTM	2,000	30261
chlorobenzene-d5	3114-55-4	PTM	2,000	30223
chlorobenzilate	510-15-6	M	1,000	32211
chloroethane	75-00-3	PTM	2,000	30263
2-chloroethanol	107-07-3	PTM	2,000	30264
2-chloroethyl vinyl ether	110-75-8	PTM	2,000	30265
1-chloro-2-fluorobenzene	348-51-6	PTM	2,000	30040
1-chloro-4-fluorobenzene	352-33-0	PTM	2,500	30066
chloroform	67-66-3	DMSO	0.3 mg/mL	36285
chloroform	67-66-3	PTM	2,000	30266
chloromethane	74-87-3	PTM	2,000	30267
2-chloronaphthalene	91-58-7	M	1,000	31284
4-chloro-3-nitrobenzotrifluoride	121-17-5	A	1,000	32282
1-chlorooctadecane	3386-33-2	D	10,000	31098
1-chlorooctane	111-85-3	PTM	10,000	30084
chloroprene	126-99-8	PTM	5,000	30238
chlorpyrifos	2921-88-2	M	1,000	32212
chrysene	218-01-9	A	1,000	31275
clobazam	22316-47-8	PTM	1,000	34045
clonazepam	1622-61-3	PTM	1,000	34046
cocaethylene	529-38-4	ACN	1,000	34066
cocaine	53-21-4	PTM	1,000	34015
codeine	76-57-3	PTM	1,000	34000
continine	486-56-6	M	1,000	34086
creosote oil	8001-58-9	D	50,000	31838
cyanazine	21725-46-2	A	1,000	32215
cyanuric acid	108-80-5	DEA:W (20:80)	1,000	33248
cyclohexane	110-82-7	DMSO	19.4 mg/mL	36286
2,4-D (2,4-dichlorophenoxyacetic acid)	94-75-7	M	1,000	32239
2,4-D methyl ester	1928-38-7	M	1,000	32240
Dacthal (DCPA dimethyl ester)	1861-32-1	M	1,000	32216
dalapon	75-99-0	ACN	1,000	32432
dalapon	75-99-0	M	1,000	32253
dalapon	75-99-0	M	2,000	32056
dalapon methyl ester	17640-02-7	H	2,000	32057
dalapon methyl ester	17640-02-7	M	1,000	32254
2,4-DB	94-82-6	M	1,000	32241
DCPA diacid	2136-79-0	M	200	32261
2,4'-DDD	53-19-0	M	1,000	32098
4,4'-DDD	72-54-8	M	1,000	32201
2,4'-DDE	3424-82-6	M	1,000	32099
4,4'-DDE	72-55-9	M	1,000	32202
2,4'-DDT	789-02-6	M	1,000	32200
4,4'-DDT	50-29-3	M	1,000	32203

Single-Component Solutions

Compound	CAS #	Solvent	Conc.	cat.#
decachlorobiphenyl (BZ #209) (5 mL)	2051-24-3	A	200	32030
decachlorobiphenyl (BZ #209)	2051-24-3	A	200	32029
decachlorobiphenyl (BZ #209)	2051-24-3	I	10	32289
decafluorobiphenyl	434-90-2	A	1,000	31855
decafluorobiphenyl	434-90-2	D	2,000	31041
decafluorobiphenyl	434-90-2	ACN	1,000	31842
decafluorotriphenylphosphine (DFTPP)	5074-71-5	D	2,500	31001
n-decane	124-18-5	Neat	1 mL	31858
desethyl-atrazine	6190-65-4	A	1,000	32445
desisopropylatrazine	1007-28-9	A	1,000	32446
dextromethorphan HBr monohydrate	125-69-9	M	1,000	34081
dextro-propoxyphene	1639-60-7	PTM	1,000	34008
diazepam	439-14-5	PTM	1,000	34047
dibenzo(a,h)anthracene	53-70-3	D	1,000	31276
4,4' -dibromobiphenyl	92-86-4	D	2,000	31039
4,4' -dibromobiphenyl	92-86-4	EA	500	32092
dibromochloromethane (chlorodibromochloromethane)	124-48-1	PTM	2,000	30271
1,2-dibromo-3-chloropropane (DBCP)	96-12-8	PTM	2,000	30270
1,2-dibromoethane	106-93-4	PTM	2,000	30272
dibromofluoromethane	1868-53-7	Neat	100 mg	30634
dibromomethane	74-95-3	PTM	2,000	30430
4,4' -dibromooctafluorobiphenyl	10386-84-2	D	2,000	31040
4,4' -dibromooctafluorobiphenyl	10386-84-2	H	250	32053
4,4' -dibromooctafluorobiphenyl	10386-84-2	MTBE	2,000	31856
2,3-dibromopropionic acid	600-05-5	MTBE	1,000	31655
2,5-dibromotoluene	615-59-8	PTM	1,000	30435
2,5-dibromotoluene	615-59-8	PTM	10,000	30453
dibutylchlorendate	1770-80-5	A	200	32025
dicamba	1918-00-9	M	1,000	32247
dicamba methyl ester	6597-78-0	M	1,000	32248
1,2-dichlorobenzene	95-50-1	M	1,000	31442
1,3-dichlorobenzene	541-73-1	M	1,000	31443
1,4-dichlorobenzene	106-46-7	ACN	1,000	30498
1,4-dichlorobenzene	106-46-7	M	1,000	31444
1,2-dichlorobenzene-d4	2199-69-1	PTM	2,000	30049
3,3' -dichlorobenzidine	91-94-1	D	2,000	31835
3,3' -dichlorobenzidine	91-94-1	M	2,000	31026
3,5-dichlorobenzoic acid	51-36-5	MTBE	1,000	31652
3,5-dichlorobenzoic acid methyl ester	2905-67-1	M	1,000	32264
3,5-dichlorobenzoic acid methyl ester	2905-67-1	MTBE	1,000	31649
1,4-dichlorobutane	110-56-5	PTM	2,000	30227
trans-1,4-dichloro-2-butene	110-57-6	PTM	2,000	30274
dichlorodifluoromethane (CFC-12)	75-71-8	PTM	2,000	30275
1,1-dichloroethane	75-34-3	PTM	2,000	30276
1,2-dichloroethane	107-06-2	DMSO	25 mg/mL	36288
1,2-dichloroethane	107-06-2	PTM	2,000	30277
1,2-dichloroethane-d4	17060-07-0	PTM	2,000	30027
1,1-dichloroethene	75-35-4	DMSO	40 mg/mL	36287
1,1-dichloroethene	75-35-4	PTM	2,000	30278
cis-1,2-dichloroethene	156-59-2	PTM	2,000	30279
trans-1,2-dichloroethene	156-60-5	PTM	2,000	30280
cis-1,2-dichloroethylene	156-59-2	DMSO	4.67 mg/mL	36289
trans-1,2-dichloroethylene	156-60-5	DMSO	4.67 mg/mL	36290
2,6-dichlorophenol	87-65-0	M	1,000	31409
2,4-dichlorophenylacetic acid	19719-28-9	M	200	32049
2,4-dichlorophenylacetic acid	19719-28-9	A	1,000	32439
2,4-dichlorophenyl acetic acid methyl ester	55954-23-9	H	200	32050
1,2-dichloropropane	78-87-5	PTM	2,000	30281
2,2-dichloropropane	594-20-7	PTM	2,000	30283
cis-1,3-dichloropropene	10061-01-5	PTM	2,000	30284
trans-1,3-dichloropropene	10061-02-6	PTM	2,000	30285
2,3-dichloropropionic acid	565-64-0	MTBE	1,000	31650
2,3-dichloropropionic acid methyl ester	3674-09-7	MTBE	1,000	31651

Compound	CAS #	Solvent	Conc.	cat.#
1,2-dichlorotetrafluoroethane (CFC-114)	76-14-2	PTM	2,000	30476
dichlorprop	120-36-5	M	1,000	32249
dichlorprop methyl ester	57153-17-0	M	1,000	32250
dieldrin	60-57-1	M	1,000	32218
diesel fuel #2 composite (5 mL)	68334-30-5	D	50,000	31259
diesel fuel #2 composite	68334-30-5	D	5,000	31093
diesel fuel #2 composite	68334-30-5	D	50,000	31258
diesel fuel #2: 25% weathered	68334-30-5	D	5,000	31234
diesel fuel #2: 50% weathered	68334-30-5	D	5,000	31235
diesel fuel #2: 75% weathered	68334-30-5	D	5,000	31236
diesel fuel #2: unweathered	68334-30-5	D	5,000	31233
diesel:biodiesel (80:20)	67784-80-9	D	5,000	31880
diethyl ether (ethyl ether)	60-29-7	PTM	2,000	30286
1,4-difluorobenzene	540-36-3	PTM	2,000	30032
diisopropyl ether (DIPE)	108-20-3	PTM	2,000	30627
dimethachlor ESA sodium salt		M	100	33203
1,2-dimethoxyethane	173201-80-4	DMSO	0.5 mg/mL	36291
N,N-dimethylacetamide	127-19-5	DMSO	5.45 mg/mL	36292
dimethyldichlorosilane (DMDCS) (20 mL)	75-78-5	Neat	20 mL	31840
N,N-dimethylformamide	68-12-2	DMSO	4.4 mg/mL	36293
3,5-dinitroaniline	618-87-1	ACN	1,000	31661
1,2-dinitrobenzene	528-29-0	M	1,000	31453
1,3-dinitrobenzene	99-65-0	ACN	1,000	31662
1,4-dinitrobenzene	100-25-4	ACN	2,000	33205
2,4-dinitrophenol	51-28-5	M	1,000	31291
2,4-dinitrotoluene	121-14-2	ACN	1,000	31663
2,6-dinitrotoluene	606-20-2	ACN	1,000	31664
3,4-dinitrotoluene	610-39-9	EA	2,000	33901
3,4-dinitrotoluene	610-39-9	M	1,000	31452
di-*n*-octyl phthalate	117-84-0	M	1,000	31426
dinoseb	88-85-7	M	1,000	32251
dinoseb methyl ether	6099-79-2	M	1,000	32252
diolein (1,3-di[*cis*-octadecenoyl] glycerol)	2465-32-9	pyridine	5,000	33022
1,4-dioxane	123-91-1	DMSO	1.9 mg/mL	36294
1,4-dioxane	123-91-1	D	2,000	31853
1,4-dioxane	123-91-1	PTM	2,000	30287
1,4-dioxane-d8	17647-74-4	PTM	2,000	30614
1,2-diphenylhydrazine	122-66-7	M	1,000	31497
diuron	330-54-1	ACN	200	32450
ecgonine	5796-31-6	PTM	1,000	34017
ecgonine methyl ester	38969-40-3	PTM	1,000	34018
EDDP perchlorate	66729-78-0	M	1,000	34069
EGDN**	628-96-6	M	1,000	31601
endosulfan I	959-98-8	A	1,000	32465
endosulfan II	33213-65-9	A	1,000	32466
endosulfan sulfate	1031-07-8	A	1,000	32467
endrin	72-20-8	A	1,000	32463
endrin ketone	53494-70-5	A	1,000	32464
ethanol	64-17-5	PTM	2,000	30288
ethanol	64-17-5	W	10,000	30466
2-ethoxyethanol	110-80-5	DMSO	0.8 mg/mL	36295
ethylbenzene	100-41-4	DMSO	1.84 mg/mL	36296
ethylbenzene	100-41-4	PTM	2,000	30290
ethylbenzene-d10	25837-05-2	PTM	2,000	30029
ethylbenzene-d5	20302-26-5	PTM	2,000	30028
ethyl-*tert*-butyl ether (ETBE)	637-92-3	PTM	2,000	30628
ethylenediamine	107-15-3	M	540	35222
ethylene glycol	3775-85-7	DMSO	3.1 mg/mL	36297
ethylene oxide	75-21-8	D	50 mg/mL	30620
ethylene oxide	75-21-8	DMSO	500	36005
ethyl methacrylate	97-63-2	PTM	2,000	30289
fentanyl	437-38-7	M	1,000	34082
nor-fentanyl oxalate	1609-66-1	M	1,000	34083

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Compound	CAS #	Solvent	Conc.	cat.#
flunitrazepam	1622-62-4	PTM	1,000	34049
fluoranthene	206-44-0	M	1,000	31277
fluorene	86-73-7	M	1,000	31278
fluorobenzene	462-06-6	PTM	2,000	30030
2-fluorobiphenyl	321-60-8	D	2,000	31091
2-fluorobiphenyl	321-60-8	D	10,000	31096
1-fluoronaphthalene	321-38-0	D	2,000	31092
2-fluorophenol	367-12-4	D	2,000	31047
flurazepam	1172-18-5	PTM	1,000	34050
formaldehyde-DNPH	1081-15-8	ACN	500	31837
formaldehyde-2,4-DNPH	1081-15-8	ACN	100	33082
formaldehyde oxazoladine		T	2,000	33004
formamide	75-12-7	DMSO	1.1 mg/mL	36298
fuel oil # 4	68476-31-3	D	5,000	31216
fuel oil # 4	68476-31-3	D	50,000	31244
fuel oil # 5	70892-11-4	D	5,000	31217
fuel oil # 5	70892-11-4	D	50,000	31246
fuel oil # 6 (5 mL)	68553-00-4	D	50,000	31249
fuel oil # 6	68553-00-4	D	5,000	31218
fuel oil # 6	68553-00-4	D	50,000	31248
DL-glutethimide	18389-24-7	PTM	1,000	34058
glycerin	56-81-5	pyridine	500	33020
glycolaldehyde-2,4-DNPH		ACN	100	33091
glyphosate (5 mL)	1071-83-6	W	1,000	32427
glyphosate	1071-83-6	W	1,000	32426
1,6-HDIP	72375-27-0	DMSO	1,000	33002
heptachlor	76-44-8	M	1,000	32228
heptachlor epoxide (isomer B)	1024-57-3	M	1,000	32230
2,2' ,3,4,4' ,5,5' -heptachlorobiphenyl (BZ #180)	35065-29-3	I	10	32288
hexachlorobenzene	118-74-1	A	1,000	32231
2,2' ,3,4,4' ,5' -hexachlorobiphenyl (BZ #138)	35065-28-2	I	10	32286
2,2' ,4,4' ,5,5' -hexachlorobiphenyl (BZ #153)	35065-27-1	I	10	32287
hexachloro-1,3-butadiene	87-68-3	M	1,000	31435
hexachlorocyclopentadiene	77-47-4	M	1,000	32232
hexachloroethane	67-72-1	M	1,000	31436
hexachlorophene	70-30-4	D	2,000	31811
hexane	8031-34-3	DMSO	1.45 mg/mL	36299
hexobarbital	56-29-1	PTM	1,000	34033
HMX**	2691-41-0	ACN	1,000	31665
hydraulic oil	64741-89-5	D	50,000	31839
hydrocodone	34195-34-1	PTM	1,000	34002
hydromorphone	71-68-1	PTM	1,000	34063
indeno(1,2,3-cd)pyrene	193-39-5	D	1,000	31279
iodomethane	74-88-4	PTM	2,000	30292
isobutyl alcohol	78-83-1	PTM	2,000	30293
isobutylbenzene		PTM	1,000	30613
isopropylbenzene	98-82-8	PTM	2,000	30294
jet fuel A (5 mL)	64742-47-8	D	50,000	31243
jet fuel A	64742-47-8	D	5,000	31215
jet fuel A	64742-47-8	D	50,000	31242
JP-4 military fuel	8008-20-6	D	5,000	31219
JP-4 military fuel	8008-20-6	D	50,000	31250
JP-4 military fuel	8008-20-6	PTM	50,000	30472
JP-5 military fuel	8008-20-6	D	5,000	31220
JP-5 military fuel	8008-20-6	D	50,000	31252
JP-8 military fuel	8008-20-6	D	5,000	31262
JP-8 military fuel	8008-20-6	D	50,000	31254
kerosene composite (5 mL)	84742-81-0	D	50,000	31257
kerosene composite	84742-81-0	D	5,000	31094
kerosene composite	84742-81-0	D	50,000	31256
kerosene: 25% weathered	84742-81-0	D	5,000	31230
kerosene: 50% weathered	84742-81-0	D	5,000	31231
kerosene: 75% weathered	84742-81-0	D	5,000	31232
kerosene: unweathered	84742-81-0	D	5,000	31229
levorphanol	5985-38-6	PTM	1,000	34003
lorazepam	846-49-1	PTM	1,000	34051

Compound	CAS #	Solvent	Conc.	cat.#
MCPA	94-74-6	M	1,000	32269
MCPP	93-65-2	M	1,000	32271
3,4-MDA HCl	4764-17-4	M	1,000	34070
3,4-MDEA HCl	82801-81-8	M	1,000	34072
4,4' -MDIP	72375-24-7	DMSO	1,000	33003
3,4-MDMA HCl	64057-70-1	M	1,000	34071
melamine	108-78-1	DEA:W (20:80)	1,000	33247
meperidine	50-13-5	PTM	1,000	34004
mephobarbital	115-38-8	PTM	1,000	34034
meprobamate	57-53-4	PTM	1,000	34059
methacrylonitrile	126-98-7	PTM	2,000	30297
methadone	1095-90-5	PTM	1,000	34005
(+)methamphetamine	51-57-0	PTM	1,000	34021
methanol	67-56-1	DMSO	15 mg/mL	36401
methanol	67-56-1	W	10,000	30467
methaqualone	340-56-7	PTM	1,000	34064
methohexital	151-83-7	PTM	1,000	34035
methoxychlor	72-43-5	M	1,000	32233
2-methoxyethanol	109-86-4	DMSO	0.25 mg/mL	36402
1-(methylamino)anthraquinone	82-38-3	D	100	31823
methyl arachidate	1120-28-1	Neat		35056
methyl arachidonate	2566-89-4	Neat		35060
methyl behenate	929-77-1	Neat		35062
methyl *tert*-butyl ether (MTBE)	1634-04-4	PTM	2,000	30402
methylbutylketone	591-78-6	DMSO	0.25 mg/mL	36400
methyl caprate	110-42-9	Neat		35041
methyl caproate	106-70-7	Neat		35037
methyl caprylate	111-11-5	Neat		35039
3-methylcholanthrene	56-49-5	D	2,000	31996
methylcyclohexane	108-87-2	DMSO	5.9 mg/mL	36403
methyl-2,3-dibromopropionate	1729-67-5	MTBE	1,000	31656
2-methyl-4,6-dinitrophenol	534-52-1	M	1,000	31292
methyl eicosadienoate	2463-02-7	Neat		35058
methyl eicosatrienoate	55682-88-7	Neat		35059
methyl eicosenoate	2390-09-2	Neat		35057
methyl erucate	1120-34-9	Neat		35063
methyl heneicosanoate	6064-90-0	Neat		35061
methyl heptadecanoate	1731-92-6	Neat		35050
methyl heptanoate	106-73-0	Neat		35038

Restek Offers a Full Line of Certified Reference Materials

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See **pages 438–439**.

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

**Meets all DOT requirements. Available only to customers or distributors inside the 48 contiguous United States; item may not be resold for export.

Solvent codes:

A = acetone
ACN = acetonitrile
C = carbon disulfide
Cy = cyclohexane
D = methylene chloride
DEA = diethylamine
DMSO = dimethyl sulfoxide
EA = ethyl acetate
H = hexane
I = isooctane
Ip = isopropanol
M = methanol
MTBE = methyl *tert*-butyl ether
PTM = purge-and-trap grade methanol
T = toluene
TO = transformer oil
W = water (DI)

Single-Component Solutions

Compound	CAS #	Solvent	Conc.	cat.#
methyl laurate	111-82-0	Neat		35043
methyl lignocerate	2442-49-1	Neat		35064
methyl linoleate	112-63-0	Neat		35053
methyl linolenate	301-00-8	Neat		35054
methyl methacrylate	80-62-6	PTM	2,000	30299
methyl myristate	124-10-7	Neat		35045
methyl myristoleate	56219-06-8	Neat		35046
1-methylnaphthalene	90-12-0	M	1,000	31283
2-methylnaphthalene	91-57-6	D	1,000	31285
methyl nervonate	2733-88-2	Neat		35065
2-methyl-4-nitroaniline	99-52-5	M	1,000	31612
methyl nonadecanoate	1731-94-8	Neat		35055
methyl nonanoate	1731-84-6	Neat		35040
methyl oleate	112-62-9	Neat		35052
methyl palmitate	112-39-0	Neat		35048
methyl palmitoleate	1120-25-8	Neat		35049
methyl pentadecanoate	7132-64-1	Neat		35047
4-methyl-2-pentanone (MIBK)	108-10-1	PTM	5,000	30400
3-methylphenol	108-39-4	M	1,000	31403
N-methylpyrrolidone	872-50-4	DMSO	2.65 mg/mL	36405
methyl stearate	112-61-8	Neat		35051
methyl tridecanoate	1731-88-0	Neat		35044
methyl undecanoate	1731-86-8	Neat		35042
α-methylene-γ-butyrolactone (AMGBL)	547-65-9	ACN	1,000	34079
methylene chloride (dichloromethane)	75-09-2	DMSO	3 mg/mL	36404
methylene chloride (dichloromethane)	75-09-2	PTM	2,000	30401
methyprylon	125-64-4	PTM	1,000	34060
metolachlor	51218-45-2	M	100	33209
metolachlor ESA sodium salt	171118-09-5	M	100	33200
metolachlor OA	152019-73-3	M	100	33201
metribuzin	21087-64-9	A	1,000	32436
mineral spirits: 25% weathered	8030-30-6	D	5,000	31226
mineral spirits: 50% weathered	8030-30-6	D	5,000	31227
mineral spirits: 75% weathered	8030-30-6	D	5,000	31228
mineral spirits: unweathered (5 mL)	8030-30-6	D	50,000	31261
mineral spirits: unweathered	8030-30-6	D	5,000	31225
mineral spirits: unweathered	8030-30-6	D	50,000	31260
monolein (1-mono[*cis*-9-octadecenoyl]-rac-glycerol)	111-03-5	pyridine	5,000	33021
monopalmitin	524-44-9	pyridine	5,000	33026
morphine	6211-15-0	PTM	1,000	34006
motor oil composite	64742-47-8	D	50,000	31464
naphthalene	91-20-3	M	1,000	31280
naphthalene-d8	1146-65-2	D	2,000	31043
nicarbazin (bis-nitrophenol urea) (5 mL)	330-95-0	ACN	10	33261
nicotine	54-11-5	M	1,000	34085
nitrazepam	146-22-5	PTM	1,000	34053
nitrobenzene	98-95-3	ACN	1,000	31657
nitrobenzene-d5	4165-60-0	D	2,000	31044
nitroglycerin**	55-63-0	M	1,000	31498
nitroguanidine**	556-88-7	M	1,000	31602
2-nitromesitylene	603-71-4	M	2,000	33902
nitromethane	75-52-5	DMSO	0.25 mg/mL	36406
4-nitrophenol	100-02-7	M	1,000	31296
2-nitropropane	79-46-9	PTM	2,000	30403
N-nitrosodimethylamine	62-75-9	M	1,000	31427
N-nitrosodimethylamine-d6	17829-05-9	D	1,000	33910
N-nitrosodiphenylamine	86-30-6	M	1,000	31429
N-nitroso-di-*n*-propylamine	621-64-7	M	1,000	31428
N-nitrosodi-*n*-propylamine-d14	93951-96-3	D	1,000	33911
2-nitrotoluene	88-72-2	ACN	1,000	31659
3-nitrotoluene	99-08-1	ACN	1,000	31660
4-nitrotoluene	99-99-0	ACN	1,000	31658
n-nonatriacontane (C39) (10 mL)	7194-86-7	C	3,000	31877
n-nonatriacontane (C39)	7194-86-7	C	3,000	31456

Compound	CAS #	Solvent	Conc.	cat.#
n-octacosane (C28)	630-02-4	D	10,000	31672
oxazepam	604-75-1	PTM	1,000	34054
oxycodone	124-90-3	PTM	1,000	34007
oxymorphone	76-41-5	PTM	1,000	34065
PCB 18 (5 mL)	37680-65-2	ACN	50	33255
PCB 28 (5 mL)	7012-37-5	ACN	50	33256
PCB 52 (5 mL)	35693-99-3	ACN	50	33257
PCB 138 (5 mL)	35065-28-2	ACN	50	33262
PCB 153 (5 mL)	35065-27-1	ACN	50	33263
pentachloroanisole	1825-21-4	M	1,000	32268
2,2',4,5,5'-pentachlorobiphenyl (BZ #101)	37680-73-2	I	10	32285
2,3',4,4',5-pentachlorobiphenyl (BZ #118)	31508-00-6	I	10	32293
pentachloroethane	76-01-7	PTM	2,000	30404
pentachloronitrobenzene	82-68-8	EA	100	32091
pentachlorophenol	87-86-5	M	1,000	31297
n-pentacontane (C50)	6596-40-3	T	10	31685
pentacosane (C25)	629-99-2	D	10,000	31487
pentafluorobenzene	363-72-4	PTM	2,000	30031
pentafluorophenol	771-61-9	D	2,000	31048
pentazocine	64024-15-3	PTM	1,000	34062
pentobarbital	76-74-4	PTM	1,000	34036
perfluorotributylamine (PFTBA)	311-89-7	Neat	1 mL	30482
perfluorotributylamine (PFTBA)	311-89-7	Neat	1 g	33027
PETN (pentaerythritol tetranitrate)**	78-11-5	M	1,000	31600
phenanthrene	85-01-8	M	1,000	31281
phenanthrene-d10	1517-22-2	D	2,000	31045
phencyclidine	956-90-1	PTM	1,000	34027
phendimetrazine	50-58-8	PTM	1,000	34025
phenmetrazine	1707-14-8	PTM	1,000	34026
phenobarbital	50-06-6	PTM	1,000	34037
phenol	108-95-2	M	1,000	31298
phenol-d6	13127-88-3	D	2,000	31049
phentermine	1197-21-3	PTM	1,000	34024
phenylpropanolamine HCl	154-41-6	M	1,000	34073
picloram	1918-02-1	M	1,000	32265
picloram methyl ester	14143-55-6	M	1,000	32266
picric acid**	88-89-1	M	1,000	31499
Polywax 500	9002-88-4	Neat	1 g	36224
Polywax 655	9002-88-4	Neat	1 g	36225
Polywax 850	9002-88-4	Neat	1 g	36226
Polywax 1000	9002-88-4	Neat	1 g	36227
prazepam	2955-38-6	PTM	1,000	34055
prometryne	7287-19-6	A	1,000	32449
propachlor	1918-16-7	M	1,000	32235
2-propanol	67-63-0	W	50,000	30473
propazine	139-40-2	A	1,000	32448
propionitrile	107-12-0	PTM	2,000	30407
propylene glycol dinitrate (PGDN)	6423-43-4	M	1,000	31821
pyrene	129-00-0	M	1,000	31282
pyridine	110-86-1	DMSO	1 mg/mL	36407
pyridine	110-86-1	PTM	2,000	30409
pyridine-d5	7291-22-7	D	2,000	31046

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Compound	CAS #	Solvent	Conc.	cat.#
RDX**	121-82-4	ACN	1,000	31666
secobarbital	29071-21-4	PTM	1,000	34038
simazine	122-34-9	A	1,000	32236
stearyl stearate (10 mL)	2778-96-3	Cy	2,000	31636
stearyl stearate (10 mL)	2778-96-3	H	2,000	31681
stearyl stearate	2778-96-3	Neat	100 mg	31860
Stoddard solvent	8052-41-3	PTM	10,000	30487
styrene	100-42-5	PTM	2,000	30410
sulfolane	126-33-0	DMSO	0.8 mg/mL	36413
2,4,5-T	93-76-5	M	200	32243
2,4,5-T methyl ester	1928-37-6	M	1,000	32244
talbutal	115-44-6	PTM	1,000	34039
2,4-TDIP	72375-21-4	DMSO	1,000	33001
2,6-TDIP	195625-39-9	DMSO	1,000	33000
temazepam	896-50-4	PTM	1,000	34056
terbuthylazine	5915-41-3	A	1,000	32447
o-terphenyl	84-15-1	A	2,000	31066
o-terphenyl	84-15-1	D	10,000	31097
p-terphenyl	92-94-4	D	10,000	31095
p-terphenyl-d14	1718-51-0	D	1,000	31828
α-terpineol	98-55-5	D	2,000	33912
2,2' ,5,5' -tetrachlorobiphenyl (BZ #52)	35693-99-3	I	10	32284
1,1,1,2-tetrachloroethane	630-20-6	PTM	2,000	30411
1,1,2,2-tetrachloroethane	79-34-5	PTM	2,000	30412
tetrachloroethene	127-18-4	PTM	2,000	30413
2,3,4,6-tetrachlorophenol	58-90-2	M	1,000	31402
2,4,5,6-tetrachloro-*m*-xylene (5 mL)	877-09-8	A	200	32028
2,4,5,6-tetrachloro-*m*-xylene	877-09-8	A	200	32027
n-tetracontane (C40)	4181-95-7	Neat	100 mg	31859
delta-8-tetrahydrocannabinol (THC)	5957-75-5	PTM	1,000	34090
tetrahydrofuran (THF)	109-99-9	DMSO	3.6 mg/mL	36408
tetrahydrofuran (THF)	109-99-9	PTM	2,000	30414
tetrahydrofuran-d8	1693-74-9	PTM	2,000	30112
tetralin	119-64-2	DMSO	0.5 mg/mL	36409
tetrapentyltin	3765-65-9	D	2,000	31475
tetra-*n*-propyltin	2176-98-9	D	2,000	31474
tetryl**	479-45-8	ACN	1,000	31667
delta-9-tetrahydrocannabinol (THC)	1972-08-3	M	1,000	34067
(±)11-nor-9-carboxy-Δ^9-THC	104874-50-2	M	100	34068
delta-9-tetrahydrocannabinolic acid A (THCA-A)	23978-85-0	PTM	1,000	34093
thebaine	115-37-7	PTM	1,000	34009
Tinuvin P	2440-22-4	Ip	52	31629
toluene	108-88-3	DMSO	4.45 mg/mL	36410
toluene	108-88-3	PTM	2,000	30415
toluene-d8	2037-26-5	PTM	2,000	30224
toxaphene	8001-35-2	H	1,000	32005
toxaphene	8001-35-2	I	5,000	32071
toxaphene	8001-35-2	M	2,000	32015
2,4,5-TP (Silvex)	93-72-1	M	1,000	32245
2,4,5-TP (Silvex) methyl ester	4841-20-7	M	1,000	32246
transformer oil (PCB-free)	64742-53-6	Neat	50 mL	32425
transformer oil (PCB-free)	64742-53-6	Neat	5 mL	32424
n-triacontane-d62 (C30)	638-68-6	D	500	31816
triazolam	28911-01-5	PTM	1,000	34057
2,4,6-tribromophenol	118-79-6	M	1,000	31401
tributylphosphate	126-73-8	A	1,000	32280
tributyltin chloride	1461-22-9	D	2,000	31478
tricaprin (1,2,3-tricaprinoylglycerol)	621-71-6	pyridine	8,000	33025
tricaprin (1,2,3-tricaprinoylglycerol) (5 mL)	621-71-6	pyridine	8,000	33033
1,2,3-trichlorobenzene	87-61-6	PTM	2,000	30416
1,2,4-trichlorobenzene	120-82-1	M	1,000	31439
2,4,4' -trichlorobiphenyl (BZ #28)	7012-37-5	I	10	32283
1,1,1-trichloroethane	71-55-6	DMSO	50 mg/mL	36411
1,1,1-trichloroethane	71-55-6	PTM	2,000	30418
1,1,2-trichloroethane	79-00-5	PTM	2,000	30419

Compound	CAS #	Solvent	Conc.	cat.#
trichloroethene	79-01-6	DMSO	0.4 mg/mL	36412
trichloroethene	79-01-6	PTM	2,000	30420
trichlorofluoromethane (CFC-11)	75-69-4	PTM	2,000	30421
2,4,5-trichlorophenol	95-95-4	A	1,000	32017
2,4,5-trichlorophenol	95-95-4	M	1,000	31299
2,4,6-trichlorophenol	88-06-2	M	1,000	31400
1,2,3-trichloropropane	96-18-4	MTBE	1,000	31648
1,2,3-trichloropropane	96-18-4	PTM	2,000	30429
1,1,2-trichlorotrifluoroethane (CFC-113)	76-13-1	PTM	2,000	30462
α,α,α-trifluorotoluene	98-08-8	PTM	2,000	30048
α,α,α-trifluorotoluene	98-08-8	PTM	2,500	30068
α,α,α-trifluorotoluene	98-08-8	PTM	10,000	30083
trifluralin	1582-09-8	M	1,000	32238
1,2,4-trimethylbenzene	95-63-6	PTM	2,000	30422
1,3,5-trimethylbenzene	108-67-8	PTM	2,000	30423
1,2,4-trimethyl-5-nitrobenzene	610-91-3	M	2,000	33903
2,2,4-trimethylpentane (isooctane)	540-84-1	nonane	5% vol/vol	30671
1,3,5-trinitrobenzene**	99-35-4	ACN	1,000	31668
2,4,6-trinitrotoluene**	118-96-7	ACN	1,000	31669
triolein (1,2,3-tri[*cis*-octadecenoyl] glycerol)	122-32-7	pyridine	5,000	33023
tripentyltin chloride	3342-67-4	D	2,000	31477
triphenylmethane (5 mL)	519-73-3	ACN	10	33260
triphenylphosphate (5 mL)	115-86-6	ACN:acetic acid (99:1)	2	31964
triphenylphosphate (5 mL)	115-86-6	ACN	20	33258
tri-*n*-propyltin chloride	995-25-5	D	2,000	31476
triphenylphosphate	115-86-6	A	1,000	32281
tris(1,3-dichloroisopropyl)phosphate (5 mL)	13674-87-8	ACN	50	33259
unleaded gasoline composite (5 mL)	8006-61-9	PTM	50,000	30206
unleaded gasoline composite	8006-61-9	PTM	2,500	30081
unleaded gasoline composite	8006-61-9	PTM	50,000	30205
unleaded gasoline: 25% weathered	8006-61-9	PTM	5,000	30097
unleaded gasoline: 50% weathered	8006-61-9	PTM	5,000	30098
unleaded gasoline: 75% weathered	8006-61-9	PTM	5,000	30099
unleaded gasoline: 99% weathered	8006-61-9	PTM	5,000	30436
unleaded gasoline: unweathered	8006-61-9	PTM	5,000	30096
used motor oil composite	64742-65-0	D	50,000	31465
γ-valerolactone	108-29-2	ACN	1,000	34080
vinyl acetate	108-05-4	PTM	2,000	30216
vinyl chloride	75-01-4	PTM	2,000	30089
vinyl chloride	75-01-4	PTM	2,500	30093
m-xylene	108-38-3	DMSO	6.51 mg/mL	36414
m-xylene	108-38-3	PTM	2,000	30424
o-xylene	95-47-6	DMSO	0.97 mg/mL	36415
o-xylene	95-47-6	PTM	2,000	30425
p-xylene	106-42-3	DMSO	1.52 mg/mL	36416
p-xylene	106-42-3	PTM	2,000	30426

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Ip = isopropanol
M = methanol
MTBE = methyl *tert*-butyl ether
PTM = purge-and-trap grade methanol
T = toluene
TO = transformer oil
W = water (DI)

Reference Standards

Column & Detector Test Mixes & Reagents

Deactivating Agent..... 446
Derivatization Reagents..... 446–447
Detector Tuning Mixtures..... 447
GC Column & Detector Test Mixes .. 447–448
GPC Calibration Mixes 448–449
LC Column & Detector Test Mixes..... 449

Deactivating Agent

Dimethyldichlorosilane (DMDCS) Deactivating Agent

- Easy deactivation of liners and other glass surfaces.
- Convenient—20 mL ampul deactivates 50 inlet liners.
- Tested to ensure consistent quality and effectiveness.

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.

Neat, 20 mL/ampul

cat.# 31840 (ea.)

No data pack available.

Derivatization Reagents

- Reagents available for acylation, alkylation, and silylation.
- Packaged in 10 x 1 g vials or 25 g vials.
- High purity for accurate results.

Derivatization Reagents

Acylation Derivatization Reagents

- Most commonly used for electron capture detection.
- React with alcohols, amines, and phenols.
- Frequently used for drugs of abuse confirmation.

Acylation reagents offer the same advantage 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.#
MBTFA (N-methyl-bis-trifluoroacetamide)		
10-pk. (10x1 g)	685-27-8	35616
25 g vial	685-27-8	35617
TFAA (trifluoroacetic acid anhydride)		
10-pk. (10x1 g)	407-25-0	35618
25 g vial	407-25-0	35619
PFAA (pentafluoropropionic acid anhydride)		
10-pk. (10x1 g)	356-42-3	35620
25 g vial	356-42-3	35621
HFAA (heptafluorobutyric acid anhydride)		
10-pk. (10x1 g)	336-59-4	35622
25 g vial	336-59-4	35623
PFPOH (pentafluoropropanol)		
10-pk. (10x1 g)	422-05-9	35624
25 g vial	422-05-9	35625

Derivatization Reagents, *cont.*

Alkylation Derivatization Reagents

- Add alkyl groups to functional hydrogens (H).
- Decrease polarity on compounds containing acidic hydrogens, i.e., phenols, carboxylic acids.
- Form 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—the most popular method of alkylation due to the availability of reagents and ease of use—is the reaction of an acid with an alcohol in the presence of a catalyst. 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.#
TMPAH		
10-pk. (10x1 g)	1899-02-1	35614
25 g vial	1899-02-1	35615

Silylation Derivatization Reagents

- Replace active hydrogen, reducing polarity and making the compounds more volatile.
- Increase stability of derivatives.

Silylation is the most widely used derivatization procedure for sample analysis by GC. In silylation, an active hydrogen is replaced by an alkylsilyl group such as trimethylsilyl (TMS) or *tert*-butyldimethylsilyl (*tert*-BDMS). Silyl derivatives are more volatile, less polar, and more thermally stable. As a result, GC separation is improved and detection is enhanced.

Both TMS and *tert*-BDMS reagents are suitable for a wide variety of compounds and can be used for many GC applications. (Note that silylation reagents are generally moisture sensitive and must be sealed to prevent deactivation.)

Compound	CAS #	cat.#
MSTFA (N-methyl-N-trimethylsilytrifluoroacetamide)		
10-pk. (10x1 g)	24589-78-4	35600
25 g vial	24589-78-4	35601
MSTFA w/1% TMCS (N-methyl-N-trimethylsilytrifluoroacetamide w/1% trimethylchlorosilane)		
10-pk. (10x1 g)	24589-78-4	35602
25 g vial	24589-78-4	35603
BSTFA (N,O-bis[trimethylsilyl]trifluoroacetamide)		
10-pk. (10x1 g)	25561-30-2	35604
25 g vial	25561-30-2	35605
BSTFA w/1% TMCS (N,O-bis[trimethylsilyltrifluoroacetamide] w/1% trimethylchlorosilane)		
10-pk. (10x1 g)	25561-30-2	35606
25 g vial	25561-30-2	35607
MTBSTFA w/1% TBDMCS (N-methyl-N[*tert*-butyldimethylsilyl trifluoroacetamide] w/1% *tert*-butyldimethylchlorosilane)		
10-pk. (10x1 g)	77377-52-7	35608
25 g vial	77377-52-7	35610
TMCS (trimethylchlorosilane)		
10-pk. (10x1 g)	75-77-4	35611
25 g vial	75-77-4	35612

Detector Tuning Mixes

VOA Tuning Compound

4-bromofluorobenzene

5,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30003 (ea.)

SV Tuning Compound

decafluorotriphenylphosphine (DFTPP)

2,500 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31001 (ea.)

PFTBA (MS Tuning Compound)

perfluorotributylamine (PFTBA)

Neat, 1 mL/ampul
cat.# 30482 (ea.)

Neat, 1 g
cat.# 33027 (ea.)

No data pack available.

GC-MS Tuning Mixture (4 components)

benzidine
4,4'-DDT
decafluorotriphenylphosphine (DFTPP)
pentachlorophenol

1,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31615 (ea.)

GC Column & Detector Test Mixes

Amine Column Test Mix (8 components)

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

1,2-butanediol	0.60 mg/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), 1 mL/ampul
cat.# 35002 (ea.)

No data pack available.

FID Performance Evaluation Standard (3 components)

n-tetradecane (C14)
n-pentadecane (C15)
n-hexadecane (C16)

0.03 w/w% each in hexane, 1 mL/ampul
cat.# 33908 (ea.)

GC-FID Test Mix (3 components)

n-dodecane (C12)
n-tetradecane (C14)
n-hexadecane (C16)

20 µg/mL each in hexane, 1 mL/ampul
cat.# 35108 (ea.)

NEW!

GC Column & Detector Test Mixes, *cont.*

Grob Test Mix (12 components)

For use with temperature-programmed conditions.

*n*C10-FAME	0.42 mg/mL	2,6-dimethylphenol	0.32
*n*C11-FAME	0.42	2-ethylhexanoic acid	0.38
*n*C12-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, 1 mL/ampul

cat.# 35000 (ea.)

No data pack available.

Inter-Polar Column Test Mix (11 components)

acetone	1.25 mg/mL	*n*-nonane (C9)	2.00
2-butanone (MEK)	1.25	*n*-octane (C8)	1.40
chlorobenzene	2.00	1-propanol	1.25
1,2-dichloropropane	2.00	pyridine	1.40
n-heptane (C7)	1.25	tetrachloroethylene	3.25
methanol	1.25		

In methylene chloride, 1 mL/ampul

NEW!

cat.# 35076 (ea.)

ISO-C14-C20 Column Test Mix (5 components)

n-tetradecane (C14)
n-pentadecane (C15)
n-hexadecane (C16)
n-octadecane (C18)
n-eicosane (C20)

400 µg/mL each in cyclohexane, 1 mL/ampul

NEW!

cat.# 35006 (ea.)

OQ/PV Headspace Standard (3 components)

1,2-dichlorobenzene
nitrobenzene
tert-butyl disulfide

2,000 µg/mL each in ethanol, 1 mL/ampul

cat.# 33909 (ea.)

OQ Response Linearity Test Standard (6 components)

n-heptadecane (C17)	1.5 µg/mL	*n*-eicosane (C20)	100
n-octadecane (C18)	10	*n*-docosane (C22)	1,000
n-nonadecane (C19)	2	*n*-tetracosane (C24)	10,000

In isooctane, 1 mL/ampul

cat.# 33906 (ea.)

Polar ISO Column Test Mix (8 components)

aniline
2-chlorophenol
2-dodecanol
n-heptadecane
methyl dodecanoate
n-nonadecane
2-nonanone
1-octanol

250 µg/mL each in 1,2-dichloroethane, 1 mL/ampul

NEW!

cat.# 35103 (ea.)

Q-BOND and U-BOND Column Test Mix (7 components)

acetone
diethyl ether (ethyl ether)
ethanol
ethyl acetate
n-hexane (C6)
methanol
n-pentane (C5)

0.1% vol/vol each in heptane, 1 mL/ampul

cat.# 35202 (ea.)

Volatile Amine Column Test Mix (8 components)

1,2-butanediol	900 µg/mL	*n*-dodecane (C12)	900
diethanolamine (DEA)	1,800	*n*-nonane (C9)	900
diethylenetriamine	1,800	2-nonanol	900
2,6-dimethylaniline	900	pyridine	900

In methanol:dichloromethane (50:50), 1 mL/ampul

NEW!

cat.# 35008 (ea.)

XIL-350 Column Test Mix (8 components)

4-chlorophenol
dicyclohexylamine
2-ethylhexanoic acid
1,6-hexanediol
1-methylnaphthalene
n-tetradecane (C14)
n-tridecane (C13)
1-undecanol

350 µg/mL each in methylene chloride, 1 mL/ampul

cat.# 35226 (ea.)

For Restek's complete line of column test mixes, visit

www.restek.com/**testmixes**

GPC Calibration Mixes

CLP GPC Calibration Mix (5 components)

Qualitative mixture useful for determining GPC dump/collect times. The compounds are dissolved in methylene chloride at the concentrations listed.

bis(2-ethylhexyl) phthalate	10 mg/mL	perylene	0.2
corn oil	250	sulfur	0.8
methoxychlor	2.0		

In methylene chloride, 1 mL/ampul

cat.# 32019 (ea.)

In methylene chloride, 5 mL/ampul

cat.# 32023 (ea.)

No data pack available.

GPC Calibration Mixes, *cont.*

Revised GPC Calibration Mix (5 components)

Qualitative mixture useful for determining GPC dump/collect times. The compounds are dissolved in methylene chloride at the concentrations listed.

bis(2-ethylhexyl) phthalate	5 mg/mL	perylene	0.2
corn oil	250	sulfur	0.8
methoxychlor	1.0		

In methylene chloride, 1 mL/ampul
cat.# 32041 (ea.)

In methylene chloride, 5 mL/ampul
cat.# 32042 (ea.)

No data pack available.

LC Column & Detector Test Mixes

LC Normal Phase Test Mix #1 (4 components)

Routine analysis using this mix can assist in determining the need to perform column and/or system maintenance.

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

In hexane, 1 mL/ampul
cat.# 35004 (ea.)

LC Reversed Phase Test Mix #1 (4 components)

Routine analysis using this mix can assist in determining the need to perform column and/or system maintenance.

benzene	3.00 mg/mL	naphthalene	0.50
uracil	0.02	biphenyl	0.06

In methanol:water (75:25), 1 mL/ampul
cat.# 35005 (ea.)

LC Performance Test Mix (5 components)

- Highly effective for characterizing LC column parameters.
- Simple, easy, reliable approach to Quality Control (QC) evaluations or column classification.
- Monitor column performance over time.

The National Institute of Standards and Technology (NIST) has formulated a mixture that is highly effective for characterizing LC 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 µg/mL	toluene	1,400
ethylbenzene	1,700	uracil	28
quinizarin	94		

In methanol, 1 mL/ampul
cat.# 31699 (ea.)

LC Column & Detector Test Mixes, *cont.*

Carbohydrate LC Performance Check Mix (5 components)

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

glucose	2.1 mg	maltose	4.5
fructose	2.0	sucrose	4.0
lactose	4.4		

Dry components in 4 mL screw-cap vial. Reconstitute in 1 mL acetonitrile:water (75:25) to 2.1, 2.0, 4.4, 4.5, 4.0 mg/mL, respectively.
cat.# 31809 (ea.)

No data pack available.

LC OQ Wavelength Accuracy Standard

erbium perchlorate

10 mg/mL in water, 5 mL/ampul
cat.# 31053 (ea.)

NEW!

No data pack available.

LC OQ Gradient Standard

acetone

Neat, 1 mL/ampul
cat.# 30012 (ea.)

NEW!

No data pack available.

LC OQ Linearity Test Mix Kit

Linear detector responses to concentration variations are an important part of operation qualification (OQ) for LC 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.

Contains 1 mL each of these mixtures.
31804: Caffeine (caffeine at 5 µg/mL in water)
31803: Caffeine (caffeine at 25 µg/mL in water)
31802: Caffeine (caffeine at 125 µg/mL in water)
31801: Caffeine (caffeine at 250 µg/mL in water)
31800: Caffeine (caffeine at 500 µg/mL in water)

cat.# 31805 (kit)

NEW! kit

No data pack available.

LC OQ Standards Kit

Contains the following:
30012: LC OQ Gradient Standard, 1 mL
31053: LC OQ Wavelength Accuracy Standard, 5 mL
31068: LC OQ Linearity Kit, 6 - 1 mL/ampuls

cat.# 31069 (kit)

NEW! kit

No data pack available.

Reference Standards

Clinical, Forensic & Toxicology

Bank Dye Standard 451
Blood Alcohol Standards 451
Cannabinoids (Medical Marijuana) 452
Exempted Drugs of Abuse Standards 452–453
Explosives Solutions 453
ASTM E1387 and E1618 (Fire Debris Analysis) 454
Weathered Petrochemical Solutions 454–455

Bank Dye Standard (MAAQ)

Bank Dye Standard (MAAQ)

Restek offers this qualitative standard (red dye used in bank "Security Packs") to help investigators in municipal police stations and criminal laboratories fight crime.

1-N-(methylamino)anthraquinone (MAAQ)

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

No data pack available.

Blood Alcohol Standards

Blood Alcohol Standards (Calibration)

- NIST-traceable ethanol calibration standards.
- Calibration mixtures ranging from 0.010 g/dL to 0.40 g/dL in water.
- Data pack and certificate of analysis for each standard available on our website.

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.#
0.010 g/dL forensic ethanol solution		
1 mL/ampul	5-pk.	36276
1 mL/ampul	10-pk.	36278
0.015 g/dL forensic ethanol solution		
1 mL/ampul	5-pk.	36232
1 mL/ampul	10-pk.	36332
20 mL/ampul	ea.	36248
0.02 g/dL forensic ethanol solution		
1 mL/ampul	5-pk.	36233
1 mL/ampul	10-pk.	36333
20 mL/ampul	ea.	36249
0.025 g/dL forensic ethanol solution		
1 mL/ampul	5-pk.	36234
1 mL/ampul	10-pk.	36334
0.04 g/dL forensic ethanol solution		
1 mL/ampul	5-pk.	36235
1 mL/ampul	10-pk.	36335
20 mL/ampul	ea.	36251
0.05 g/dL forensic ethanol solution		
1 mL/ampul	5-pk.	36257
1 mL/ampul	10-pk.	36259
20 mL/ampul	ea.	36260
0.08 g/dL forensic ethanol solution		
1 mL/ampul	5-pk.	36262
1 mL/ampul	10-pk.	36264
20 mL/ampul	ea.	36265
0.1 g/dL forensic ethanol solution		
1 mL/ampul	5-pk.	36236
1 mL/ampul	10-pk.	36336
20 mL/ampul	ea.	36252

Blood Alcohol Standards, *cont.*

Compound	qty.	cat.#
0.15 g/dL forensic ethanol solution		
1 mL/ampul	5-pk.	36237
1 mL/ampul	10-pk.	36337
20 mL/ampul	ea.	36253
0.2 g/dL forensic ethanol solution		
1 mL/ampul	5-pk.	36238
1 mL/ampul	10-pk.	36338
20 mL/ampul	ea.	36254
0.3 g/dL forensic ethanol solution		
1 mL/ampul	5-pk.	36239
1 mL/ampul	10-pk.	36339
20 mL/ampul	ea.	36255
0.4 g/dL forensic ethanol solution		
1 mL/ampul	5-pk.	36266
1 mL/ampul	10-pk.	36268
20 mL/ampul	ea.	36269

Blood Alcohol Standards (Control)

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.

Blood Alcohol Mix Resolution Control Standard

(8 components)

acetaldehyde
acetone
acetonitrile
ethanol
ethyl acetate
isopropanol
methanol
methyl ethyl ketone

0.100 g/dL each in water, 1 mL/ampul
cat.# 36256 (ea.)

BAC Resolution Control Standard *n*-P (6 components)

- Includes 1-propanol internal standard.
- Intended for qualitative use only.

acetaldehyde
acetone
ethanol (BAC)
methanol
1-propanol (*n*-propanol)
2-propanol (isopropanol)

100 mg/dL each in water, 1 mL/ampul
cat.# 36010 (ea.)

NEW!

No data pack available.

BAC Resolution Control Standard *t*-B (6 components)

- Includes *tert*-butanol internal standard.
- Intended for qualitative use only.

acetaldehyde
acetone
tert-butanol (TBA)
ethanol (BAC)
methanol
2-propanol (isopropanol)

100 mg/dL each in water, 1 mL/ampul
cat.# 36011 (ea.)

NEW!

No data pack available.

Cannabinoids (Medical Marijuana)

Cannabinoids Standard (3 components)

cannabidiol
cannabinol
delta-9-tetrahydrocannabinol (Δ^9-THC)

1,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 34014 (ea.)

NEW!

Medical Marijuana Singles

NEW!

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

Compound	CAS #	Solvent	Conc.	cat.#
cannabichromene	20675-51-8	PTM	1,000	34092
cannabidiol	13956-29-1	PTM	1,000	34011
cannabigerol	25654-31-3	PTM	1,000	34091
cannabinol	521-35-7	PTM	1,000	34010
delta-8-tetrahydrocannabinol (THC)	5957-75-5	PTM	1,000	34090
delta-9-tetrahydrocannabinol (THC)	1972-08-3	M	1,000	34067
delta-9-tetrahydrocannabinolic acid A (THCA-A)	23978-85-0	PTM	1,000	34093
tetrahydrofuran-d8	1693-74-9	PTM	2,000	30112
(±)11-nor-9-carboxy-Δ^9-THC	104874-50-2	M	100	34068

M = methanol; PTM = purge-and-trap grade methanol

Get Fast, Definitive Data for Blood Alcohol Testing

Rtx®-BAC Plus 1 and Rtx®-BAC Plus 2 Columns & Standards

- Optimized column selectivities.
- Robust and reproducible column chemistry.
- 2-minute analysis time.
- Product line also features resolution control standards.

See **page 55**.

www.restek.com/**BACPlus**

Exempted Drug of Abuse Standards

Exempted Drug of Abuse Reference Standards

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

Compound	CAS #	Solvent	Conc.	cat.#
Benzodiazepines				
alprazolam	28981-97-7	PTM	1,000	34042
bromazepam	1812-30-2	PTM	1,000	34043
chlordiazepoxide	438-41-5	PTM	1,000	34044
clobazam	22316-47-8	PTM	1,000	34045
clonazepam	1622-61-3	PTM	1,000	34046
diazepam	439-14-5	PTM	1,000	34047
flunitrazepam	1622-62-4	PTM	1,000	34049
flurazepam	1172-18-5	PTM	1,000	34050
lorazepam	846-49-1	PTM	1,000	34051
nitrazepam	146-22-5	PTM	1,000	34053
oxazepam	604-75-1	PTM	1,000	34054
prazepam	2955-38-6	PTM	1,000	34055
temazepam	896-50-4	PTM	1,000	34056
triazolam	28911-01-5	PTM	1,000	34057
Cocaine & Metabolites				
cocaethylene	529-38-4	ACN	1,000	34066
cocaine	53-21-4	PTM	1,000	34015
benzoylecgonine	519-09-5	PTM	1,000	34016
ecgonine	5796-31-6	PTM	1,000	34017
ecgonine methyl ester	38969-40-3	PTM	1,000	34018
Methadone & Metabolites				
EDDP perchlorate	66729-78-0	M	1,000	34069
methadone	1095-90-5	PTM	1,000	34005
Amphetamines & Metabolites				
d-amphetamine	51-63-8	PTM	1,000	34020
(+)methamphetamine	51-57-0	PTM	1,000	34021
3,4-MDA HCl	4764-17-4	M	1,000	34070
3,4-MDEA HCl	82801-81-8	M	1,000	34072
3,4-MDMA HCl	64057-70-1	M	1,000	34071
phenylpropanolamine HCl	154-41-6	M	1,000	34073
Opiates & Metabolites				
codeine	76-57-3	PTM	1,000	34000
dextromethorphan HBr monohydrate	125-69-9	M	1,000	34081
hydrocodone	34195-34-1	PTM	1,000	34002
hydromorphone	71-68-1	PTM	1,000	34063
morphine	6211-15-0	PTM	1,000	34006
oxycodone	124-90-3	PTM	1,000	34007
oxymorphone	76-41-5	PTM	1,000	34065
Cannabinoid & Metabolites				
cannabichromene	20675-51-8	PTM	1,000	34092
cannabidiol	13956-29-1	PTM	1,000	34011
cannabigerol	25654-31-3	PTM	1,000	34091
cannabinol	521-35-7	PTM	1,000	34010
delta-9-tetrahydrocannabinol (THC)	1972-08-3	M	1,000	34067
(±)11-nor-9-carboxy-Δ^9-THC	104874-50-2	M	100	34068
Barbiturates				
amobarbital	64-43-7	PTM	1,000	34028
aprobarbital	77-02-1	PTM	1,000	34029
barbital	57-44-3	PTM	1,000	34030
butabarbital	125-40-6	PTM	1,000	34031
butalbital	77-26-9	PTM	1,000	34032
DL-glutethimide	18389-24-7	PTM	1,000	34058
hexobarbital	56-29-1	PTM	1,000	34033
mephobarbital	115-38-8	PTM	1,000	34034
methohexital	151-83-7	PTM	1,000	34035
pentobarbital	76-74-4	PTM	1,000	34036
phenobarbital	50-06-6	PTM	1,000	34037
secobarbital	29071-21-4	PTM	1,000	34038
talbutal	115-44-6	PTM	1,000	34039

Exempted Drug of Abuse Standards, *cont.*

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

ACN = acetonitrile; M = methanol; PTM = purge-and-trap grade methanol

Forensic Drug Screen Test Mixture (8 components)

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

In P&T methanol, 1 mL/ampul
cat.# 36340 (ea.)

Forensic Drug Screen Internal Standard (2 components)

D5-diazepam
D5-doxepine

10 µg/mL each in P&T methanol, 10 mL/ampul
cat.# 36341 (ea.)

Restek Offers a Full Line of Certified Reference Materials

See **pages 438–439**.

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Explosives Solutions

Single-Component Explosives Solutions

- Supports U.S. Department of Defense base closures and remediation.
- Mixtures and singles supporting LC U.S. EPA Method 8330.
- Mixtures and singles supporting GC-ECD U.S. EPA Method 8095.
- Internal standards and surrogates to support both methods.

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 1 mL/ampul. Concentration is µg/mL.

Compound	CAS #	Solvent	Conc.	cat.#
2-amino-4,6-dinitrotoluene	35572-78-2	ACN	1,000	31670
4-amino-2,6-dinitrotoluene	19406-51-0	ACN	1,000	31671
ammonium picrate*	131-74-8	ACN	2,000	31890
3,5-dinitroaniline	618-87-1	ACN	1,000	31661
1,2-dinitrobenzene	528-29-0	M	1,000	31453
1,3-dinitrobenzene	99-65-0	ACN	1,000	31662
2,4-dinitrotoluene	121-14-2	ACN	1,000	31663
2,6-dinitrotoluene	606-20-2	ACN	1,000	31664
3,4-dinitrotoluene	610-39-9	EA	2,000	33901
3,4-dinitrotoluene	610-39-9	M	1,000	31452
EGDN*	628-96-6	M	1,000	31601
HMX*	2691-41-0	ACN	1,000	31665
2-methyl-4-nitroaniline	99-55-8	M	1,000	31612
nitrobenzene	98-95-3	ACN	1,000	31657
nitroglycerin*	55-63-0	M	1,000	31498
nitroguanidine*	556-88-7	M	1,000	31602
2-nitrotoluene	88-72-2	ACN	1,000	31659
3-nitrotoluene	99-08-1	ACN	1,000	31660
4-nitrotoluene	99-99-0	ACN	1,000	31658
PETN (pentaerythritol tetranitrate)*	78-11-5	M	1,000	31600
picric acid*	88-89-1	M	1,000	31499
propylene glycol dinitrate (PGDN)	6423-43-4	M	1,000	31821
RDX*	121-82-4	ACN	1,000	31666
tetryl*	479-45-8	ACN	1,000	31667
1,3,5-trinitrobenzene*	99-35-4	ACN	1,000	31668
2,4,6-trinitrotoluene*	118-96-7	ACN	1,000	31669

ACN = acetonitrile; EA = ethyl acetate; M = methanol

*Meet all DOT requirements. Available only to customers or distributors inside the 48 contiguous United States; items may not be resold for export.

References (Not available from Restek)

[1]U.S. 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.

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

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)

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

2,000 µg/mL each in methylene chloride, 1 mL/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.

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

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

No data pack available.

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!

NEW!

Compound Index for Reference Standards

See **pages 730–736.**

Weathered Petrochemical Solutions

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 collected, then 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

Stoddard solvent is also known as Type I mineral spirits, Texsolve S, or Varsol® 1 mineral spirits. We offer this reference material for those who need to calibrate Stoddard solvent separately. This standard is dissolved in methanol for analysis by either direct injection or purge-and-trap.

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

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

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

Unleaded Gasoline	CAS #	Solvent	Conc.	cat.#
unleaded gasoline: unweathered	8006-61-9	PTM	5,000	30096
unleaded gasoline: 25% weathered	8006-61-9	PTM	5,000	30097
unleaded gasoline: 50% weathered	8006-61-9	PTM	5,000	30098
unleaded gasoline: 75% weathered	8006-61-9	PTM	5,000	30099
unleaded gasoline: 99% weathered	8006-61-9	PTM	5,000	30436
Kerosene	**CAS #**	**Solvent**	**Conc.**	**cat.#**
kerosene: unweathered	84742-81-0	D	5,000	31229
kerosene: 25% weathered	84742-81-0	D	5,000	31230
kerosene: 50% weathered	84742-81-0	D	5,000	31231
kerosene: 75% weathered	84742-81-0	D	5,000	31232
Diesel Fuel #2	**CAS #**	**Solvent**	**Conc.**	**cat.#**
diesel fuel #2: unweathered	68334-30-5	D	5,000	31233
diesel fuel #2: 25% weathered	68334-30-5	D	5,000	31234
diesel fuel #2: 50% weathered	68334-30-5	D	5,000	31235
diesel fuel #2: 75% weathered	68334-30-5	D	5,000	31236
Mineral Spirits	**CAS #**	**Solvent**	**Conc.**	**cat.#**
mineral spirits: unweathered	8030-30-6	D	5,000	31225
mineral spirits: unweathered	8030-30-6	D	50,000	31260
mineral spirits: unweathered (5 mL)	8030-30-6	D	50,000	31261
mineral spirits: 25% weathered	8030-30-6	D	5,000	31226
mineral spirits: 50% weathered	8030-30-6	D	5,000	31227
mineral spirits: 75% weathered	8030-30-6	D	5,000	31228

D = methylene chloride
PTM = purge-and-trap grade methanol

Weathered Petrochemical Solutions, *cont.*

Weathered Gasoline Kit

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 collected, then blended in equal volumes.

Contains 1 mL each of these mixtures.
30096: Unleaded Gasoline Standard
30097: Unleaded Gasoline Standard: 25% Weathered
30098: Unleaded Gasoline Standard: 50% Weathered
30099: Unleaded Gasoline Standard: 75% Weathered

cat.# 30100 (kit) **kit**

Weathered Gasoline Kit #2

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 collected, then blended in equal volumes.

Contains 1 mL each of these mixtures.
30096: Unleaded Gasoline Standard
30097: Unleaded Gasoline Standard: 25% Weathered
30098: Unleaded Gasoline Standard: 50% Weathered
30099: Unleaded Gasoline Standard: 75% Weathered
30436: Unleaded Gasoline Standard: 99% Weathered

cat.# 30437 (kit) **kit**

Weathered Kerosene Kit

These solutions are prepared from a single-source (one-refinery) product. The weathered materials indicate the percent weight loss from the original material.

Contains 1 mL each of these mixtures.
31229: Kerosene Standard
31230: Kerosene Standard: 25% Weathered
31231: Kerosene Standard: 50% Weathered
31232: Kerosene Standard: 75% Weathered

cat.# 31238 (kit) **kit**

Weathered Diesel Fuel #2 Kit

These solutions are prepared from a single-source (one-refinery) product. The weathered materials indicate the percent weight loss from the original material.

Contains 1 mL each of these mixtures.
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

cat.# 31239 (kit) **kit**

Weathered Mineral Spirits Kit

The solutions listed below were prepared from an equal-volume blend of Type I, II, and III mineral spirits.

Contains 1 mL each of these mixtures.
31225: Mineral Spirits Standard
31226: Mineral Spirits Standard: 25% Weathered
31227: Mineral Spirits Standard: 50% Weathered
31228: Mineral Spirits Standard: 75% Weathered

cat.# 31237 (kit) **kit**

Reference Standards

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Acetates

8260B Acetate Mix (5 components)

vinyl acetate
ethyl acetate
isopropyl acetate
n-propyl acetate
n-butyl acetate

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30477 (ea.)

8260B Acetate Mix (Revised) (7 components)

- Includes methyl acetate and *n*-amyl acetate.
- Contains 7 acetates.

n-amyl acetate
butyl acetate
ethyl acetate
isopropyl acetate
methyl acetate
propyl acetate
vinyl acetate

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30489 (ea.)

Vinyl Acetate

2,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30216 (ea.)

Alcohols

8240 Alcohols Mix (5 components)

allyl alcohol
2-chloroethanol
ethanol
isobutyl alcohol
propargyl alcohol

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30214 (ea.)

Aldehydes

Method 8315 (Aldehydes & Ketones DNPH by LC)

Aldehyde-Ketone-DNPH TO-11A Calibration Mix (15 components)

acetaldehyde-DNPH
acetone-DNPH
acrolein-DNPH
benzaldehyde-DNPH
n-butyraldehyde-DNPH
crotonaldehyde-DNPH
2,5-dimethylbenzaldehyde-DNPH
formaldehyde-DNPH
hexaldehyde-DNPH
isovaleraldehyde-DNPH
propionaldehyde-DNPH
m-tolualdehyde-DNPH
o-tolualdehyde-DNPH
p-tolualdehyde-DNPH
valeraldehyde-DNPH

15 µg/mL each in acetonitrile, 1 mL/ampul*
cat.# 31808 (ea.)

*Concentration calculated as the aldehyde/ketone.

Formaldehyde-DNPH Mix

500 µg/mL in acetonitrile, 1 mL/ampul*
cat.# 31837 (ea.)

*Concentration calculated as the aldehyde/ketone.

Aldehydes, *cont.*

CARB 1004 Aldehyde/Ketone-DNPH Calibration Standard (13 components)

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

3 µg/mL each in acetonitrile, 1 mL/ampul*
cat.# 33093 (ea.)

*Concentration calculated as the aldehyde/ketone.

DNPH Reference Materials

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

Compound	CAS #	Solvent	Conc.	cat.#
acetaldehyde-2,4-DNPH	1019-57-4	ACN	100	33074
formaldehyde-2,4-DNPH	1081-15-8	ACN	100	33082
glycolaldehyde-2,4-DNPH		ACN	100	33091

*Concentration calculated as the aldehyde/ketone.
ACN = acetonitrile

ASTM Method 5197 (Formaldehyde and Other Carbonyl Compounds in Air)

See cat. #s 33093, 33074, 33082, and 33091 above.

Base, Neutral & Acid Extractable (BNA)/ Semivolatile Organics

See pages 496–508.

Benzidines

605 Benzidines Calibration Mix (2 components)

benzidine
3,3'-dichlorobenzidine

2,000 µg/mL each in methanol, 1 mL/ampul
cat.# 31030 (ea.)

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31834 (ea.)

8270 Benzidines Mix (3 components)

benzidine
3,3'-dichlorobenzidine
3,3'-dimethylbenzidine

2,000 µg/mL each in methanol, 1 mL/ampul
cat.# 31688 (ea.)

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31852 (ea.)

3,3'-Dichlorobenzidine

2,000 µg/mL in methanol, 1 mL/ampul
cat.# 31026 (ea.)

2,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31835 (ea.)

BTEX

BTEX Standard (6 components)

benzene
ethylbenzene
toluene
m-xylene
o-xylene
p-xylene

200 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30051 (ea.)

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30213 (ea.)

2,000 µg/mL each in P&T methanol (*m*- & *p*-xylene at 1,000 µg/mL), 1 mL/ampul
cat.# 30488 (ea.)

BTEX Gas Mix (6 components)

benzene
ethylbenzene
toluene
m-xylene
o-xylene
p-xylene

cylinder design

Cylinder Construction: aluminum
Cylinder Fitting: CGA-180 outlet

Spectra (Linde) 104 L Cylinders:

Size: 8 x 24 cm
Volume/Pressure: 104 liters of gas @ 1,800 psi
Weight: 1.5 lb/0.7 kg

Scotty (Air Liquide) 110 L Cylinders:

Size: 8.3 x 29.5 cm
Volume/Pressure: 110 liters of gas @ 1,800 psi
Weight: 2.2 lb/1 kg
U.S. DOT Specs: 3AL2216

1 ppm in nitrogen, 104 liters @ 1,800 psi
cat.# 34414 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi
cat.# 26361 (ea.)
NEW!

1 ppm in nitrogen, 110 liters @ 1,800 psi (Pi-marked cylinder)
cat.# 34414-PI (ea.)

100 ppb in nitrogen, 104 liters @ 1,800 psi
cat.# 34428 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi
cat.# 26362 (ea.)
NEW!

100 ppb in nitrogen, 110 liters @ 1,800 psi (Pi-marked cylinder)
cat.# 34428-PI (ea.)

No data pack available.

Gas standards are subject to hazardous materials shipping fees by most freight carriers. All calibration gas standards are nonreturnable due to DOT hazardous shipping requirements.

also available

Gas Regulators

See **pages 279–281.**

Diesel Fuel

Diesel Surrogate and Internal Standards

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

Compound	CAS #	Solvent	Conc.	cat.#
1-chlorooctadecane	3386-33-2	D	10,000	31098
2-fluorobiphenyl	321-60-8	D	10,000	31096
o-terphenyl	84-15-1	D	10,000	31097
p-terphenyl	92-94-4	D	10,000	31095

Recommended Internal Standards

Compound	CAS #	Solvent	Conc.	cat.#
5-α-androstane	438-22-2	D	2,000	31065
o-terphenyl	84-15-1	A	2,000	31066

A = acetone; D = methylene chloride

Diesel Fuel #2 Composite Standard

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31093 (ea.)

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31258 (ea.)

50,000 µg/mL in methylene chloride, 5 mL/ampul
cat.# 31259 (ea.)

Diesel Fuel #2 Standard

Prepared from a single-source (one-refinery) product.

diesel fuel #2: unweathered

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31233 (ea.)

Certified PAHs in Diesel (7 components)

- Confirms diesel #2 TPH and priority PAHs in a single analysis.
- Certificate of analysis includes concentration of TPH and certified concentrations of individual PAHs.
- Complete data packs available.

Certified PAHs

acenaphthene*
acenaphthylene*
fluorene*
1-methylnaphthalene*
2-methylnaphthalene*
naphthalene*
phenanthrene*

50,000 ppm diesel #2 in methylene chloride, 1 mL/ampul
cat.# 31673 (ea.)

*Concentration differs from lot to lot. See online certificate of analysis for certified concentrations.

Diesel:Biodiesel (80:20) Blend Standard

The biodiesel component is methyl soyate.

diesel:biodiesel (80:20)

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31880 (ea.)

Diesel Fuel, *cont.*

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 200 mL amber bottle.

cat.# 33051 (ea.)

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 200 mL amber bottle.

cat.# 33052 (ea.)

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 200 mL amber bottle.

cat.# 33053 (ea.)

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 200 mL amber bottle.

cat.# 33054 (ea.)

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 200 mL amber bottle.

cat.# 33055 (ea.)

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 200 mL amber bottle.

cat.# 33056 (ea.)

Restek Offers a Full Line of Certified Reference Materials

QUALITY ISO 9001 • 17025 • Guide 34

www.restek.com/iso

See **pages 438–439**.

ISO/DIS 9377 Water Quality Testing (German H-53)

Reference mixtures for ISO/DIS 9377 (German H-53), a gas chromatography–flame ionization detection (GC-FID) method.

Diesel #2/Motor Oil (2 components)

diesel fuel #2 composite
motor oil

5,000 µg/mL each in hexane, 1 mL/ampul

cat.# 31682 (ea.)

Diesel #2/Mineral Oil (2 components)

diesel fuel #2 composite
mineral oil

5,000 µg/mL each in hexane, 1 mL/ampul

cat.# 31676 (ea.)

Standard Mixture Stock Solution (2 components)

- For GC analysis of total petroleum hydrocarbons (TPH) in water.
- Calibration standard available as Diesel #2/motor oil and Diesel #2/mineral oil.

diesel #2 (additive-free)
mineral oil (additive-free [i.e., USP grade] bp 325–460 or C18–C32 retention time range)

5,000 µg/mL each in cyclohexane, 1 mL/ampul (prepares 8 mL of 1.25 µg/µL calibration curve high point). Total hydrocarbon concentration is 10,000 µg/mL.

cat.# 31630 (ea.)

Quality Control Standard Mixture, Revised

(2 components)

- Updated reference materials for GC analysis of TPH in water.
- Determination of hydrocarbon oil index—applicable to drinking, surface, waste, and treated water.

diesel #2 (additive-free)
motor oil (additive-free bp 325–460 or C18–C32 retention time range)

500 µg/mL each in acetone, 1 mL/ampul (1 mL is enough mix to spike one 900 mL quality control sample). Total hydrocarbon concentration is 1,000 µg/mL.

cat.# 31641 (ea.)

Quality Control Standard Mixture (2 components)

- For GC analysis of total petroleum hydrocarbons (TPH) in water.
- Environmentally safer than previous methods.
- Calibration standard available as Diesel #2/motor oil and Diesel #2/mineral oil.

diesel #2 (additive-free)
mineral oil (additive-free [i.e., USP grade] bp 391–522 or C24–C40 retention time range)

500 µg/mL each in acetone, 1 mL/ampul (1 mL is enough mix to spike one quality control sample). Total hydrocarbon concentration is 1,000 µg/mL.

cat.# 31631 (ea.)

Disinfection By-Products

Disinfection By-Product and Chlorinated Solvents Mix
(19 components)

bromochloroacetonitrile
bromodichloromethane
bromoform
carbon tetrachloride
chloroform
chloropicrin
dibromoacetonitrile
dibromochloromethane
1,2-dibromo-3-chloropropane (DBCP)
1,2-dibromoethane (EDB)
dichloroacetonitrile
1,1-dichloro-2-propanone
tetrachloroethylene
trichloroacetonitrile
1,1,1-trichloroethane
1,1,2-trichloroethane
trichloroethylene
1,2,3-trichloropropane
1,1,1-trichloro-2-propanone

2,000 µg/mL each in acetone, 1 mL/ampul
cat.# 30615 (ea.)

Chloral Hydrate

1,000 µg/mL in acetonitrile, 1 mL/ampul
cat.# 30609 (ea.)

Disinfection By-Product Mix (7 components)

bromochloroacetonitrile
chloropicrin
dibromoacetonitrile
dichloroacetonitrile
1,1-dichloro-2-propanone
trichloroacetonitrile
1,1,1-trichloro-2-propanone

2,000 µg/mL each in acetone, 1 mL/ampul
cat.# 30616 (ea.)

Drinking Water Odor

Drinking Water Odor Standard (2 components)

- Reference mix of the two most common odor-causing compounds.
- Convenient concentration for purge-and-trap analysis: 100 µg/mL in methanol.

Unpleasant odor in drinking water is associated with the growth and decay of microorganisms. The threshold value for these compounds is low (10 ppt) and purge-and-trap analyses usually are used to quantify them.

(+/-)-geosmin
2-methylisoborneol

100 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30608 (ea.)

Ethylene Oxide

Ethylene Oxide

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

50 mg/mL in methylene chloride, 1 mL/ampul
cat.# 30620 (ea.)

NEW!

Ethylene oxide is available in other solvents and concentrations. Request your custom formulation at **www.restek.com/solutions**

NEW!

Compound Index for Reference Standards

See **pages 730–736.**

Explosives

Method 529 (Nitroaromatics & Nitramines)

529 Internal Standard Mix

3,4-dinitrotoluene

2,000 µg/mL in ethyl acetate, 1 mL/ampul

cat.# 33901 (ea.)

529 Surrogate Standard #1

2-nitromesitylene

2,000 µg/mL in methanol, 1 mL/ampul

cat.# 33902 (ea.)

529 Surrogate Standard #2

1,2,4-trimethyl-5-nitrobenzene

2,000 µg/mL in methanol, 1 mL/ampul

cat.# 33903 (ea.)

529 Surrogate Standard #3

nitrobenzene-d5

2,000 µg/mL in methylene chloride, 1 mL/ampul

cat.# 31044 (ea.)

Nitroaromatics and Nitramine Explosives in Drinking Water (14 components)

3,5-dinitroaniline
1,3-dinitrobenzene
2-amino-4,6-dinitrotoluene
4-amino-2,6-dinitrotoluene
2,4-dinitrotoluene
2,6-dinitrotoluene
nitrobenzene
2-nitrotoluene
3-nitrotoluene
4-nitrotoluene
RDX
tetryl
1,3,5-trinitrobenzene
2,4,6-trinitrotoluene

1,000 µg/mL each in acetonitrile, 1 mL/ampul

cat.# 33900 (ea.)

Meet all DOT requirements. Available only to customers or distributors inside the 48 contiguous United States; items may not be resold for export.

Method 609 (Nitroaromatics/Isophorone)

609 Nitroaromatics & Isophorone Calibration Mix (4 components)

2,4-dinitrotoluene
isophorone
2,6-dinitrotoluene
nitrobenzene

2,000 µg/mL each in hexane, 1 mL/ampul

cat.# 31033 (ea.)

Method 8095 (Explosives by GC)

8095 Surrogate

3,4-dinitrotoluene

1,000 µg/mL in methanol, 1 mL/ampul

cat.# 31452 (ea.)

8095 Surrogate

2-methyl-4-nitroaniline

1,000 µg/mL in methanol, 1 mL/ampul

cat.# 31612 (ea.)

8095 Matrix Spike Mix A (10 components)

2-amino-4,6-dinitrotoluene
4-amino-2,6-dinitrotoluene
1,3-dinitrobenzene
2,4-dinitrotoluene
2,6-dinitrotoluene
HMX*
RDX
tetryl
1,3,5-trinitrobenene
2,4,6-trinitrotoluene

200 µg/mL each in acetonitrile (*HMX at 2,000 µg/mL), 1 mL/ampul

cat.# 31609 (ea.)

Meet all DOT requirements. Available only to customers or distributors inside the 48 contiguous United States; items may not be resold for export.

8095 Matrix Spike Mix B (7 components)

3,5-dinitroaniline*
nitrobenzene
nitroglycerine
2-nitrotoluene
3-nitrotoluene
4-nitrotoluene
PETN

1,000 µg/mL each in acetonitrile (*3,5-dinitroaniline at 200 µg/mL), 1 mL/ampul

cat.# 31610 (ea.)

Meet all DOT requirements. Available only to customers or distributors inside the 48 contiguous United States; items may not be resold for export.

8095 Calibration Mix A (10 components)

2-amino-4,6-dinitrotoluene
4-amino-2,6-dinitrotoluene
1,3-dinitrobenzene
2,4-dinitrotoluene
2,6-dinitrotoluene
HMX
RDX
tetryl
1,3,5-trinitrobenzene
2,4,6-trinitrotoluene

1,000 µg/mL each in acetonitrile, 1 mL/ampul

cat.# 31607 (ea.)

Meet all DOT requirements. Available only to customers or distributors inside the 48 contiguous United States; items may not be resold for export.

8095 Calibration Mix B (7 components)

3,5-dinitroaniline*
nitrobenzene
nitroglycerine
2-nitrotoluene
3-nitrotoluene
4-nitrotoluene
PETN

5,000 µg/mL each in acetonitrile (*3,5-dinitroaniline at 1,000 µg/mL), 1 mL/ampul

cat.# 31608 (ea.)

Meet all DOT requirements. Available only to customers or distributors inside the 48 contiguous United States; items may not be resold for export.

Explosives, *cont.*

Method 8095 (Explosives by GC), *cont.*

Single-Component Explosives Solutions

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

Compound	CAS #	Solvent	Conc.	cat.#
2-amino-4,6-dinitrotoluene	35572-78-2	ACN	1,000	31670
4-amino-2,6-dinitrotoluene	19406-51-0	ACN	1,000	31671
ammonium picrate*	131-74-8	ACN	2,000	31890
3,5-dinitroaniline	618-87-1	ACN	1,000	31661
1,2-dinitrobenzene	528-29-0	M	1,000	31453
1,3-dinitrobenzene	99-65-0	ACN	1,000	31662
2,4-dinitrotoluene	121-14-2	ACN	1,000	31663
2,6-dinitrotoluene	606-20-2	ACN	1,000	31664
3,4-dinitrotoluene	610-39-9	EA	2,000	33901
3,4-dinitrotoluene	610-39-9	M	1,000	31452
EGDN*	628-96-6	M	1,000	31601
HMX*	2691-41-0	ACN	1,000	31665
2-methyl-4-nitroaniline	99-55-8	M	1,000	31612
nitrobenzene	98-95-3	ACN	1,000	31657
nitroglycerin*	55-63-0	M	1,000	31498
nitroguanidine*	556-88-7	M	1,000	31602
2-nitrotoluene	88-72-2	ACN	1,000	31659
3-nitrotoluene	99-08-1	ACN	1,000	31660
4-nitrotoluene	99-99-0	ACN	1,000	31658
PETN (pentaerythritol tetranitrate)*	78-11-5	M	1,000	31600
picric acid*	88-89-1	M	1,000	31499
propylene glycol dinitrate (PGDN)	6423-43-4	M	1,000	31821
RDX*	121-82-4	ACN	1,000	31666
tetryl*	479-45-8	ACN	1,000	31667
1,3,5-trinitrobenzene*	99-35-4	ACN	1,000	31668
2,4,6-trinitrotoluene*	118-96-7	ACN	1,000	31669

ACN = acetonitrile; EA = ethyl acetate; M = methanol

*Meet all DOT requirements. Available only to customers or distributors inside the 48 contiguous United States; items may not be resold for export.

References (Not available from Restek)

[1]U.S. 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.

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

Method 8330 (Nitroaromatics and Nitramines by LC)

8330 Internal Standard

3,4-dinitrotoluene

1,000 µg/mL in methanol, 1 mL/ampul

cat.# 31452 (ea.)

8330 Internal Standard

1,4-dinitrobenzene

2,000 µg/mL in acetonitrile, 1 mL/ampul

cat.# 33205 (ea.)

8330 Surrogate

1,2-dinitrobenzene

1,000 µg/mL in methanol, 1 mL/ampul

cat.# 31453 (ea.)

Method 8330 (Nitroaromatics and Nitramines by LC), *cont.*

8330B Nitroaromatics and Nitramine Mix

(17 components)*

2-amino-4,6-dinitrotoluene
4-amino-2,6-dinitrotoluene
3,5-dinitroaniline
1,3-dinitrobenzene
2,4-dinitrotoluene
2,6-dinitrotoluene
HMX
nitrobenzene
nitroglycerin
2-nitrotoluene
3-nitrotoluene
4-nitrotoluene
PETN
RDX
tetryl
1,3,5-trinitrobenzene
2,4,6-trinitrotoluene

1,000 µg/mL each in acetonitrile, 1 mL/ampul

cat.# 33204 (ea.)

Nitroaromatics and Nitramine Explosives by LC

(14 components)*

1,3-dinitrobenzene
2-amino-4,6-dinitrotoluene
4-amino-2,6-dinitrotoluene
2,4-dinitrotoluene
2,6-dinitrotoluene
HMX
nitrobenzene
2-nitrotoluene
3-nitrotoluene
4-nitrotoluene
RDX
tetryl
1,3,5-trinitrobenzene
2,4,6-trinitrotoluene

1,000 µg/mL each in acetonitrile, 1 mL/ampul

cat.# 33905 (ea.)

8330 Calibration Mix #1 (7 components)*

1,3-dinitrobenzene
2,4-dinitrotoluene
HMX
nitrobenzene
RDX
1,3,5-trinitrobenzene
2,4,6-trinitrotoluene

1,000 µg/mL each in acetonitrile, 1 mL/ampul

cat.# 31450 (ea.)

8330 Calibration Mix #2 (7 components)*

2-amino-4,6-dinitrotoluene
4-amino-2,6-dinitrotoluene
2,6-dinitrotoluene
2-nitrotoluene
3-nitrotoluene
4-nitrotoluene
tetryl

1,000 µg/mL each in acetonitrile, 1 mL/ampul

cat.# 31451 (ea.)

*Meet all DOT requirements. Available only to customers or distributors inside the 48 contiguous United States; items may not be resold for export.

did you know?

When you order reference materials for Method 8330, be aware that obtaining pure, neat compounds for standards can be very difficult. Some of these commercial-grade materials contain desensitizing agents such as beeswax, water, or other manufacturing by-products. Many are shipped wet and must be carefully dried before preparation.

To ensure the highest quality standards, Restek's Quality Control (QC) lab confirms the chemical identity and purity of mixture components and solvents using one or more of the following techniques: GC-FID, HPLC, GC-ECD, GC-MS, LC-MS, refractive index, and melting point. All compounds are 98% pure or higher.

Gases

624 Calibration Mix #1 (gases) (5 components)

bromomethane
chloroethane
chloromethane
trichlorofluoromethane (CFC-11)
vinyl chloride

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30020 (ea.)

tech tip

Achieving the Best Results From Gas Standards

In order to achieve the best results from gas standards, proper handling and storage of gas solutions is of vital importance. Use the following tips to help ensure trouble-free performance:

- Before opening the sealed ampul, warm it to room temperature and invert ampul several times. This will redissolve any gases that may have migrated into the headspace of the ampul.
- When diluting a gas standard, always add it to a solvent. Adding the gas standard to an empty vessel prior to adding solvent will result in the loss of gas compounds.
- When diluting a gas standard in solvent, make sure the pipette or needle tip is directly above, or immersed below, the solvent surface.
- We recommend that any unused portion of gas standard be disposed of after it has been removed from the sealed ampul. If it is necessary to store the unused portion, place it into a tightly capped vial and store it in the freezer.
- We recommend that any gas solutions that have been stored outside of a sealed ampul be disposed of after seven days.

Method 8240 (Volatile Organic Compounds [VOCs])

502.2 Calibration Mix #1 (gases) (6 components)

bromomethane
chloroethane
chloromethane
dichlorodifluoromethane (CFC-12)
trichlorofluoromethane (CFC-11)
vinyl chloride

200 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30439 (ea.)

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30042 (ea.)

BTEX Gas Mix (6 components)

benzene
ethylbenzene
toluene
m-xylene
o-xylene
p-xylene

1 ppm in nitrogen, 104 liters @ 1,800 psi
cat.# 34414 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi
cat.# 26361 (ea.)

NEW!

1 ppm in nitrogen, 110 liters @ 1,800 psi (Pi-marked cylinder)
cat.# 34414-PI (ea.)

100 ppb in nitrogen, 104 liters @ 1,800 psi
cat.# 34428 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi
cat.# 26362 (ea.)

NEW!

100 ppb in nitrogen, 110 liters @ 1,800 psi (Pi-marked cylinder)
cat.# 34428-PI (ea.)

No data pack available.

cylinder design

Cylinder Construction: aluminum
Cylinder Fitting: CGA-180 outlet

Spectra (Linde) 104 L Cylinders:

Size: 8 x 24 cm
Volume/Pressure: 104 liters of gas @ 1,800 psi
Weight: 1.5 lb/0.7 kg

Scotty (Air Liquide) 110 L Cylinders:

Size: 8.3 x 29.5 cm
Volume/Pressure: 110 liters of gas @ 1,800 psi
Weight: 2.2 lb/1 kg
U.S. DOT Specs: 3AL2216

For more gas calibration standards,

See **pages 418–423.**

Japan Calibration Mix (9 components)

acrylonitrile
benzene
1,3-butadiene
chloroform
1,2-dichloroethane
dichloromethane
tetrachloroethylene
trichloroethylene
vinyl chloride

1 ppm in nitrogen, 104 liters @ 1,800 psi
cat.# 34418 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi
cat.# 26367 (ea.)

NEW!

1 ppm in nitrogen, 110 liters @ 1,800 psi (Pi-marked cylinder)
cat.# 34418-PI (ea.)

No data pack available.

Gas standards are subject to hazardous materials shipping fees by most freight carriers. All calibration gas standards are nonreturnable due to DOT hazardous shipping requirements.

Gasoline

Gasoline Surrogate and Internal Standards

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

Compound	CAS #	Solvent	Conc.	cat.#
4-bromofluorobenzene	460-00-4	PTM	2,500	30067
4-bromofluorobenzene	460-00-4	PTM	10,000	30082
1-chlorooctane	111-85-3	PTM	10,000	30084
α,α,α-trifluorotoluene	98-08-8	PTM	2,500	30068
α,α,α-trifluorotoluene	98-08-8	PTM	10,000	30083

Recommended Internal Standard (PID) for EPA GRO Method

Compound	CAS #	Solvent	Conc.	cat.#
1-chloro-4-fluorobenzene	352-33-0	PTM	2,500	30066

PTM = Purge-and-trap grade methanol

Unleaded Gasoline Standard

Prepared from a single-source (one-refinery) product.

unleaded gasoline: unweathered

5,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30096 (ea.)

Unleaded Gasoline Composite Standard

2,500 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30081 (ea.)

50,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30205 (ea.)

50,000 µg/mL in P&T methanol, 5 mL/ampul
cat.# 30206 (ea.)

Petroleum Volatile Organic Compounds (PVOC), Gasoline Range Organics (GRO) & Benzene-Toluene-Ethylbenzene-Xylenes (BTEX)

PVOC Mix (California) (7 components)

benzene
ethylbenzene
methyl *tert*-butyl ether (MTBE)
toluene
m-xylene
o-xylene
p-xylene

1,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30231 (ea.)

PVOC/GRO Mix (Wisconsin) (10 components)

benzene
ethylbenzene
methyl *tert*-butyl ether (MTBE)
naphthalene
toluene
1,2,4-trimethylbenzene
1,3,5-trimethylbenzene
m-xylene
o-xylene
p-xylene

1,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30095 (ea.)

GRO Mix (9 components)

benzene
ethylbenzene
3-methylpentane
naphthalene
toluene
1,2,4-trimethylbenzene
2,2,4-trimethylpentane (isooctane)
m-xylene
o-xylene

1,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30069 (ea.)

Petroleum Volatile Organic Compounds (PVOC), Gasoline Range Organics (GRO) & Benzene-Toluene-Ethylbenzene-Xylenes (BTEX), *cont.*

GRO Mix (EPA) (9 components)

benzene	500 µg/mL	1,2,4-trimethylbenzene	1,000
ethylbenzene	500	2,2,4-trimethylpentane	1,500
heptane	500	*m*-xylene	1,000
2-methylpentane	1,500	*o*-xylene	1,000
toluene	1,500		

In P&T methanol, 1 mL/ampul
cat.# 30065 (ea.)

BTEX Standard (6 components)

benzene
ethylbenzene
toluene
m-xylene
o-xylene
p-xylene

200 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30051 (ea.)

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30213 (ea.)

2,000 µg/mL each in P&T methanol (*m*- & *p*-xylene at 1,000 µg/mL), 1 mL/ampul
cat.# 30488 (ea.)

Gasoline Component Standard (10 components)

benzene	500 µg/mL	1,2,4-trimethylbenzene	1,000
ethylbenzene	500	2,2,4-trimethylpentane	1,500
heptane	500	*m*-xylene	1,000
2-methylpentane	1,500	*o*-xylene	1,000
toluene	1,500	*p*-xylene	1,000

10,000 µg/mL total in P&T methanol, 1 mL/ampul
cat.# 30486 (ea.)

Certified BTEX in Unleaded Gas Composite Standard (9 components)

Certified for:
benzene*
ethylbenzene*
isopropyl benzene*
methyl *tert*-butyl ether (MTBE)*
naphthalene*
toluene*
m-xylene*
o-xylene*
p-xylene*

5,500 ppm gasoline in P&T methanol, 1 mL/ampul
cat.# 30237 (ea.)

*Concentration differs from lot to lot. See online certificate of analysis for certified concentrations.

Certified Aromatics in Gasoline (16 components)

Certified for:
benzene*
ethylbenzene*
m-ethyltoluene*
o-ethyltoluene*
p-ethyltoluene*
isopropylbenzene*
methyl *tert*-butyl ether (MTBE)*
naphthalene*
n-propylbenzene*
toluene*
1,2,3-trimethylbenzene*
1,2,4-trimethylbenzene*
1,3,5-trimethylbenzene*
m-xylene*
o-xylene*
p-xylene*

5,500 ppm gasoline in P&T methanol, 1 mL/ampul
cat.# 30485 (ea.)

*Concentration differs from lot to lot. See online certificate of analysis for certified concentrations.

Glycols

Glycols Standard (2 components)

ethylene glycol
propylene glycol

50,000 µg/mL each in DI water, 1 mL/ampul
cat.# 30471 (ea.)

Haloacetic Acids

Methods 552, 552.1, 552.2, 552.3 (Haloacetic Acids and Dalapon)

Internal Standards and Surrogates for Method 552

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

Compound	CAS #	Solvent	Conc.	cat.#
Internal Standard				
1,2,3-trichloropropane	96-18-4	MTBE	1,000	31648
Surrogates for Method 552, 552.1				
2,3-dichloropropionic acid	565-64-0	MTBE	1,000	31650
3,5-dichlorobenzoic acid	51-36-5	MTBE	1,000	31652
3,5-dichlorobenzoic acid methyl ester	2905-67-1	MTBE	1,000	31649
2,3-dichloropropionic acid methyl ester	3674-09-7	MTBE	1,000	31651
Surrogates for Method 552.2				
2-bromopropionic acid	598-72-1	MTBE	1,000	31653
2,3-dibromopropionic acid	600-05-5	MTBE	1,000	31655
methyl-2,3-dibromopropionate	1729-67-5	MTBE	1,000	31656
Surrogates for Method 552.3				
2-bromobutanoic acid	80-58-0	MTBE	2,000	31881
2-bromobutyrate	3196-15-4	MTBE	2,000	31882

MTBE = methyl *tert*-butyl ether

Haloacetic Acid Mix (9 components)

bromochloroacetic acid
bromodichloroacetic acid
chlorodibromoacetic acid
dibromoacetic acid
dichloroacetic acid
monobromoacetic acid
monochloroacetic acid
tribromoacetic acid
trichloroacetic acid

1,000 µg/mL each in methyl *tert*-butyl ether, 1 mL/ampul
cat.# 31896 (ea.)

Haloacetic Acid Mix #1 (6 components)

bromochloroacetic acid
dibromoacetic acid
dichloroacetic acid
monobromoacetic acid
monochloroacetic acid
trichloroacetic acid

2,000 µg/mL each in methyl *tert*-butyl ether, 1 mL/ampul
cat.# 31644 (ea.)

Haloacetic Acids, *cont.*

Methods 552, 552.1, 552.2, 552.3 (Haloacetic Acids and Dalapon), *cont.*

Haloacetic Acid Methyl Ester Mix #1 (6 components)

methyl bromochloroacetate
methyl dibromoacetate
methyl dichloroacetate
methyl monobromoacetate
methyl monochloroacetate
methyl trichloroacetate

1,000 µg/mL each in methyl *tert*-butyl ether, 1 mL/ampul
cat.# 31645 (ea.)

Haloacetic Acid Mix #2 (9 components)

bromochloroacetic acid	400 µg/mL	monobromoacetic acid	400
bromodichloroacetic acid	400	monochloroacetic acid	600
chlorodibromoacetic acid	1,000	tribromoacetic acid	2,000
dibromoacetic acid	200	trichloroacetic acid	200
dichloroacetic acid	600		

In methyl *tert*-butyl ether, 1 mL/ampul
cat.# 31646 (ea.)

Haloacetic Acid Methyl Ester Mix #2 (9 components)

methyl bromochloroacetate	400 µg/mL	methyl monobromoacetate	400
methyl bromodichloroacetate	400	methyl monochloroacetate	600
methyl chlorodibromoacetate	1,000	methyl tribromoacetate	2,000
methyl dibromoacetate	200	methyl trichloroacetate	200
methyl dichloroacetate	600		

In methyl *tert*-butyl ether, 1 mL/ampul
cat.# 31647 (ea.)

Dalapon (2,2-dichloropropionic acid)

1,000 µg/mL in acetonitrile, 1 mL/ampul
cat.# 32432 (ea.)

1,000 µg/mL in methanol, 1 mL/ampul
cat.# 32253 (ea.)

2,000 µg/mL in methanol, 1 mL/ampul
cat.# 32056 (ea.)

Dalapon Methyl Ester

1,000 µg/mL in methanol, 1 mL/ampul
cat.# 32254 (ea.)

2,000 µg/mL in hexane, 1 mL/ampul
cat.# 32057 (ea.)

Haloethers

611 Haloethers Calibration Mix (5 components)

bis(2-chloroethoxy)methane
bis(2-chloroethyl)ether
bis(2-chloroisopropyl)ether
4-bromophenyl phenyl ether
4-chlorophenyl phenyl ether

2,000 µg/mL each in acetone, 1 mL/ampul
cat.# 31034 (ea.)

Herbicides, Chloroacetanilide Herbicide Degradates

Method 535 (Chloroacetanilide Herbicide Degradates)

Method 535 Internal Standard

butachlor ESA sodium salt

100 µg/mL in methanol, 1 mL/ampul
cat.# 33202 (ea.)

Method 535 Surrogate Standard

dimethachlor ESA sodium salt

100 µg/mL in methanol, 1 mL/ampul
cat.# 33203 (ea.)

Method 535 Individual Compounds

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

Compound	CAS #	Solvent	Conc.	cat.#
acetochlor ESA sodium salt	187022-11-3	M	100	33092
acetochlor OA	184992-44-4	M	100	33094
alachlor ESA sodium salt	142363-53-9	M	100	33096
alachlor OA	171262-17-2	M	100	33099
metolachlor ESA sodium salt	171118-09-5	M	100	33200
metolachlor OA	152019-73-3	M	100	33201

M = methanol

Herbicides, Chlorinated Acid

Method 515, 515.4 (Chlorinated Acid Herbicides)

Herbicide Internal Standard

4,4'-dibromooctafluorobiphenyl

250 µg/mL in hexane, 1 mL/ampul
cat.# 32053 (ea.)

2,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31040 (ea.)

2,000 µg/mL in methyl *tert*-butyl ether, 1 mL/ampul
cat.# 31856 (ea.)

Herbicide Surrogate

Free Acid Form

2,4-dichlorophenylacetic acid (2,4-DCAA)

200 µg/mL in methanol, 1 mL/ampul
cat.# 32049 (ea.)

1,000 µg/mL in acetone, 1 mL/ampul
cat.# 32439 (ea.)

Derivatized Form

2,4-dichlorophenyl acetic acid methyl ester (DCAA methyl ester)

200 µg/mL in hexane, 1 mL/ampul
cat.# 32050 (ea.)

Method 515, 515.4 (Chlorinated Acid Herbicides), *cont.*

Herbicide Lab Performance Check Mix (5 components)

dinoseb methyl ether	4 µg/mL	3,5-dichlorobenzoic acid methyl ester	600
DCAA methyl ester	500	4-nitroanisole	1,600
4,4'-dibromooctafluorobiphenyl	250		

In methyl *tert*-butyl ether, 1 mL/ampul
cat.# 32063 (ea.)

Herbicide Mix #1 (7 components)

Free Acid Form

2,4-D
2,4-DB
2,4,5-T
2,4,5-TP
dicamba
dichlorprop
dinoseb

200 µg/mL each in methanol, 1 mL/ampul
cat.# 32054 (ea.)

Derivatized Form

2,4-D methyl ester
2,4-DB methyl ester
2,4,5-T methyl ester
2,4,5-TP methyl ester
dicamba methyl ester
dichlorprop methyl ester
dinoseb methyl ether

200 µg/mL each in hexane, 1 mL/ampul
cat.# 32055 (ea.)

Herbicide Mix #2

Free Acid Form

dalapon

1,000 µg/mL in acetonitrile, 1 mL/ampul
cat.# 32432 (ea.)

1,000 µg/mL in methanol, 1 mL/ampul
cat.# 32253 (ea.)

2,000 µg/mL in methanol, 1 mL/ampul
cat.# 32056 (ea.)

Derivatized Form

dalapon methyl ester

2,000 µg/mL in hexane, 1 mL/ampul
cat.# 32057 (ea.)

1,000 µg/mL in methanol, 1 mL/ampul
cat.# 32254 (ea.)

Herbicide Mix #4 (8 components)

Free Acid Form

acifluorfen
bentazon
chloramben
DCPA diacid
3,5-dichlorobenzoic acid
4-nitrophenol
pentachlorophenol
picloram

200 µg/mL each in methanol, 1 mL/ampul
cat.# 32061 (ea.)

Derivatized Form

acifluorfen methyl ester
bentazon methyl ester
chloramben methyl ester
DCPA (Dacthal)
3,5-dichlorobenzoic acid methyl ester
4-nitroanisole
pentachloroanisole
picloram methyl ester

200 µg/mL each in hexane, 1 mL/ampul
cat.# 32062 (ea.)

Herbicides, Chlorinated Acid, *cont.*

Method 515, 515.4 (Chlorinated Acid Herbicides), *cont.*

515.4 Calibration Mix (16 components)

acifluorfen (Blazer)	50 µg/mL	3,5-dichlorobenzoic acid	50
bentazon	100	dichlorprop	100
chloramben	50	dinoseb	100
2,4-D	100	pentachlorophenol	10
dalapon	100	picloram	50
2,4-DB	100	quinclorac	50
DCPA diacid (tetrachloroterephthalic acid)	50	2,4,5-T	25
dicamba	50	2,4,5-TP (Silvex)	25

In acetone, 1 mL/ampul

cat.# 32443 (ea.)

515.4 Methylated Chlorinated Acids Mix (16 components)

acifluorfen methyl ester	50 µg/mL	3,5-dichlorobenzoic acid methyl ester	50
bentazon methyl ester	100	dichlorprop methyl ester	100
chloramben methyl ester	50	dinoseb methyl ether	100
dalapon methyl ester	100	pentachloroanisole	10
2,4-D methyl ester	100	picloram methyl ester	50
2,4-DB methyl ester	100	quinclorac methyl ester	50
DCPA (Dacthal)	100	2,4,5-T methyl ester	25
dicamba methyl ester	50	2,4,5-TP (Silvex) methyl ester	25

In methyl *tert*-butyl ether, 1 mL/ampul

cat.# 32444 (ea.)

Method 555 (Chlorinated Acids) LC Mixes

Chlorinated Acids by LC, Mix A (8 components)

acifluorfen (Blazer)
bentazon
chloramben
2,4-D
dicamba
dichlorprop
picloram
2,4,5-TP (Silvex)

1,000 µg/mL each in acetonitrile, 1 mL/ampul

cat.# 32431 (ea.)

Chlorinated Acids by LC, Mix B (8 components)

2,4-DB
3,5-dichlorobenzoic acid
dinoseb
MCPA
MCPP (mecoprop)
4-nitrophenol
pentachlorophenol
2,4,5-T

1,000 µg/mL each in acetonitrile, 1 mL/ampul

cat.# 32430 (ea.)

Chlorinated Acid Herbicide Mix (2 components)

2,4-dichlorophenoxyacetic acid (2,4-D)
2,4,5-TP (Silvex)

1,000 µg/mL each in acetonitrile, 1 mL/ampul

cat.# 32429 (ea.)

Method 615 (Chlorinated Acid Herbicides)

Herbicide Surrogate

Free Acid Form

2,4-dichlorophenylacetic acid (2,4-DCAA)

200 µg/mL in methanol, 1 mL/ampul

cat.# 32049 (ea.)

1,000 µg/mL in acetone, 1 mL/ampul

cat.# 32439 (ea.)

Derivatized Form

2,4-dichlorophenyl acetic acid methyl ester (DCAA methyl ester)

200 µg/mL in hexane, 1 mL/ampul

cat.# 32050 (ea.)

Herbicide Mix #1 (7 components)

Free Acid Form

2,4-D
2,4-DB
2,4,5-T
2,4,5-TP
dicamba
dichlorprop
dinoseb

200 µg/mL each in methanol, 1 mL/ampul

cat.# 32054 (ea.)

Derivatized Form

2,4-D methyl ester
2,4-DB methyl ester
2,4,5-T methyl ester
2,4,5-TP methyl ester
dicamba methyl ester
dichlorprop methyl ester
dinoseb methyl ether

200 µg/mL each in hexane, 1 mL/ampul

cat.# 32055 (ea.)

Herbicide Mix #2

Free Acid Form

dalapon

1,000 µg/mL in acetonitrile, 1 mL/ampul

cat.# 32432 (ea.)

1,000 µg/mL in methanol, 1 mL/ampul

cat.# 32253 (ea.)

2,000 µg/mL in methanol, 1 mL/ampul

cat.# 32056 (ea.)

Derivatized Form

dalapon methyl ester

2,000 µg/mL in hexane, 1 mL/ampul

cat.# 32057 (ea.)

1,000 µg/mL in methanol, 1 mL/ampul

cat.# 32254 (ea.)

Herbicide Mix #3 (2 components)

Free Acid Form

MCPA
MCPP

20,000 µg/mL each in methanol, 1 mL/ampul

cat.# 32058 (ea.)

Derivatized Form

MCPA methyl ester
MCPP methyl ester

20,000 µg/mL each in hexane, 1 mL/ampul

cat.# 32059 (ea.)

Herbicides, Chlorinated Acid, *cont.*

Method 8150, 8151, 8151A (Chlorinated Acid Herbicides)

Herbicide Internal Standard

4,4'-dibromooctafluorobiphenyl

250 µg/mL in hexane, 1 mL/ampul
cat.# 32053 (ea.)

2,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31040 (ea.)

2,000 µg/mL in methyl *tert*-butyl ether, 1 mL/ampul
cat.# 31856 (ea.)

Herbicide Surrogate

Free Acid Form

2,4-dichlorophenylacetic acid (2,4-DCAA)

200 µg/mL in methanol, 1 mL/ampul
cat.# 32049 (ea.)

1,000 µg/mL in acetone, 1 mL/ampul
cat.# 32439 (ea.)

Derivatized Form

2,4-dichlorophenyl acetic acid methyl ester (DCAA methyl ester)

200 µg/mL in hexane, 1 mL/ampul
cat.# 32050 (ea.)

Herbicide Mix #1 (7 components)

Free Acid Form

2,4-D
2,4-DB
2,4,5-T
2,4,5-TP
dicamba
dichlorprop
dinoseb

200 µg/mL each in methanol, 1 mL/ampul
cat.# 32054 (ea.)

Derivatized Form

2,4-D methyl ester
2,4-DB methyl ester
2,4,5-T methyl ester
2,4,5-TP methyl ester
dicamba methyl ester
dichlorprop methyl ester
dinoseb methyl ether

200 µg/mL each in hexane, 1 mL/ampul
cat.# 32055 (ea.)

Herbicide Mix #2

Free Acid Form

dalapon

1,000 µg/mL in acetonitrile, 1 mL/ampul
cat.# 32432 (ea.)

1,000 µg/mL in methanol, 1 mL/ampul
cat.# 32253 (ea.)

2,000 µg/mL in methanol, 1 mL/ampul
cat.# 32056 (ea.)

Derivatized Form

dalapon methyl ester

2,000 µg/mL in hexane, 1 mL/ampul
cat.# 32057 (ea.)

1,000 µg/mL in methanol, 1 mL/ampul
cat.# 32254 (ea.)

Herbicide Mix #3 (2 components)

Free Acid Form

MCPA
MCPP

20,000 µg/mL each in methanol, 1 mL/ampul
cat.# 32058 (ea.)

Derivatized Form

MCPA methyl ester
MCPP methyl ester

20,000 µg/mL each in hexane, 1 mL/ampul
cat.# 32059 (ea.)

MCPA

1,000 µg/mL in methanol, 1 mL/ampul
cat.# 32269 (ea.)

MCPP

1,000 µg/mL in methanol, 1 mL/ampul
cat.# 32271 (ea.)

Herbicide Mix #4 (8 components)

Free Acid Form

acifluorfen
bentazon
chloramben
DCPA diacid
3,5-dichlorobenzoic acid
4-nitrophenol
pentachlorophenol
picloram

200 µg/mL each in methanol, 1 mL/ampul
cat.# 32061 (ea.)

Derivatized Form

acifluorfen methyl ester
bentazon methyl ester
chloramben methyl ester
DCPA (Dacthal)
3,5-dichlorobenzoic acid methyl ester
4-nitroanisole
pentachloroanisole
picloram methyl ester

200 µg/mL each in hexane, 1 mL/ampul
cat.# 32062 (ea.)

Picloram

1,000 µg/mL in methanol, 1 mL/ampul
cat.# 32265 (ea.)

3,5-Dichlorobenzoic Acid Surrogate Standard

1,000 µg/mL in methyl *tert*-butyl ether, 1 mL/ampul
cat.# 31652 (ea.)

3,5-Dichlorobenzoic Acid Methyl Ester Surrogate Standard

1,000 µg/mL in methyl *tert*-butyl ether, 1 mL/ampul
cat.# 31649 (ea.)

1,000 µg/mL in methanol, 1 mL/ampul
cat.# 32264 (ea.)

Herbicides, Chlorinated Acid, *cont.*

Method 8321 (Chlorinated Acids by LC)

Chlorinated Acids by LC, Mix A (8 components)

acifluorfen (Blazer)
bentazon
chloramben
2,4-D
dicamba
dichlorprop
picloram
2,4,5-TP (Silvex)

1,000 µg/mL each in acetonitrile, 1 mL/ampul
cat.# 32431 (ea.)

Chlorinated Acids by LC, Mix B (8 components)

2,4-DB
3,5-dichlorobenzoic acid
dinoseb
MCPA
MCPP (mecoprop)
4-nitrophenol
pentachlorophenol
2,4,5-T

1,000 µg/mL each in acetonitrile, 1 mL/ampul
cat.# 32430 (ea.)

Chlorinated Acid Herbicide Mix (2 components)

2,4-dichlorophenoxyacetic acid (2,4-D)
2,4,5-TP (Silvex)

1,000 µg/mL each in acetonitrile, 1 mL/ampul
cat.# 32429 (ea.)

Dalapon (2,2-dichloropropionic acid)

1,000 µg/mL in acetonitrile, 1 mL/ampul
cat.# 32432 (ea.)

1,000 µg/mL in methanol, 1 mL/ampul
cat.# 32253 (ea.)

2,000 µg/mL in methanol, 1 mL/ampul
cat.# 32056 (ea.)

Herbicides, Phenoxyacid

Canadian Drinking Water Phenoxyacid Herbicides Mix (11 components)

bromoxynil
2,4-D
dicamba
2,4-dichlorophenol
diclofop methyl
dinoseb
pentachlorophenol
picloram
2,4,5-T
2,3,4,6-tetrachlorophenol
2,4,6-trichlorophenol

1,000 µg/mL each in acetone, 1 mL/ampul
cat.# 31868 (ea.)

Method 1311 (Toxicity Characteristics Leaching Procedure [TCLP])

TCLP Herbicide Mix (2 components)

2,4-D (free acid)
Silvex (free acid)

2,000 µg/mL each in methanol, 1 mL/ampul
cat.# 32014 (ea.)

Herbicides, Glyphosate

Method 547 (Glyphosate)

Glyphosate Standard

1,000 µg/mL in DI water, 1 mL/ampul
cat.# 32426 (ea.)

1,000 µg/mL in DI water, 5 mL/ampul
cat.# 32427 (ea.)

AMPA (glyphosate metabolite)

aminomethyl phosphonic acid (AMPA)

100 µg/mL in DI water, 1 mL/ampul
cat.# 32428 (ea.)

Herbicides, Paraquat/Diquat

Method 549.2 (Paraquat/Diquat)

Paraquat & Diquat Calibration Mix (2 components)

diquat dibromide
paraquat dichloride

1,000 µg/mL each in water, 1 mL/ampul
cat.# 32437 (ea.)

NEW!

Compound Index for Reference Standards

See **pages 730–736.**

Herbicides, Triazines

Canadian Drinking Water Triazine Herbicides Mix

(7 components)

alachlor
atrazine
cyanazine (Bladex)
metolachlor
metribuzin
prometryne
simazine

500 µg/mL each in acetone, 1 mL/ampul

cat.# 31864 (ea.)

Desethyl-atrazine

1,000 µg/mL in acetone, 1 mL/ampul

cat.# 32445 (ea.)

Desisopropylatrazine

1,000 µg/mL in acetone, 1 mL/ampul

cat.# 32446 (ea.)

Terbuthylazine

1,000 µg/mL in acetone, 1 mL/ampul

cat.# 32447 (ea.)

Propazine

1,000 µg/mL in acetone, 1 mL/ampul

cat.# 32448 (ea.)

Prometryne

1,000 µg/mL in acetone, 1 mL/ampul

cat.# 32449 (ea.)

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See **pages 438–439**.

Hormones

Method 539 (Hormones in Drinking Water)

EPA 539 Calibration Stock Standard (7 components)

- Contains the seven hormones listed in EPA Method 539 at the appropriate concentrations.
- Certified reference material (CRM) manufactured and QC-tested in Restek's ISO-accredited labs—satisfy your ISO requirements.
- Also available: UCMR3 Method 539 calibration standard with concentrations of 10–400 µg/mL to more conveniently match UCMR3 requirements (cat.# 32461).

4-androstene-3,17-dione	CAS # 63-05-8	100 µg/mL
equilin	CAS # 474-86-2	200
17-beta-estradiol	CAS # 50-28-2	250
estriol	CAS # 50-27-1	200
estrone	CAS # 53-16-7	200
17-alpha-ethynylestradiol	CAS # 57-63-6	350
testosterone	CAS # 58-22-0	100

In acetonitrile, 1 mL/ampul

cat.# 31998 (ea.)

NEW!

UCMR3 Method 539 Calibration Standard

(7 components)

- Contains the seven hormones listed in EPA Method 539 at concentrations suited for Unregulated Contaminant Monitoring Rule 3 (UCMR3) screening.
- Ideal for the analysis of finished drinking water as outlined in UCMR3, which requires monitoring of all public drinking water systems with 10,000 or more customers.
- Certified reference material (CRM) manufactured and QC-tested in Restek's ISO-accredited labs—satisfy your ISO requirements.
- Also available: EPA 539 calibration stock standard with concentrations of 100–350 µg/mL to more conveniently match EPA requirements (cat.# 31998).

4-androstene-3,17-dione	CAS # 63-05-8	30 µg/mL
equilin	CAS # 474-86-2	400
17-beta-estradiol	CAS # 50-28-2	40
estriol	CAS # 50-27-1	80
estrone	CAS # 53-16-7	200
17-alpha-ethynylestradiol	CAS # 57-63-6	90
testosterone	CAS # 58-22-0	10

In acetonitrile, 1 mL/ampul

cat.# 32461 (ea.)

NEW!

Hydrocarbons, Aromatic

Method 602 (Purgeable Aromatics)

602 Purgeable Aromatics Calibration Mix
(7 components)

benzene
chlorobenzene
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
ethylbenzene
toluene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30035 (ea.)

Method 8020 (Aromatic Volatile Organics)

Internal and Surrogate Standards for Method 8020

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

Compound	CAS #	Solvent	Conc.	cat.#
4-bromofluorobenzene	460-00-4	PTM	2,000	30026
1,4-difluorobenzene	540-36-3	PTM	2,000	30032
fluorobenzene	462-06-6	PTM	2,000	30030
α,α,α-trifluorotoluene	98-08-8	PTM	2,000	30048

PTM = Purge-and-trap grade methanol

8020A Calibration Mix (10 components)

benzene
chlorobenzene
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
ethylbenzene
toluene
m-xylene
o-xylene
p-xylene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30222 (ea.)

Method 609 (Nitroaromatics/Isophorone)

609 Nitroaromatics & Isophorone Calibration Mix
(4 components)

2,4-dinitrotoluene
isophorone
2,6-dinitrotoluene
nitrobenzene

2,000 µg/mL each in hexane, 1 mL/ampul
cat.# 31033 (ea.)

Hydrocarbons, Halogenated

Method 611 (Haloethers)

611 Haloethers Calibration Mix (5 components)

bis(2-chloroethoxy)methane
bis(2-chloroethyl)ether
bis(2-chloroisopropyl)ether
4-bromophenyl phenyl ether
4-chlorophenyl phenyl ether

2,000 µg/mL each in acetone, 1 mL/ampul
cat.# 31034 (ea.)

Method 612 (Chlorinated Hydrocarbons)

612 Chlorinated Hydrocarbons Calibration Mix
(9 components)

2-chloronaphthalene
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
hexachlorobenzene
hexachlorobutadiene
hexachlorocyclopentadiene
hexachloroethane
1,2,4-trichlorobenzene

2,000 µg/mL each in isooctane, 1 mL/ampul
cat.# 31035 (ea.)

Method 624 (Purgeable Halocarbons)

Volatiles MegaMix® Standard, EPA Method 624 (26 components)

MEGAMIX®

benzene
bromodichloromethane
bromoform
carbon tetrachloride
chlorobenzene
2-chloroethyl vinyl ether
chloroform
dibromochloromethane
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
1,1-dichloroethane
1,2-dichloroethane
1,1-dichloroethene
trans-1,2-dichloroethene
1,2-dichloropropane
cis-1,3-dichloropropene
trans-1,3-dichloropropene
ethylbenzene
methylene chloride
1,1,2,2-tetrachloroethane
tetrachloroethene
toluene
1,1,1-trichloroethane
1,1,2-trichloroethane
trichloroethene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30497 (ea.)

624 Internal Standard Mix (3 components)

bromochloromethane
2-bromo-1-chloropropane
1,4-dichlorobutane

1,500 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30023 (ea.)

624 Surrogate Standard Mix (3 components)

4-bromofluorobenzene
fluorobenzene
pentafluorobenzene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30243 (ea.)

Hydrocarbons, Halogenated, *cont.*

Method 624 (Purgeable Halocarbons), *cont.*

Surrogate Standard (2 components)

4-bromofluorobenzene
α,α,α-trifluorotoluene

2,500 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30484 (ea.)

624 Calibration Mix #1 (gases) (5 components)

bromomethane
chloroethane
chloromethane
trichlorofluoromethane (CFC-11)
vinyl chloride

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30020 (ea.)

624 Calibration Mix #2 (12 components)

benzene
carbon tetrachloride
chlorobenzene
2-chloroethyl vinyl ether
dibromochloromethane
1,1-dichloroethane
1,1-dichloroethene
1,2-dichloropropane
methylene chloride
tetrachloroethene
1,1,2-trichloroethane
trichloroethene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30021 (ea.)

624 Calibration Mix #3 (14 components)

bromodichloromethane
bromoform
chloroform
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
1,2-dichloroethane
trans-1,2-dichloroethene
cis-1,3-dichloropropene
trans-1,3-dichloropropene
ethylbenzene
1,1,2,2-tetrachloroethane
toluene
1,1,1-trichloroethane

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30022 (ea.)

NEW!

Compound Index for Reference Standards

See **pages 730–736.**

Method 8010 (Halogenated Volatile Organics)

502.2 Calibration Mix #1 (gases) (6 components)

bromomethane
chloroethane
chloromethane
dichlorodifluoromethane (CFC-12)
trichlorofluoromethane (CFC-11)
vinyl chloride

200 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30439 (ea.)

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30042 (ea.)

8010A Calibration Mix #2 (15 components)

benzyl chloride
bromodichloromethane
bromoform
carbon tetrachloride
chlorobenzene
1,2-dichlorobenzene
1,3-dichlorobenzene
1,1-dichloroethene
trans-1,2-dichloroethene
cis-1,3-dichloropropene
trans-1,3-dichloropropene
methylene chloride
tetrachloroethene
trichloroethene
1,2,3-trichloropropane

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30056 (ea.)

8010A Calibration Mix #3 (13 components)

bromobenzene
2-chloroethyl vinyl ether
chloroform
dibromochloromethane
dibromomethane
1,4-dichlorobenzene
1,1-dichloroethane
1,2-dichloroethane
1,2-dichloropropane
1,1,1,2-tetrachloroethane
1,1,2,2-tetrachloroethane
1,1,1-trichloroethane
1,1,2-trichloroethane

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30057 (ea.)

Note: Method 8010 does not specify internal standards to be used. The analyst must select appropriate internal standards based on the particular samples being analyzed. Potential internal standards are available. See pages 440–445.

BTEX Standard (6 components)

benzene
ethylbenzene
toluene
m-xylene
o-xylene
p-xylene

200 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30051 (ea.)

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30213 (ea.)

2,000 µg/mL each in P&T methanol (*m*- & *p*-xylene at 1,000 µg/mL), 1 mL/ampul
cat.# 30488 (ea.)

Method 8011 (1,2-Dibromoethane, 1,2-Dibromo-3-chloropropane)

8011 Calibration Mix—EDB/DBCP (2 components)

1,2-dibromo-3-chloropropane (DBCP)
1,2-dibromoethane (EDB)

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30062 (ea.)

Hydrocarbons, Polycyclic Aromatic (PAHs)

Method 610 (Polycyclic Aromatic Hydrocarbons [PAHs])

SV Calibration Mix #5 / 610 PAH Mix (16 components)

acenaphthene	chrysene
acenaphthylene	dibenzo(a,h)anthracene
anthracene	fluoranthene
benzo(a)anthracene	fluorene
benzo(a)pyrene	indeno(1,2,3-cd)pyrene
benzo(b)fluoranthene	naphthalene
benzo(k)fluoranthene	phenanthrene
benzo(ghi)perylene	pyrene

2,000 µg/mL each in methylene chloride, 1 mL/ampul

cat.# 31011 (ea.)

610 PAH Calibration Mix A (16 components)

For LC-fluorescence detection.

acenaphthene	1,000 µg/mL	chrysene	500
acenaphthylene	1,000	dibenzo(a,h)anthracene	500
anthracene	1,000	fluoranthene	500
benzo(a)anthracene	500	fluorene	1,000
benzo(a)pyrene	500	indeno(1,2,3-cd)pyrene	500
benzo(b)fluoranthene	500	naphthalene	1,000
benzo(k)fluoranthene	500	phenanthrene	500
benzo(ghi)perylene	500	pyrene	500

In methylene chloride, 1 mL/ampul

cat.# 31264 (ea.)

610 PAH Calibration Mix B (16 components)

For LC-UV detection.

acenaphthene	1,000 µg/mL	chrysene	100
acenaphthylene	2,000	dibenzo(a,h)anthracene	200
anthracene	100	fluoranthene	200
benzo(a)anthracene	100	fluorene	200
benzo(a)pyrene	100	indeno(1,2,3-cd)pyrene	100
benzo(b)fluoranthene	200	naphthalene	1,000
benzo(k)fluoranthene	100	phenanthrene	100
benzo(ghi)perylene	200	pyrene	100

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

cat.# 31455 (ea.)

Method 8100 (Polycyclic Aromatic Hydrocarbons [PAHs])

PAH Supplement Mix for Method 8100 (8 components)

benzo(j)fluoranthene	dibenzo(a,e)pyrene
dibenzo(a,h)acridine	dibenzo(a,h)pyrene
dibenzo(a,j)acridine	dibenzo(a,i)pyrene
7H-dibenzo(c,g)carbazole	3-methylcholanthrene

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

cat.# 31857 (ea.)

SV Calibration Mix #5 / 610 PAH Mix (16 components)

See cat.# 31011 (above).

Method 8310 (Polycyclic Aromatic Hydrocarbons [PAHs])

EPA Method 8310 PAH Mixture (18 components)

acenaphthene	dibenzo(a,h)anthracene
acenaphthylene	fluoranthene
anthracene	fluorene
benzo(a)anthracene	indeno(1,2,3-cd)pyrene
benzo(a)pyrene	1-methylnaphthalene
benzo(b)fluoranthene	2-methylnaphthalene
benzo(ghi)perylene	naphthalene
benzo(k)fluoranthene	phenanthrene
chrysene	pyrene

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

cat.# 31841 (ea.)

EPA Method 8310 Surrogate Standard

decafluorobiphenyl

1,000 µg/mL in acetonitrile, 1 mL/ampul

cat.# 31842 (ea.)

EPA Method 8310 Quality Control Check

(18 components)

acenaphthene	100 µg/mL	dibenzo(a,h)anthracene	10
acenaphthylene	100	fluoranthene	10
anthracene	100	fluorene	100
benzo(a)anthracene	10	indeno(1,2,3-cd)pyrene	10
benzo(a)pyrene	10	1-methylnaphthalene	100
benzo(b)fluoranthene	10	2-methylnaphthalene	100
benzo(ghi)perylene	10	naphthalene	100
benzo(k)fluoranthene	5	phenanthrene	100
chrysene	10	pyrene	10

In acetonitrile, 1 mL/ampul

cat.# 31843 (ea.)

8270 Calibration Mix #5, Revised (18 components)

acenaphthene	dibenzo(a,h)anthracene
acenaphthylene	fluoranthene
anthracene	fluorene
benz(a)anthracene	indeno(1,2,3-cd)pyrene
benzo(a)pyrene	1-methylnaphthalene
benzo(b)fluoranthene	2-methylnaphthalene
benzo(ghi)perylene	naphthalene
benzo(k)fluoranthene	phenanthrene
chrysene	pyrene

2,000 µg/mL each in methylene chloride, 1 mL/ampul

cat.# 31995 (ea.)

NEW!

Certified PAHs in Diesel (7 components)

acenaphthene*	2-methylnaphthalene*
acenaphthylene*	naphthalene*
fluorene*	phenanthrene*
1-methylnaphthalene*	

50,000 ppm diesel #2 in methylene chloride, 1 mL/ampul

cat.# 31673 (ea.)

*Concentration differs from lot to lot. See online certificate of analysis for certified concentrations.

Hydrocarbons, Polycyclic Aromatic (PAHs), *cont.*

Miscellaneous

MA EPH Aromatic Hydrocarbon Standard
(17 components)

acenaphthene
acenaphthylene
anthracene
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(k)fluoranthene
benzo(ghi)perylene
chrysene
dibenzo(a,h)anthracene
fluoranthene
fluorene
indeno(1,2,3-cd)pyrene
2-methylnaphthalene
naphthalene
phenanthrene
pyrene

1,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31458 (ea.)

MA Fractionation Surrogate Spike Mix (2 components)

2-bromonaphthalene
2-fluorobiphenyl

4,000 µg/mL each in hexane, 1 mL/ampul
cat.# 31480 (ea.)

MA Fractionation Check Mix (31 components)

PAHs:
acenaphthene
acenaphthylene
anthracene
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(k)fluoranthene
benzo(ghi)perylene
chrysene
dibenzo(a,h)anthracene
fluoranthene
fluorene
indeno(1,2,3-cd)pyrene
2-methylnaphthalene
naphthalene
phenanthrene
pyrene

Hydrocarbons:
n-nonane (C9)
n-decane (C10)
n-dodecane (C12)
n-tetradecane (C14)
n-hexadecane (C16)
n-octadecane (C18)
n-nonadecane (C19)
n-eicosane (C20)
n-docosane (C22)
n-tetracosane (C24)
n-hexacosane (C26)
n-octacosane (C28)
n-triacontane (C30)
n-hexatriacontane (C36)

25 µg/mL each in hexane, 1 mL/ampul
cat.# 31481 (ea.)

NJDEP EPH 10/08 Rev. 2 Aromatics Fractionation Check Mix (16 components)

acenaphthene
acenaphthylene
anthracene
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(ghi)perylene
benzo(k)fluoranthene
chrysene
dibenzo(a,h)anthracene
fluoranthene
fluorene
indeno(1,2,3-cd)pyrene
phenanthrene
pyrene
1,2,3-trimethylbenzene

400 µg/mL each in hexane:toluene (50:50), 5 mL/ampul
cat.# 30545 (ea.)

NJDEP EPH 10/08 Rev. 2 Aromatics Matrix Spike Mix
(18 components)

acenaphthene
acenaphthylene
anthracene
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(ghi)perylene
benzo(k)fluoranthene
chrysene
dibenzo(a,h)anthracene
fluoranthene
fluorene
indeno(1,2,3-cd)pyrene
2-methylnaphthalene
naphthalene
phenanthrene
pyrene
1,2,3-trimethylbenzene

200 µg/mL each in acetone:toluene (50:50), 5 mL/ampul
cat.# 30543 (ea.)

WA EPH Aromatic Hydrocarbon Standard
(18 components)

acenaphthene
acenaphthylene
anthracene
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(k)fluoranthene
benzo(ghi)perylene
chrysene
dibenzo(a,h)anthracene
fluoranthene
fluorene
indeno(1,2,3-cd)pyrene
2-methylnaphthalene
naphthalene
phenanthrene
pyrene
1,2,3-trimethylbenzene

1,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31469 (ea.)

WA EPH Aromatic Hydrocarbon Mix (6 components)

acenaphthene
benzo(ghi)perylene
naphthalene
pyrene
toluene
1,2,3-trimethylbenzene

1,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31488 (ea.)

Naphthalene-d8

2,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31043 (ea.)

Method 525.2 Fortification Recovery Standard

p-terphenyl-d14

1,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31828 (ea.)

Restek Offers a Full Line of Certified Reference Materials
See **pages 438–439**.
QUALITY ISO 9001 • 17025 • Guide 34
www.restek.com/iso

Hydrocarbons, Polycyclic Aromatic (PAHs), *cont.*

Miscellaneous, *cont.*

SV Internal Standard Mix (6 components)

acenaphthene-d10
chrysene-d12
1,4-dichlorobenzene-d4
naphthalene-d8
perylene-d12
phenanthrene-d10

Each	15-pk.	25-pk.
2,000 µg/mL each in methylene chloride, 1 mL/ampul		
31206	31206.15	31206.25
4,000 µg/mL each in methylene chloride, 1 mL/ampul		
31006	31006.15	31006.25

Revised SV Internal Standard Mix (7 components)

acenaphthene-d10
chrysene-d12
1,4-dichlorobenzene-d4
1,4-dioxane-d8
naphthalene-d8
perylene-d12
phenanthrene-d10

Each	15-pk.	25-pk.
2,000 µg/mL each in methylene chloride, 1 mL/ampul		
31885	31885.15	31885.25
4,000 µg/mL each in methylene chloride, 1 mL/ampul		
31886	31886.15	31886.25

B/N Surrogate Mix (4/89 SOW) (3 components)

2-fluorobiphenyl
nitrobenzene-d5
p-terphenyl-d14

Each	15-pk.	25-pk.
1,000 µg/mL each in methylene chloride, 1 mL/ampul		
31024	31024.15	31024.25
5,000 µg/mL each in methylene chloride, 1 mL/ampul		
31062	31062.15	31062.25
5,000 µg/mL each in methylene chloride, 5 mL/ampul		
31086	31086.15	31086.25
5,000 µg/mL each in methylene chloride, 10 mL/ampul		
33028	33028.15	33028.25

Revised B/N Surrogate Mix (4 components)

2-fluorobiphenyl
nitrobenzene-d5
p-terphenyl-d14
pyrene-d10

Each	15-pk.	25-pk.
1,000 µg/mL each in methylene chloride, 1 mL/ampul		
31887	31887.15	31887.25
5,000 µg/mL each in methylene chloride, 1 mL/ampul		
31888	31888.15	31888.25
5,000 µg/mL each in methylene chloride, 5 mL/ampul		
31889	31889.15	31889.25

Hydrocarbons, Petroleum

Fuels & Products

Aviation Gas

Aviation Gas Standard

100-octane, low-lead fuel used in piston-type aircraft.

2,500 µg/mL in P&T methanol, 1 mL/ampul	cat.# 30094 (ea.)
50,000 µg/mL in P&T methanol, 1 mL/ampul	cat.# 30207 (ea.)

Hydrocarbons, Petroleum, *cont.*

Fuels & Products, *cont.*

BTEX

See page 458.

Creosote Oil

Creosote Oil Standard

- For total petroleum hydrocarbon pattern recognition of creosote oil.
- High concentration—50,000 µg/mL in methylene chloride.

Creosote oil, a widely used wood preservative produced by distilling coal tar, contains chemicals that are classified as carcinogens (e.g., benzo(a)pyrene).

50,000 µg/mL in methylene chloride, 1 mL/ampul	cat.# 31838 (ea.)

Diesel

See pages 458–459.

Fuel Oil

Fuel Oil #4 Standard

Fuel oil #4 is typically used in limited applications in which the fuel cannot be preheated prior to burning. The fuel is a blend of distillate (fuel oil #2) and residual (fuel oil #6) to meet ASTM viscosity specifications. The fuel oil #4 used to prepare this mixture has a kinematic viscosity of 21.9 at 38 °C (100 °F), measured using ASTM D-445.

5,000 µg/mL in methylene chloride, 1 mL/ampul	cat.# 31216 (ea.)
50,000 µg/mL in methylene chloride, 1 mL/ampul	cat.# 31244 (ea.)

Fuel Oil #5 Standard

Fuel oil #5 is typically used in applications in which there is little or no preheating of the fuel prior to burning. A blend of distillate (fuel oil #2) and residual (fuel oil #6), the fuel oil #5 used to prepare this mixture has a kinematic viscosity of 106.5 at 38 °C (100 °F), measured using ASTM D-445.

5,000 µg/mL in methylene chloride, 1 mL/ampul	cat.# 31217 (ea.)
50,000 µg/mL in methylene chloride, 1 mL/ampul	cat.# 31246 (ea.)

Hydrocarbons, Petroleum, *cont.*

Fuels & Products, *cont.*

Fuel Oil, *cont.*

Fuel Oil #6 Standard

This fuel, sometimes called bunker C or residual, is a black viscous oil. Applications in which it may be used require the ability to preheat the fuel prior to pumping and burning.

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31218 (ea.)

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31248 (ea.)

50,000 µg/mL in methylene chloride, 5 mL/ampul
cat.# 31249 (ea.)

Fuel Oil Degradation Mix (4 components)

Subsurface degradation of fuel oil spills can be estimated by examining the ratios of C17/pristane and C18/phytane.[1] To assist in identifying these four compounds from the complex fuel oil analysis, we offer a product that contains these compounds for retention time determination.

heptadecane (C17)
octadecane (C18)
pristane (2,6,10,14-tetramethylpentadecane)
phytane (2,6,10,14-tetramethylhexadecane)

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31240 (ea.)

[1]Interpretation of Gas Chromatographic Data in Subsurface Hydrocarbon Investigations, R. Senn and M. Johnson, Ground Water Monitoring Review, Winter 1987.

Gasoline

See page 464.

Hydraulic Oil

Hydraulic Oil Standard

- For total petroleum hydrocarbon pattern recognition of hydraulic oil.
- High concentration—50,000 µg/mL in methylene chloride.

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31839 (ea.)

Jet Fuel

JP-4 Military Fuel Standard

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31219 (ea.)

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31250 (ea.)

50,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30472 (ea.)

JP-5 Military Fuel Standard

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31220 (ea.)

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31252 (ea.)

JP-8 Military Fuel Standard

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31262 (ea.)

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31254 (ea.)

Jet Fuel A Standard

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31215 (ea.)

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31242 (ea.)

50,000 µg/mL in methylene chloride, 5 mL/ampul
cat.# 31243 (ea.)

Kerosene

Kerosene Standard

Prepared from a single-source (one-refinery) product.

kerosene: unweathered

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31229 (ea.)

Kerosene Composite Standard

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31094 (ea.)

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31256 (ea.)

50,000 µg/mL in methylene chloride, 5 mL/ampul
cat.# 31257 (ea.)

Leaking Underground Storage Tank (LUST)

See pages 555–567.

Hydrocarbons, Petroleum, *cont.*

Fuels & Products, *cont.*

Mineral Spirits

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

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

Mineral Spirits Standards (Unweathered)

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31225 (ea.)

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31260 (ea.)

50,000 µg/mL in methylene chloride, 5 mL/ampul
cat.# 31261 (ea.)

Stoddard Solvent Standard

Stoddard solvent is also known as Type I mineral spirits, Texsolve S, or Varsol® 1 mineral spirits. We offer this reference material for those who need to calibrate Stoddard solvent separately. This standard is dissolved in methanol for analysis by either direct injection or purge-and-trap.

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

Motor Oil

Motor Oil Composite Standard

Prepared from an equal-volume blend of 5W30, 10W30, 10W40, and 20W50 motor oils. After blending, a precisely weighed amount of the composite is added to a volumetric flask to produce the standard.

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31464 (ea.)

Used Motor Oil Composite Standard

Prepared from an equal-volume blend from five gasoline-powered vehicles (belonging to Restek employees). After blending, a precisely weighed amount of the composite is added to a volumetric flask to produce the standard.

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31465 (ea.)

Stoddard Solvent

See cat.# 30487 (left).

Hydrocarbons, Petroleum, *cont.*

Retention Time Markers

Used during initial sample screening to determine retention time windows for each petroleum product. Gasoline generally elutes in the window from C6 to C10 (or C12), and diesel fuel from C10 (or C12) to C24 (or C28). Retention above C24 (or C28) indicates oil or lubricant contamination.

Leaking Underground Storage Tank Retention Time Standard (7 components)

n-hexane (C6)
n-decane (C10)
n-dodecane (C12)
n-tetracosane (C24)
n-octacosane (C28)
n-triacontane (C30)
n-tetracontane (C40)

25 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31200 (ea.)

Retention Time Marker Standard (3 components)

n-decane (C10)
n-pentacosane (C25)
n-hexatriacontane (C36)

1,000 µg/mL each in hexane, 1 mL/ampul
cat.# 31637 (ea.)

Retention Time Marker (3 components)

n-hexane (C6)
n-decane (C10)
n-dodecane (C12)

1,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30483 (ea.)

TNRCC 1005 Retention Time Markers Mix (4 components)

n-hexane (C6)
n-dodecane (C12)
n-octacosane (C28)
n-pentatriacontane (C35)

200 µg/mL each in pentane, 1 mL/ampul
cat.# 31698 (ea.)

TNRCC 1006 Retention Time Marker Mix (9 components)

n-hexane (C6)
n-heptane (C7)
n-octane (C8)
n-decane (C10)
n-dodecane (C12)
n-hexadecane (C16)
n-heneicosane (C21)
n-octacosane (C28)
n-pentatriacontane (C35)

200 µg/mL in pentane, 1 mL/ampul
cat.# 31814 (ea.)

Retention Time Marker - Alaska (4 components)

n-hexane (C6)
n-decane (C10)
n-pentacosane (C25)
n-hexatriacontane (C36)

1,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31819 (ea.)

Alternate Boiling Point/Carbon Number Distribution Marker Stock Standard (9 components)

n-hexane (C6)
n-octane (C8)
n-decane (C10)
n-dodecane (C12)
n-hexadecane (C16)
n-heneicosane (C21)
n-octacosane (C28)
n-pentatriacontane (C35)
n-hexatriacontane (C36)

200 µg/mL each in pentane, 1 mL/ampul
cat.# 31639 (ea.)

CCME F1 Retention Time Marker (3 components)

n-decane (C10)
n-hexane (C6)
toluene

2,000 µg/mL each in methanol, 1 mL/ampul
cat.# 30611 (ea.)

Hydrocarbons, Petroleum, *cont.*

Total Petroleum Hydrocarbons (TPH)

Method 418.1 (Total Recoverable Petroleum Hydrocarbons [TRPH])

418.1 Calibration Mix (3 components)

Method 418.1 is an infrared spectrophotometric method for determining Total Recoverable Petroleum Hydrocarbons (TRPH). Dilute this mixture 1:200 to make the stock mixture specified in section 6.5.2 of Method 418.1.

chlorobenzene	25.0% (v/v)
n-hexadecane	37.5%
isooctane	37.5%

1 mL/ampul

cat.# 30080 (ea.)

Miscellaneous

Glycols Standard (2 components)

ethylene glycol
propylene glycol

50,000 µg/mL each in DI water, 1 mL/ampul

cat.# 30471 (ea.)

NW TPH-Dx Surrogate Mix Standards

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

Compound	CAS #	Solvent	Conc.	cat.#
2-fluorobiphenyl	321-60-8	D	10,000	31096
o-terphenyl	84-15-1	D	10,000	31097
p-terphenyl	92-94-4	D	10,000	31095
pentacosane (C25)	629-99-2	D	10,000	31487

D = methylene choride

TX TPH Locator Mix (3 components)

n-hexane (C6)
n-decane (C10)
n-octacosane (C28)

200 µg/mL each in pentane, 1 mL/ampul

cat.# 31482 (ea.)

TX TPH Calibration Mix (2 components)

diesel fuel #2 composite
unleaded gasoline composite

10,000 µg/mL each in pentane, 1 mL/ampul

cat.# 31483 (ea.)

TX TPH Matrix Spike Mix (2 components)

diesel fuel #2 composite
unleaded gasoline composite

10,000 µg/mL each in P&T methanol, 1 mL/ampul

cat.# 31484 (ea.)

Miscellaneous, *cont.*

CCME PHC Calibration Mix (3 components)

- Meets CCME 2001 Petroleum Hydrocarbons in Soil Method—Tier 1.
- Primary reference calibration standards for quantification of four fractions.

n-decane (C10)
n-hexadecane (C16)
n-tetratriacontane (C34)

5,000 µg/mL each in toluene, 1 mL/ampul

cat.# 31684 (ea.)

α,α,α-Trifluorotoluene

2,000 µg/mL in P&T methanol, 1 mL/ampul

cat.# 30048 (ea.)

2,500 µg/mL in P&T methanol, 1 mL/ampul

cat.# 30068 (ea.)

10,000 µg/mL in P&T methanol, 1 mL/ampul

cat.# 30083 (ea.)

1-Chlorooctane

10,000 µg/mL in P&T methanol, 1 mL/ampul

cat.# 30084 (ea.)

1-Chlorooctadecane

10,000 µg/mL in methylene chloride, 1 mL/ampul

cat.# 31098 (ea.)

Weathered Petrochemical Solutions

See pages 454–455.

NEW!

Compound Index for Reference Standards

See **pages 730–736.**

Isocyanates

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

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 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)piperzine (1-2pp) derivative.

Isocyanates Singles

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

Compound	CAS #	Solvent	Conc.	cat.#
2,6-TDIP	195625-39-9	DMSO	1,000	33000
2,4-TDIP	72375-21-4	DMSO	1,000	33001
1,6-HDIP	72375-27-0	DMSO	1,000	33002
4,4'-MDIP	72375-24-7	DMSO	1,000	33003

DMSO = dimethyl sulfoxide

Formaldehyde Oxazoladine

2,000 µg/mL in toluene, 1 mL/ampul
cat.# 33004 (ea.)

Jet Fuel

See page 476.

Kerosene

See page 476.

Ketones

VOA Calibration Mix #1 (ketones) (4 components)

acetone
2-butanone (MEK)
2-hexanone
4-methyl-2-pentanone (MIBK)

5,000 µg/mL each in P&T methanol:water (90:10), 1 mL/ampul
cat.# 30006 (ea.)

Ketones Mix, 524.2 Rev. 4.1 (5 components)

acetone
2-butanone (MEK)
1,1-dichloro-2-propanone
2-hexanone
4-methyl-2-pentanone (MIBK)

5,000 µg/mL each in P&T methanol:water (90:10), 1 mL/ampul
cat.# 30602 (ea.)

Ketones, *cont.*

Aldehyde-Ketone-DNPH TO-11A Calibration Mix (15 components)

acetaldehyde-DNPH
acetone-DNPH
acrolein-DNPH
benzaldehyde-DNPH
n-butyraldehyde-DNPH
crotonaldehyde-DNPH
2,5-dimethylbenzaldehyde-DNPH
formaldehyde-DNPH
hexaldehyde-DNPH
isovaleraldehyde-DNPH
propionaldehyde-DNPH
m-tolualdehyde-DNPH
o-tolualdehyde-DNPH
p-tolualdehyde-DNPH
valeraldehyde-DNPH

15 µg/mL each in acetonitrile, 1 mL/ampul*
cat.# 31808 (ea.)

*Concentration calculated as the aldehyde/ketone.

Leaking Underground Storage Tank (LUST)

See pages 555–567.

Nitriles

8240 Nitriles Mix (7 components)

acrylonitrile
ethyl methacrylate
malononitrile
methacrylonitrile
methyl methacrylate
propionitrile
styrene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30215 (ea.)

Method 603 (Acrolein/Acrylonitrile)

Acrolein/Acrylonitrile (2 components)

acrolein
acrylonitrile

2,000 µg/mL each in DI water, 1 mL/ampul
cat.# 30600 (ea.)

Must ship overnight on ice.
This product has a limited shelf life. We recommend that you order only the ampul quantity that meets your immediate needs.

Acrolein

5,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30645 (ea.)

5,000 µg/mL in water, 1 mL/ampul
cat.# 30646 (ea.)

This product has a limited shelf life. We recommend that you order only the ampul quantity that meets your immediate needs.

Acrylonitrile

2,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30246 (ea.)

Nitroaromatics & Nitramines

See pages 461 and 462.

Nitrosamines

Method 521 (Nitrosamines)

Nitrosamine Calibration Mix, Method 521

(7 components)

N-nitrosodiethylamine
N-nitrosodimethylamine
N-nitrosodi-*n*-butylamine
N-nitrosodi-*n*-propylamine
N-nitrosomethylethylamine
N-nitrosopiperidine
N-nitrosopyrrolidine

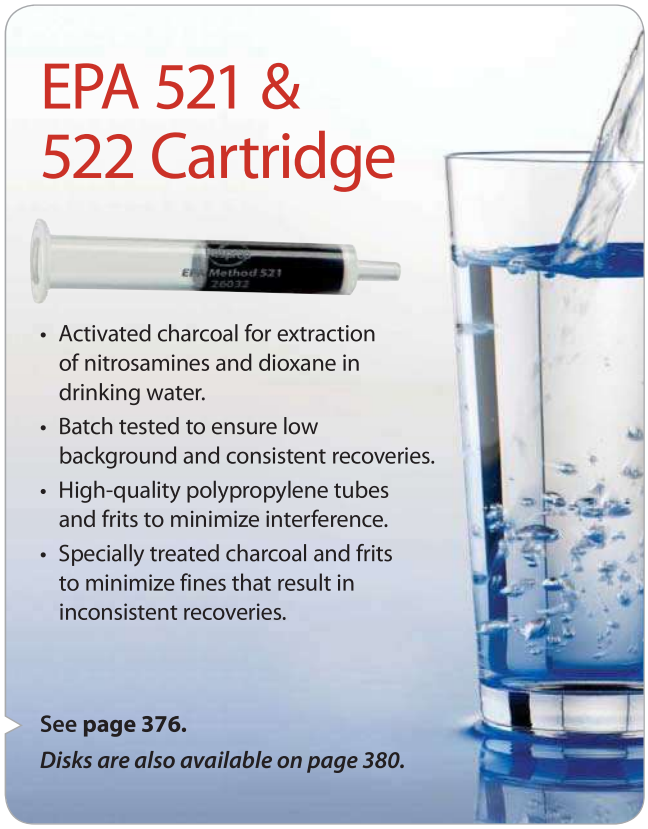
1,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31898 (ea.)

N-Nitrosodimethylamine-d6

1,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 33910 (ea.)

N-Nitrosodi-*n*-propylamine-d14

1,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 33911 (ea.)



Method 522 (1,4-Dioxane)

Tetrahydrofuran-d8 Standard

2,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30112 (ea.)

1,4-Dioxane-d8

2,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30614 (ea.)

1,4-Dioxane

2,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30287 (ea.)

2,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31853 (ea.)

1.9 mg/mL in dimethyl sulfoxide, 1 mL/ampul
cat.# 36294 (ea.)

Method 607 (Nitrosamines)

607 Nitrosamines Calibration Mix (3 components)

N-nitrosodimethylamine
N-nitroso-di-*n*-propylamine
N-nitrosodiphenylamine

2,000 µg/mL each in methanol, 1 mL/ampul
cat.# 31032 (ea.)

Oil & Grease

Method 1664 (Oil & Grease)

Method 1664 Oil & Grease Standard (2 components)

n-hexadecane (C16)
stearic acid

2,000 µg/mL each in acetone, 10 mL/ampul
cat.# 31954 (ea.)

NEW!

Method 1664 Oil & Grease Mix (2 components)

n-hexadecane (C16)
stearic acid

4,000 µg/mL each in acetone, 5 mL/ampul
cat.# 31457 (ea.)

Organometallics/Organotin

Complete data pack available for audit compliance.

Butyltin Chloride Calibration Mixture (4 components)

butyltin trichloride
dibutyltin dichloride
tetrabutyltin
tributyltin chloride

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31472 (ea.)

Tributyltin Chloride Calibration Mixture

2,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31478 (ea.)

Phenyltin Chloride Calibration Mixture (4 components)

diphenyltin dichloride
phenyltin trichloride
tetraphenyltin
triphenyltin chloride

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31473 (ea.)

Tri-*n*-propyltin Chloride Surrogate

2,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31476 (ea.)

Tripentyltin Chloride Surrogate

2,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31477 (ea.)

Tetra-*n*-propyltin Internal Standard

2,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31474 (ea.)

Tetrapentyltin Internal Standard

2,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31475 (ea.)

Oxygenates/Ethers

California Oxygenates Mix (5 components)

diisopropyl ether (DIPE) 2,000 µg/mL
ethyl-*tert*-butyl ether (ETBE) 2,000
tert-amyl methyl ether (TAME) 2,000
tert-butyl alcohol 10,000
methyl *tert*-butyl ether (MTBE) 2,000

In P&T methanol, 1 mL/ampul
cat.# 30465 (ea.)

Oxygenates (6 components)

tert-amyl ethyl ether (TAEE) 2,000 µg/mL
tert-amyl methyl ether (TAME) 2,000
tert-butyl alcohol (TBA) 10,000
diisopropyl ether (DIPE) 2,000
ethyl-*tert*-butyl ether (ETBE) 2,000
methyl *tert*-butyl ether (MTBE) 2,000

In P&T methanol, 1 mL/ampul
cat.# 30626 (ea.)

Single-Component Oxygenates Solutions

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

Compound	CAS #	Solvent	Conc.	cat.#
tert-amyl alcohol	75-85-4	PTM	10,000	30631
tert-amyl ethyl ether (TAEE)	919-94-8	PTM	2,000	30617
tert-amyl methyl ether (TAME)	994-05-8	PTM	2,000	30629
tert-butanol	75-65-0	PTM	50,000	30470
tert-butanol-d9	25725-11-5	PTM	20,000	30618
diisopropyl ether (DIPE)	108-20-3	PTM	2,000	30627
ethanol	64-17-5	PTM	2,000	30288
ethanol	64-17-5	W	10,000	30466
ethyl-*tert*-butyl ether (ETBE)	637-92-3	PTM	2,000	30628
methanol	67-56-1	W	10,000	30467
methyl *tert*-butyl ether (MTBE)	1634-04-4	PTM	2,000	30402

PTM = purge-and-trap grade methanol; W = DI water

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Pesticides, Carbamate

Method 531.1, 531.2 (Carbamates)

531.1 Internal Standard

4-bromo-3,5-dimethylphenyl-N-methylcarbamate (BDMC)

100 µg/mL in methanol, 1 mL/ampul

cat.# 32274 (ea.)

531.1 Performance Check Mix (4 components)

aldicarb sulfoxide	100 µg/mL	3-hydroxycarbofuran	2
BDMC	10	methiocarb	20

In methanol, 1 mL/ampul

cat.# 32275 (ea.)

531.1 Carbamate Pesticide Calibration Mixture

(10 components)

aldicarb
aldicarb sulfone
aldicarb sulfoxide
carbaryl (Sevin)
carbofuran
3-hydroxycarbofuran
methiocarb
methomyl
oxamyl
propoxur (Baygon)

100 µg/mL each in methanol, 1 mL/ampul

cat.# 32273 (ea.)

531.2 Carbamate Pesticide Calibration Mixture

(11 components)

- Complete set of materials for N-methylcarbamoyloximes and N-methylcarbamates.
- New mix satisfies latest update of EPA Method 531.2.
- Formulated in acetonitrile for stability and convenience for LC analysis.

aldicarb
aldicarb sulfone
aldicarb sulfoxide
carbaryl (Sevin)
carbofuran
3-hydroxycarbofuran
methiocarb
methomyl
1-naphthol
oxamyl
propoxur (Baygon)

100 µg/mL in acetonitrile, 1 mL/ampul

cat.# 32435 (ea.)

Canada

Canadian Drinking Water Carbamates Mix

(5 components)

aldicarb
bendiocarb
carbaryl (Sevin)
carbofuran
triallate

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

cat.# 31865 (ea.)

Pesticides, Chlorinated Disinfection By-Products, Pesticides & Herbicides

Method 551 (Chlorinated Disinfection By-Products, Pesticides & Herbicides)

551.1 Internal Standard

1-bromo-4-fluorobenzene

1,000 µg/mL in acetone, 1 mL/ampul

cat.# 31854 (ea.)

551.1 Surrogate Standard

decafluorobiphenyl

1,000 µg/mL in acetone, 1 mL/ampul

cat.# 31855 (ea.)

Method 551.1 Pesticide/Herbicide Mix (16 components)

alachlor
atrazine
bromacil
cyanazine (Bladex)
endrin
endrin aldehyde
endrin ketone
γ-BHC (lindane)
heptachlor
heptachlor epoxide (isomer B)
hexachlorobenzene
hexachlorocyclopentadiene
methoxychlor
metolachlor
simazine
trifluralin

1,000 µg/mL each in acetone, 1 mL/ampul

cat.# 32438 (ea.)

Chloral Hydrate

1,000 µg/mL in acetonitrile, 1 mL/ampul

cat.# 30609 (ea.)

Disinfection By-Product and Chlorinated Solvents Mix

(19 components)

bromochloroacetonitrile
bromodichloromethane
bromoform
carbon tetrachloride
chloroform
chloropicrin
dibromoacetonitrile
dibromochloromethane
1,2-dibromo-3-chloropropane (DBCP)
1,2-dibromoethane (EDB)
dichloroacetonitrile
1,1-dichloro-2-propanone
tetrachloroethylene
trichloroacetonitrile
1,1,1-trichloroethane
1,1,2-trichloroethane
trichloroethylene
1,2,3-trichloropropane
1,1,1-trichloro-2-propanone

2,000 µg/mL each in acetone, 1 mL/ampul

cat.# 30615 (ea.)

Disinfection By-Product Mix (7 components)

bromochloroacetonitrile
chloropicrin
dibromoacetonitrile
dichloroacetonitrile
1,1-dichloro-2-propanone
trichloroacetonitrile
1,1,1-trichloro-2-propanone

2,000 µg/mL each in acetone, 1 mL/ampul

cat.# 30616 (ea.)

Pesticides, Chlorinated/Organochlorine/Organohalide

Method 508 (Chlorinated Pesticides)

508.1 Internal Standard

pentachloronitrobenzene

100 µg/mL in ethyl acetate, 1 mL/ampul
cat.# 32091 (ea.)

508.1 Surrogate

4,4'-dibromobiphenyl

500 µg/mL in ethyl acetate, 1 mL/ampul
cat.# 32092 (ea.)

508.1 GC Degradation Check Mix (2 components)

4,4'-DDT
endrin

100 µg/mL each in ethyl acetate, 1 mL/ampul
cat.# 32093 (ea.)

508 Performance Check Mix (4 components)

δ-BHC	0.4 µg/mL	chlorpyrifos	0.02
chlorothalonil	0.5	DCPA (Dacthal)	0.5

In methyl *tert*-butyl ether, 1 mL/ampul
cat.# 32045 (ea.)

508.1 Calibration Mix #1 (17 components)

aldrin
α-BHC
β-BHC
δ-BHC
γ-BHC (lindane)
4,4'-DDD
4,4'-DDE
4,4'-DDT
dieldrin
endosulfan I
endosulfan II
endosulfan sulfate
endrin
endrin aldehyde
heptachlor
heptachlor epoxide (isomer B)
methoxychlor

500 µg/mL each in ethyl acetate, 1 mL/ampul
cat.# 32094 (ea.)

508.1 Calibration Mix #2 (11 components)

chlorobenzilate
cis-chlordane
trans-chlordane
chlorneb
DCPA (Dacthal)
etridiazole
hexachlorobenzene
cis-permethrin*
trans-permethrin*
propachlor
trifluralin

500 µg/mL each in ethyl acetate, 1 mL/ampul
cat.# 32095 (ea.)

*1,000 µg/mL total permethrin. Exact content of each isomer is listed on certificate of analysis.

508.1 Calibration Mix #3 (8 components)

alachlor
atrazine
chlorothalonil
cyanazine
hexachlorocyclopentadiene
metolachlor
metribuzin
simazine

500 µg/mL each in ethyl acetate, 1 mL/ampul
cat.# 32096 (ea.)

Toxaphene Solutions

toxaphene

1,000 µg/mL in hexane, 1 mL/ampul
cat.# 32005 (ea.)

2,000 µg/mL in methanol, 1 mL/ampul
cat.# 32015 (ea.)

5,000 µg/mL in isooctane, 1 mL/ampul
cat.# 32071 (ea.)

Organochlorine Pesticide System Evaluation Mix

(2 components)

- Designed for daily assessment of system performance.
- Reveals active sites in the injection port and/or GC column.
- Prepared in MTBE—low expansion volume helps minimize backflash.

4,4'-DDT	200 µg/mL
endrin	100 µg/mL

In methyl *tert*-butyl ether, 1 mL/ampul
cat.# 32417 (ea.)

Decachlorobiphenyl, 508A

decachlorobiphenyl (BZ #209)

200 µg/mL in acetone, 1 mL/ampul
cat.# 32029 (ea.)

200 µg/mL in acetone, 5 mL/ampul
cat.# 32030 (ea.)

10 µg/mL in isooctane, 1 mL/ampul
cat.# 32289 (ea.)

508.1 Pesticide Kit

Contains 1 mL each of these mixtures.
32045: 508 Performance Check Mix
32091: 508.1 Internal Standard Mix
32092: 508.1 Surrogate Mix
32093: 508.1 GC Degradation Check Mix
32094: 508.1 Calibration Mix #1
32095: 508.1 Calibration Mix #2
32096: 508.1 Calibration Mix #3

cat.# 32097 (kit) kit

Pesticides, Chlorinated/Organochlorine/Organohalide, *cont.*

Method 508 (Chlorinated Pesticides), *cont.*

Endrin Standard

1,000 µg/mL in acetone, 1 mL/ampul
cat.# 32463 (ea.)

NEW!

Endrin Ketone Standard

1,000 µg/mL in acetone, 1 mL/ampul
cat.# 32464 (ea.)

NEW!

Endosulfan I Standard

1,000 µg/mL in acetone, 1 mL/ampul
cat.# 32465 (ea.)

NEW!

Endosulfan II Standard

1,000 µg/mL in acetone, 1 mL/ampul
cat.# 32466 (ea.)

NEW!

Endosulfan Sulfate Standard

1,000 µg/mL in acetone, 1 mL/ampul
cat.# 32467 (ea.)

NEW!

Endrin Aldehyde Standard

1,000 µg/mL in acetone, 1 mL/ampul
cat.# 32468 (ea.)

NEW!

Method 505 (Organohalide Pesticides & PCBs)

505 Organohalide Pesticide Mix (16 components)

aldrin
alachlor
atrazine
γ-BHC (lindane)
cis-chlordane
trans-chlordane
dieldrin
endrin
heptachlor
heptachlor epoxide (isomer B)
hexachlorobenzene
hexachlorocyclopentadiene
methoxychlor
cis-nonachlor
trans-nonachlor
simazine

200 µg/mL each in methanol, 1 mL/ampul
cat.# 32024 (ea.)

Toxaphene Solutions

See cat.#s 32005, 32015, and 32071 on page 484.

Method 608 (Organochlorine Pesticides & PCBs)

608 Calibration Mix (16 components)

aldrin
α-BHC
β-BHC
δ-BHC
γ-BHC (lindane)
4,4'-DDD
4,4'-DDE
4,4'-DDT
dieldrin
endosulfan I
endosulfan II
endosulfan sulfate
endrin
endrin aldehyde
heptachlor
heptachlor epoxide (isomer B)

200 µg/mL each in hexane:toluene (1:1), 1 mL/ampul
cat.# 32022 (ea.)

608 Complete Kit

Contains 1 mL each of these mixtures.
32022: 608 Calibration Mix
32006: Aroclor 1016
32007: Aroclor 1221
32008: Aroclor 1232
32009: Aroclor 1242
32010: Aroclor 1248
32011: Aroclor 1254
32012: Aroclor 1260
32005: toxaphene
32021: chlordane

cat.# 32060 (kit)

kit

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Pesticides, Chlorinated/Organochlorine/Organohalide, *cont.*

Method 8080, 8081 (Chlorinated Pesticides)

Organochlorine Pesticide Mix AB #1 (20 components)

aldrin	dieldrin
α-BHC	endosulfan I
β-BHC	endosulfan II
δ-BHC	endosulfan sulfate
γ-BHC (lindane)	endrin
cis-chlordane	endrin aldehyde
trans-chlordane	endrin ketone
4,4'-DDD	heptachlor
4,4'-DDE	heptachlor epoxide (isomer B)
4,4'-DDT	methoxychlor

200 µg/mL each in hexane:toluene (1:1), 1 mL/ampul
cat.# 32291 (ea.)

Organochlorine Pesticide Mix AB #2 (20 components)

aldrin	8 µg/mL	dieldrin	16
α-BHC	8	endosulfan I	8
β-BHC	8	endosulfan II	16
δ-BHC	8	endosulfan sulfate	16
γ-BHC (lindane)	8	endrin	16
cis-chlordane	8	endrin aldehyde	16
trans-chlordane	8	endrin ketone	16
4,4'-DDD	16	heptachlor	8
4,4'-DDE	16	heptachlor epoxide (isomer B)	8
4,4'-DDT	16	methoxychlor	80

In hexane:toluene (1:1), 1 mL/ampul
cat.# 32292 (ea.)

Organochlorine Pesticide Mix AB # 3 (20 components)

aldrin	dieldrin
α-BHC	endosulfan I
β-BHC	endosulfan II
δ-BHC	endosulfan sulfate
γ-BHC (lindane)	endrin
cis-chlordane	endrin aldehyde
trans-chlordane	endrin ketone
4,4'-DDD	heptachlor
4,4'-DDE	heptachlor epoxide (isomer B)
4,4'-DDT	methoxychlor

2,000 µg/mL each in hexane:toluene (1:1), 1 mL/ampul
cat.# 32415 (ea.)

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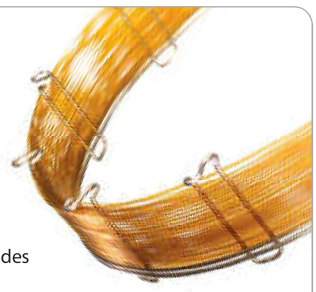

See **pages 62–63**.

Pesticide Surrogate Mix (2 components)

decachlorobiphenyl
2,4,5,6-tetrachloro-*m*-xylene

200 µg/mL each in acetone, 1 mL/ampul
cat.# 32000 (ea.)

200 µg/mL each in acetone, 5 mL/ampul
cat.# 32457 (ea.)

Pesticide Surrogate Mix (2 components)

decachlorobiphenyl	200 µg/mL
2,4,5,6-tetrachloro-*m*-xylene	100

In acetone, 1 mL/ampul
cat.# 32453 (ea.)

TCLP Pesticide Mix (5 components)

γ-BHC (lindane)	heptachlor epoxide (isomer B)
endrin	methoxychlor
heptachlor	

2,000 µg/mL each in methanol, 1 mL/ampul
cat.# 32013 (ea.)

TCLP Toxaphene Mix

toxaphene

2,000 µg/mL in methanol, 1 mL/ampul
cat.# 32015 (ea.)

TCLP Chlordane Mix

chlordane

2,000 µg/mL in methanol, 1 mL/ampul
cat.# 32016 (ea.)

SOM01.1 (Pesticides), QA Mixes

Pesticide Surrogate Mix (2 components)

decachlorobiphenyl	200 µg/mL
2,4,5,6-tetrachloro-*m*-xylene	100

In acetone, 1 mL/ampul
cat.# 32453 (ea.)

Organochlorine Pesticide Resolution Check Mix (with surrogates) (22 components)

aldrin	10 µg/mL	4,4'-DDT	20
α-BHC	10	endosulfan I	10
β-BHC	10	endosulfan II	20
δ-BHC	10	endosulfan sulfate	20
γ-BHC (lindane)	10	endrin	20
cis-chlordane	10	endrin aldehyde	20
trans-chlordane	10	endrin ketone	20
decachlorobiphenyl (SS)	20	heptachlor	10
dieldrin	20	heptachlor epoxide (isomer B)	10
4,4'-DDD	20	methoxychlor	100
4,4'-DDE	20	2,4,5,6-tetrachloro-*m*-xylene (SS)	10

In hexane:toluene (90:10), 1 mL/ampul
cat.# 32454 (ea.)

Pesticides, Chlorinated/Organochlorine/Organohalide, *cont.*

04.2, 04.1, 03.2, 3/90, 4/89, and 2/88 SOW (Pesticides), QA Mixes

Pesticide Surrogate Mix (2 components)

See cat.#s 32000 and 32457 on page 486.

2,4,5,6-Tetrachloro-*m*-xylene

200 µg/mL in acetone, 1 mL/ampul
cat.# 32027 (ea.)

200 µg/mL in acetone, 5 mL/ampul
cat.# 32028 (ea.)

Decachlorobiphenyl (BZ #209)

200 µg/mL in acetone, 1 mL/ampul
cat.# 32029 (ea.)

200 µg/mL in acetone, 5 mL/ampul
cat.# 32030 (ea.)

10 µg/mL in isooctane, 1 mL/ampul
cat.# 32289 (ea.)

Dibutylchlorendate

200 µg/mL in acetone, 1 mL/ampul
cat.# 32025 (ea.)

Florisil® Cartridge Check Standard

2,4,5-trichlorophenol

1,000 µg/mL in acetone, 1 mL/ampul
cat.# 32017 (ea.)

Organochlorine Pesticide System Evaluation Mix

(2 components)

- Designed for daily assessment of system performance.
- Reveals active sites in the injection port and/or GC column.
- Prepared in MTBE—low expansion volume helps minimize backflash.

4,4'-DDT	200 µg/mL
endrin	100 µg/mL

In methyl *tert*-butyl ether, 1 mL/ampul
cat.# 32417 (ea.)

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Pesticide Resolution Check Mix (7 components)

trans-chlordane	1 µg/mL	endosulfan sulfate	2
4,4'-DDE	2	endrin ketone	2
dieldrin	2	methoxychlor	10
endosulfan I	1		

In hexane, 1 mL/ampul
cat.# 32001 (ea.)

Pesticide Resolution Check Mix w/Surrogates

(9 components)

trans-chlordane	1 µg/mL	endosulfan sulfate	2
4,4'-DDE	2	endrin ketone	2
decachlorobiphenyl (SS)	2	methoxychlor	10
dieldrin	2	2,4,5,6-tetrachloro-*m*-xylene (SS)	2
endosulfan I	1		

In hexane, 1 mL/ampul
cat.# 32073 (ea.)

Pesticide Performance Evaluation Mix (6 components)

α-BHC	1 µg/mL	4,4'-DDT	10
β-BHC	1	endrin	5
γ-BHC (lindane)	1	methoxychlor	25

In hexane, 1 mL/ampul
cat.# 32002 (ea.)

Pesticide Performance Evaluation Mix w/Surrogates

(8 components)

α-BHC	1 µg/mL	decachlorobiphenyl (SS)	2
β-BHC	1	endrin	5
γ-BHC (lindane)	1	methoxychlor	25
4,4'-DDT	10	2,4,5,6-tetrachloro-*m*-xylene (SS)	2

In hexane, 1 mL/ampul
cat.# 32074 (ea.)

tech tip

Working with solutions containing decachlorobiphenyl

Decachlorobiphenyl has poor solubility in most organic solvents. The maximum concentration that can be prepared in acetone, hexane, or isooctane is 200 µg/mL. Temperature will affect the solubility as well. Storing solutions at reduced temperatures will cause decachlorobiphenyl to precipitate.

Products containing decachlorobiphenyl must be sonicated for a minimum of 10 minutes prior to opening the ampul. Because each ultrasonic bath operates at a different energy level, 10 minutes is a guideline only. Longer sonication time will not affect product quality.

These precautions apply to working solutions prepared in your laboratory as well. The amount of compound that precipitates depends on concentration AND temperature. If you store your standards at a temperature lower than 4 °C (even dilute solutions), allow extra sonication time.

Pesticides, Chlorinated/Organochlorine/Organohalide, *cont.*

CLP Pesticides Mixtures, QA Mixes

Pesticide Matrix Spike Mix (6 components)

aldrin	25 µg/mL	dieldrin	50
γ-BHC (lindane)	25	endrin	50
4,4'-DDT	50	heptachlor	25

In acetone, 1 mL/ampul

cat.# 32018 (ea.)

Pesticide Matrix Spike Mix (2/88 SOW) (6 components)

aldrin	200 µg/mL	dieldrin	500
γ-BHC (lindane)	200	endrin	500
4,4'-DDT	500	heptachlor	200

In methanol, 1 mL/ampul

cat.# 32031 (ea.)

Pesticide Evaluation Mix (2/88 SOW) (4 components)

aldrin	4,4'-DDT
dibutylchlorendate (SS)	endrin

100 µg/mL each in hexane, 1 mL/ampul

cat.# 32032 (ea.)

For complete listing of PCB reference standards, see pages 494–496.

Low-Concentration Pesticides Mixtures, QA Mixes

L/C Pesticide Lab Control Sample (7 components)

γ-BHC (lindane)	10 µg/mL	endosulfan sulfate	20
trans-chlordane	10	endrin	20
4,4'-DDE	20	heptachlor epoxide (isomer B)	10
dieldrin	20		

In acetone, 1 mL/ampul

cat.# 32040 (ea.)

CLP Pesticides Mixtures, Calibration Mixes

Pesticide Standard Mix A (2/88 SOW) (10 components)

aldrin	10 µg/mL	endosulfan II	20
γ-BHC (lindane)	5	endrin aldehyde	25
4,4'-DDT	20	heptachlor	10
dieldrin	10	heptachlor epoxide (isomer B)	10
endosulfan I	10	methoxychlor	100

In hexane, 1 mL/ampul

cat.# 32033 (ea.)

Pesticide Standard Mix B (2/88 SOW) (11 components)

aldrin	10 µg/mL	4,4'-DDD	20
α-BHC	5	4,4'-DDE	10
β-BHC	10	endosulfan sulfate	20
δ-BHC	10	endrin	10
cis-chlordane	10	endrin ketone	20
trans-chlordane	10		

In hexane, 1 mL/ampul

cat.# 32034 (ea.)

CLP Pesticides Mixtures, Calibration Mixes, *cont.*

Pesticide Standard Mix A (9 components)

α-BHC	5 µg/mL	endosulfan I	5
γ-BHC (lindane)	5	endrin	10
4,4'-DDD	10	heptachlor	5
4,4'-DDT	10	methoxychlor	50
dieldrin	10		

In hexane:toluene (90:10), 1 mL/ampul

cat.# 32297 (ea.)

Pesticide Standard Mix B (11 components)

aldrin	5 µg/mL	endosulfan II	10
β-BHC	5	endosulfan sulfate	10
δ-BHC	5	endrin aldehyde	10
cis-chlordane	5	endrin ketone	10
trans-chlordane	5	heptachlor epoxide (isomer B)	5
4,4'-DDE	10		

In hexane:toluene (90:10), 1 mL/ampul

cat.# 32298 (ea.)

Organochlorine Pesticide Mix AB #1 (20 components)

aldrin	dieldrin
α-BHC	endosulfan I
β-BHC	endosulfan II
δ-BHC	endosulfan sulfate
γ-BHC (lindane)	endrin
cis-chlordane	endrin aldehyde
trans-chlordane	endrin ketone
4,4'-DDD	heptachlor
4,4'-DDE	heptachlor epoxide (isomer B)
4,4'-DDT	methoxychlor

200 µg/mL each in hexane:toluene (1:1), 1 mL/ampul

cat.# 32291 (ea.)

Organochlorine Pesticide Mix AB #2 (20 components)

aldrin	8 µg/mL	dieldrin	16
α-BHC	8	endosulfan I	8
β-BHC	8	endosulfan II	16
δ-BHC	8	endosulfan sulfate	16
γ-BHC (lindane)	8	endrin	16
cis-chlordane	8	endrin aldehyde	16
trans-chlordane	8	endrin ketone	16
4,4'-DDD	16	heptachlor	8
4,4'-DDE	16	heptachlor epoxide (isomer B)	8
4,4'-DDT	16	methoxychlor	80

In hexane:toluene (1:1), 1 mL/ampul

cat.# 32292 (ea.)

Organochlorine Pesticide Mix AB # 3 (20 components)

aldrin	dieldrin
α-BHC	endosulfan I
β-BHC	endosulfan II
δ-BHC	endosulfan sulfate
γ-BHC (lindane)	endrin
cis-chlordane	endrin aldehyde
trans-chlordane	endrin ketone
4,4'-DDD	heptachlor
4,4'-DDE	heptachlor epoxide (isomer B)
4,4'-DDT	methoxychlor

2,000 µg/mL each in hexane:toluene (1:1), 1 mL/ampul

cat.# 32415 (ea.)

Pesticides, Chlorinated/Organochlorine/Organohalide, *cont.*

Pesticides Calibration Mixtures

Components of these products are at 16x the contract-required quantitation level (CRQL) and can be used to prepare calibration mixes at 4x CRQL and at 1x CRQL by serial dilution.

Pesticide Standard Mix A w/Surrogates (11 components)

α-BHC	8 µg/mL	endosulfan I	8
γ-BHC (lindane)	8	endrin	16
4,4'-DDD	16	heptachlor	8
4,4'-DDT	16	methoxychlor	80
decachlorobiphenyl (SS)	16	2,4,5,6-tetrachloro-*m*-xylene (SS)	8
dieldrin	16		

In hexane, 1 mL/ampul

cat.# 32003 (ea.)

Pesticide Standard Mix B w/Surrogates (13 components)

aldrin	8 µg/mL	endosulfan II	16
β-BHC	8	endosulfan sulfate	16
δ-BHC	8	endrin aldehyde	16
cis-chlordane	8	endrin ketone	16
trans-chlordane	8	heptachlor epoxide (isomer B)	8
4,4'-DDE	16	2,4,5,6-tetrachloro-*m*-xylene (SS)	8
decachlorobiphenyl (SS)	16		

In hexane, 1 mL/ampul

cat.# 32004 (ea.)

Pesticide Kit #3

Calibration mixes only for CLP 04.1. Includes pesticide standard mixes A & B at 16x CRQL with surrogates.

Contains 1 mL each of these mixtures.
32003: Pesticide Standard Mix A w/Surrogates
32004: Pesticide Standard Mix B w/Surrogates
32005: Toxaphene
32007: Aroclor 1221
32008: Aroclor 1232
32009: Aroclor 1242
32010: Aroclor 1248
32011: Aroclor 1254
32039: Aroclor 1016/1260

cat.# 32404 (kit) kit

Chlordane, Toxaphene Solutions

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

Compound	CAS #	Solvent	Conc.	cat.#
chlordane	57-74-9	H	1,000	32021
chlordane	57-74-9	I	5,000	32072
chlordane	57-74-9	M	2,000	32016
toxaphene	8001-35-2	H	1,000	32005
toxaphene	8001-35-2	I	5,000	32071
toxaphene	8001-35-2	M	2,000	32015

H = hexane; I = isooctane; M = methanol

Pesticides, Nitrogen/Phosphorus

Method 507 (Nitrogen & Phosphorus Pesticides)

Organonitrogen Pesticide Mix #1 (Rev), Method 525.2

(37 components)

alachlor
ametryn
atraton
atrazine
bromacil
butachlor
butylate
chlorpropham
cyanazine (Bladex)
cycloate
diphenamid
EPTC
etridiazole (Terrazole)
fenarimol
fluridone (Sonar)
hexazinone (Velpar)
metolachlor
metribuzin
MGK-264
molinate
napropamide (Devrinol)
norflurazon
pebulate
prometon
prometryne
pronamide (propyzamide)
propachlor
propazine
simazine
simetryn
tebuthiuron
terbacil
terbutryn
triadimefon
tricyclazole (Beam)
trifluralin
vernolate

500 µg/mL each in acetone, 1 mL/ampul

cat.# 33012 (ea.)

Organophosphorus Pesticide Mix #1 (Rev), Method 525.2 (7 components)

chlorpyrifos (Dursban)
dichlorvos (DDVP)
disulfoton sulfone
ethoprop (ethoprophos)
methyl paraoxon (parathion methyl-O-analog)
mevinphos (phosdrin)
stirofos (tetrachlorvinphos)

500 µg/mL each in acetone, 1 mL/ampul

cat.# 33013 (ea.)

Method 525.2 Nitrogen/Phosphorus Pesticide Mix #2

(6 components)

carboxin
diazinon
disulfoton
fenamiphos
merphos
terbufos

1,000 µg/mL each in acetone, 1 mL/ampul

cat.# 32423 (ea.)

NEW!

Compound Index for Reference Standards

See **pages 730–736.**

Pesticides, Organophosphorus

Method 8140, 8141 (Organophosphorus Pesticides)

The preparation of accurate and stable OP standards is complicated by their sensitivity to light, pH, heat, and water. Restek has overcome these issues through our ongoing research into OP pesticide mixtures to save your lab time and effort.

- Solvents are assayed to ensure low water content.
- Reference mixtures are stored in deactivated amber ampuls, under an inert atmosphere.
- Purity is determined by a combination of methods: GC-FID, HPLC, GC-ECD, GC-MS, LC-MS, refractive index, and melting point.

8140/8141 Internal Standards & Surrogates

NPD Detector:

Internal Standard: 1-bromo-2-nitrobenzene (cat.# 32279)
Surrogate: 4-chloro-3-nitrobenzotrifluoride (cat.# 32282)

1,000 µg/mL in acetone, 1 mL/ampul
cat.# 32279 (ea.)

1,000 µg/mL in acetone, 1 mL/ampul
cat.# 32282 (ea.)

FPD Detector:

Internal Standard: none recommended
Surrogate: tributylphosphate (cat.# 32280) and triphenylphosphate (cat.# 32281)

1,000 µg/mL in acetone, 1 mL/ampul
cat.# 32280 (ea.)

1,000 µg/mL in acetone, 1 mL/ampul
cat.# 32281 (ea.)

8140/8141 OP Pesticide Calibration Mix A

(20 components)

azinphos methyl	fenthion
bolstar (sulprofos)	merphos
chlorpyrifos	methyl parathion
coumaphos	mevinphos
demeton, O & S	naled
diazinon	phorate
dichlorvos	ronnel
disulfoton	stirofos
ethoprophos	tokuthion (prothiofos)
fensulfothion	trichloronate

200 µg/mL each in hexane:acetone (95:5), 1 mL/ampul
cat.# 32277 (ea.)

8141 OP Pesticide Calibration Mix B (7 components)

dimethoate	parathion
EPN	sulfotepp
malathion	TEPP
monocrotophos	

200 µg/mL each in hexane:acetone (95:5), 1 mL/ampul
cat.# 32278 (ea.)

International-Specific

Canadian Drinking Water OP Pesticides Mix

(9 components)

azinphos methyl (Guthion)	parathion (ethyl)
chlorpyrifos (Dursban)	phorate
Diazinon	temephos (Abate)
dimethoate	terbufos
malathion	

1,000 µg/mL each in acetonitrile, 1 mL/ampul
cat.# 31867 (ea.)

Organophosphorus Pesticide Mix, European Formulation (16 components)

acephate	200 µg/mL	methamidophos	500
azinphos methyl (Guthion)	400	methidathion	200
chlorpyrifos	100	omethoate	1,000
demeton-S-methyl	200	pirimiphos methyl	100
dichlorvos (DDVP)	500	profenfos	200
dimethoate	200	pyrazophos	500
ethion	200	tokuthion (prothiofos)	200
malathion	200	tolclofos-methyl	100

In acetone, 1 mL/ampul
cat.# 32418 (ea.)

also available

30 m x 0.32 mm ID x 0.50 µm
Rtx®-OP Pesticides Column

Provides fast analyses, low bleed, and better resolution than alternative choices.

See **page 61** for details.

Pesticides, Pesticides & Flame Retardants

Method 527 (Pesticides & Flame Retardants - GC-MS)

Internal Standard, Method 527 (3 components)

acenaphthene-d10
chrysene-d12
phenanthrene-d10

500 µg/mL each in acetone, 1 mL/ampul
cat.# 33010 (ea.)

Method 525.2 Internal Standard Mix (3 components)

acenaphthene-d10
chrysene-d12
phenanthrene-d10

1,000 µg/mL each in acetone, 1 mL/ampul
cat.# 31825 (ea.)

Surrogate Standard, Method 527 (3 components)

1,3-dimethyl-2-nitrobenzene
perylene-d12
triphenylphosate

500 µg/mL each in acetone, 1 mL/ampul
cat.# 33009 (ea.)

Method 525.2 Surrogate Standard Mix (4 components)

2-nitro-*m*-xylene
perylene-d12
pyrene-d10
triphenylphosphate

1,000 µg/mL each in acetone, 1 mL/ampul
cat.# 31826 (ea.)

PBDE Mix (5 components)

2,2',4,4',5-pentabromodiphenyl ether (BDE-99)
2,2',4,4',5,5'-hexabromobiphenyl
2,2',4,4',5,5'-hexabromodiphenyl ether (BDE-153)
2,2',4,4',6-pentabromodiphenyl ether (BDE-100)
2,2',4,4'-tetrabromodiphenyl ether (BDE-47)

50 µg/mL each in isooctane:ethyl acetate (4:1), 1 mL/ampul
cat.# 33098 (ea.)

Pesticides Mix #1, Method 527 (16 components)

atrazine
bifenthrin
esbiol (Bioallethrin, S-cyclopentyl isomer)
bromacil
esfenvalarate
fenvalarate
hexazinone
kepone
mirex
nitrofen
norflurazon
oxychlordane
prometryne
propazine
thiobencarb
vinclozolin

500 µg/mL each in ethyl acetate, 1 mL/ampul
cat.# 33007 (ea.)

Pesticides Mix #2, Method 527 (5 components)

chloropyrifos (Dursban)
dimethoate
malathion
parathion
terbufos sulfone

500 µg/mL each in ethyl acetate, 1 mL/ampul
cat.# 33008 (ea.)

Pesticides, Phenylurea

Method 532 (Phenylurea Pesticides)

Phenylurea Surrogate Mixture (2 components)

carbazole
monuron

500 µg/mL each in methanol:acetonitrile (50:50), 1 mL/ampul
cat.# 32433 (ea.)

Phenylurea Pesticide Mixture (8 components)

diflubenzuron
diuron
fluometuron
linuron
propanil
siduron
tebuthiuron
thidiazuron

200 µg/mL each in acetonitrile:acetone (90:10), 1 mL/ampul
cat.# 32434 (ea.)

Pesticides, Chlordane, Toxaphene

Chlordane, Toxaphene Solutions

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

Compound	CAS #	Solvent	Conc.	cat.#
chlordane	57-74-9	H	1,000	32021
chlordane	57-74-9	I	5,000	32072
chlordane	57-74-9	M	2,000	32016
toxaphene	8001-35-2	H	1,000	32005
toxaphene	8001-35-2	I	5,000	32071
toxaphene	8001-35-2	M	2,000	32015

H = hexane; I = isooctane; M = methanol

Restek Offers a Full Line of Certified Reference Materials
See **pages 438–439**.
QUALITY ISO 9001 • 17025 • Guide 34
www.restek.com/iso

Pesticides, State-Specific

Minnesota Department of Agriculture List 1 Pesticides

Minnesota Ag List 1 Pesticides Mix A (16 components)

acetochlor
alachlor
atrazine
cyanazine
desethylatrazine
desisopropylatrazine
dimethenamid*
ethalfluralin
metolachlor
metribuzin
pendimethalin
prometon
propachlor
propazine
simazine
trifluralin

200 ppm each in acetone, 1 mL/ampul

cat.# 32406 (ea.)

*Added to Minnesota Department of Agriculture List 1 pesticide (neutrals) incident investigation requirements, effective January 1, 2000.[1] CAS # 87674-68-8 manufactured by several companies under various trade names.
[1]Analytical Lists for Pesticide Incident Investigations, Minnesota Department of Agriculture, Guidance Document 26 (3/99), St. Paul, MN. For a copy, visit their website at: **www.mda.state.mn.us**

Minnesota Ag List 1 Pesticides Mix B (6 components)

chlorpyrifos
EPTC
fonofos
phorate
terbufos
triallate

200 ppm each in acetone, 1 mL/ampul

cat.# 32407 (ea.)

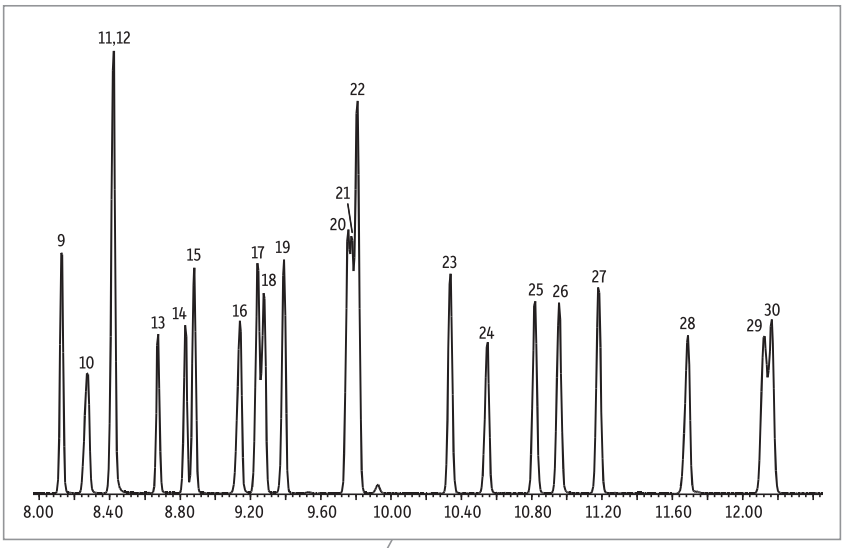
Minnesota Ag List 1 Pesticide Kit

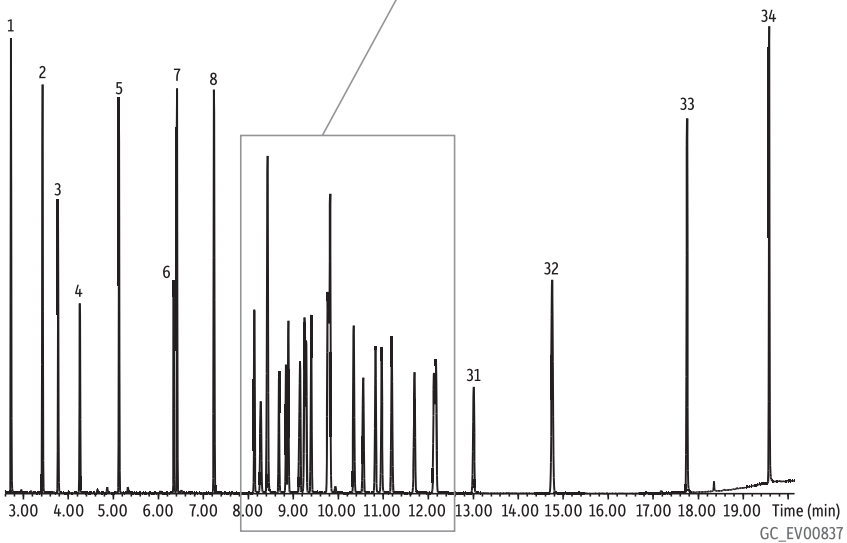
Contains 1 mL each of these mixtures.
32406: Minnesota Ag List Pesticides Mix A
32407: Minnesota Ag List Pesticides Mix B

cat.# 32408 (kit)

kit

Minnesota Dept. of Agriculture List 1 Pesticides on Rxi®-1ms





GC_EV00837

Peaks
1. 2-Fluorophenol (SS)
2. Phenol-d6 (SS)
3. 1,4-Dichlorobenzene-d4 (IS)
4. Nitrobenzene-d5 (SS)
5. Naphthalene-d8 (IS)
6. EPTC
7. 2-Fluorobiphenyl (SS)
8. Acenaphthene-d10 (IS)
9. Propachlor
10. Desisopropylatrazine
11. Desethyl-atrazine
12. 2,4,6-Tribromophenol (SS)
13. Ethalfluralin
14. Trifluralin
15. Phorate
16. Simazine
17. Prometon
18. Atrazine
19. Propazine
20. Terbufos
21. Fonofos
22. Phenanthrene-d10 (IS)
23. Triallate
24. Metribuzin
25. Dimethenamid
26. Acetochlor
27. Alachlor
28. Cyanazine
29. Metolachlor
30. Chlorpyrifos
31. Pendimethalin
32. *p*-Terphenyl-d14 (SS)
33. Chrysene-d12 (IS)
34. Perylene-d12 (IS)

Column	Rxi®-1ms, 30 m, 0.25 mm ID, 0.25 µm (cat.# 13323)
Sample	Minnesota Ag List 1 Pesticides Mix A (cat.# 32406) Minnesota Ag List 1 Pesticides Mix B (cat.# 32407) SV Internal Standard Mix (cat.# 31206) B/N Surrogate Mix (4/89 SOW) (cat.# 31024) Acid Surrogate Mix (4/89 SOW) (cat.# 31025)
Conc.:	10 µg/mL each analyte (internal standards 25 µg/ml)
Injection	
Inj. Vol.:	1.0 µL split (split ratio 10:1)
Liner:	Drilled Uniliner (hole near bottom) (cat.# 20771)
Inj. Temp.:	250 °C
Oven	
Oven Temp:	70 °C (hold 1 min) to 180 °C at 20 °C/min to 230 °C at 5 °C/min to 325 °C at 40 °C/min (hold 3.5 min)
Carrier Gas	He, constant flow
Flow Rate:	1.2 mL/min
Detector	MS
Mode:	Scan
Transfer Line Temp.:	280 °C
Solvent Delay Time:	2.5 min
Tune Type:	DFTPP
Ionization Mode:	EI
Scan Range:	35-550 amu
Instrument	HP6890 GC & 5973 MSD

Phenols

Method 528 (Phenols)

- Reference materials for U.S. EPA Method 528.
- Fortification solution formulated based on MS sensitivity to each analyte.

Internal Standard Mix, EPA 528 (2 components)

3-nitro-*o*-xylene	1,000 µg/mL
2,3,4,5-tetrachlorophenol	2,000

In methylene chloride, 1 mL/ampul

cat.# 31696 (ea.)

Surrogate Standard Mix, EPA 528 (3 components)

2-chlorophenol-d4	1,000 µg/mL	2,4,6-tribromophenol	2,000
2,4-dimethylphenol-3,5,6-d3	1,000		

In methanol, 1 mL/ampul

cat.# 31697 (ea.)

Phenol Calibration Mix, EPA 528 (12 components)

4-chloro-3-methylphenol
2-chlorophenol
o-cresol
2,4-dichlorophenol
2,4-dimethylphenol
2,4-dinitrophenol
2-methyl-4,6-dinitrophenol
2-nitrophenol
4-nitrophenol
pentachlorophenol
phenol
2,4,6-trichlorophenol

2,000 µg/mL each in methylene chloride, 1 mL/ampul

cat.# 31694 (ea.)

Phenols Fortification Mix, EPA 528 (12 components)

4-chloro-3-methylphenol	100 µg/mL	2-methyl-4,6-dinitrophenol	500
2-chlorophenol	100	2-nitrophenol	100
o-cresol	100	4-nitrophenol	500
2,4-dichlorophenol	100	pentachlorophenol	500
2,4-dimethylphenol	100	phenol	100
2,4-dinitrophenol	500	2,4,6-trichlorophenol	100

In methanol, 1 mL/ampul

cat.# 31695 (ea.)

Method 604 (Phenols)

604 Phenols Calibration Mix (11 components)

4-chloro-3-methylphenol
2-chlorophenol
2,4-dichlorophenol
2,4-dimethylphenol
2,4-dinitrophenol
2-methyl-4,6-dinitrophenol
2-nitrophenol
4-nitrophenol
pentachlorophenol
phenol
2,4,6-trichlorophenol

2,000 µg/mL each in methanol, 1 mL/ampul

cat.# 31029 (ea.)

Method 8040 (Phenols)

8040 Surrogate Mix (2 components)

2-fluorophenol
2,4,6-tribromophenol

2,000 µg/mL each in isopropanol, 1 mL/ampul

cat.# 31090 (ea.)

8040 Phenols Mix #1 (9 components)

4-chloro-3-methylphenol
2,4-dichlorophenol
2-methyl-4,6-dinitrophenol
3-methylphenol
2-nitrophenol
4-nitrophenol
pentachlorophenol
phenol
2,4,6-trichlorophenol

2,000 µg/mL each in isopropanol, 1 mL/ampul

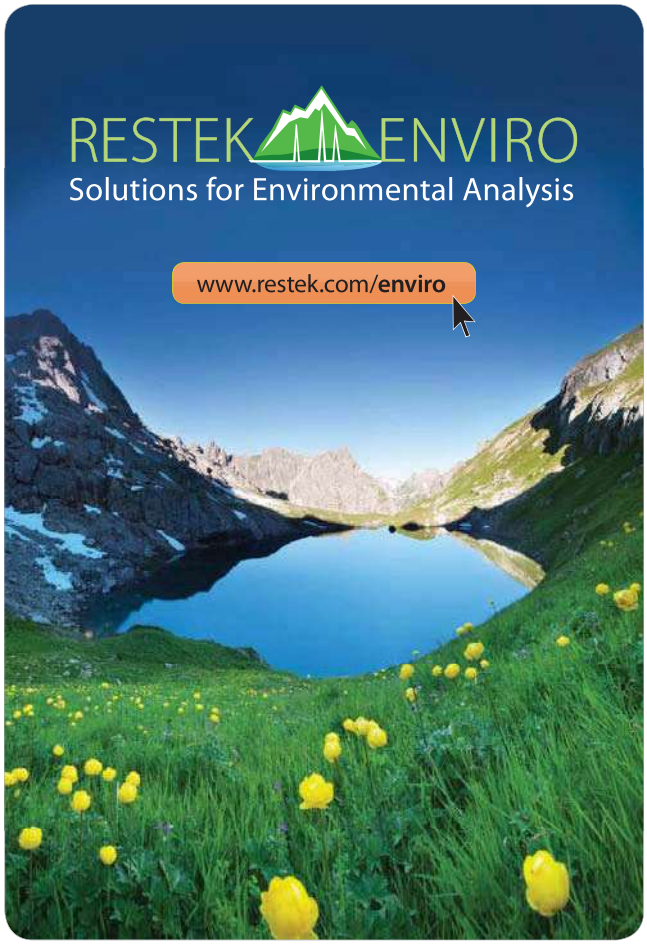
cat.# 31088 (ea.)

8040 Phenols Mix #2 (9 components)

sec-butyl-4,6-dinitrophenol (dinoseb)
2-chlorophenol
2,6-dichlorophenol
2,4-dimethylphenol
2,4-dinitrophenol
2-methylphenol
4-methylphenol
2,3,4,6-tetrachlorophenol
2,4,5-trichlorophenol

2,000 µg/mL each in isopropanol, 1 mL/ampul

cat.# 31089 (ea.)



Phthalates (Phthalate Esters)

Method 506 (Phthalate & Adipate Esters)

506 Calibration Mix (7 components)

benzyl butyl phthalate
bis(2-ethylhexyl)adipate
bis(2-ethylhexyl)phthalate
di-*n*-butylphthalate
di-*n*-octyl phthalate
diethylphthalate
dimethylphthalate

1,000 µg/mL in isooctane, 1 mL/ampul
cat.# 31845 (ea.)

Method 606 (Phthalate Esters)

606 Phthalate Esters Calibration Mix (6 components)

bis(2-ethylhexyl)phthalate
butyl benzyl phthalate
diethyl phthalate
dimethyl phthalate
di-*n*-butyl phthalate
di-*n*-octyl phthalate

2,000 µg/mL each in methanol, 1 mL/ampul
cat.# 31031 (ea.)

Method 8061A (Phthalate Esters)

8061A Matrix Spike Solution (2 components)

benzyl butyl phthalate
bis(2-ethylhexyl)phthalate

2,000 µg/mL each in acetone, 1 mL/ampul
cat.# 31846 (ea.)

Benzyl Benzoate (Internal Standard)

5,000 µg/mL in hexane, 1 mL/ampul
cat.# 31847 (ea.)

8061A Surrogate Standard (3 components)

dibenzyl phthalate
diphenyl isophthalate
diphenyl phthalate

500 µg/mL each in acetone, 1 mL/ampul
cat.# 31848 (ea.)

EPA 8061A Phthalate Esters Mixture (15 components)

benzyl butyl phthalate
bis(2-*n*-butoxyethyl)phthalate
bis(2-ethoxyethyl)phthalate
bis(2-ethylhexyl)phthalate
bis(2-methoxyethyl)phthalate
bis(4-methyl-2-pentyl)phthalate
di-*n*-butylphthalate
diethylphthalate
di-*n*-hexyl phthalate
dimethylphthalate
di-nonyl phthalate
di-*n*-octyl phthalate
dipentylphthalate
phthalic acid dicyclohexyl ester
phthalic acid diisobutyl ester

1,000 µg/mL each in hexane:acetone (80:20), 1 mL/ampul
cat.# 33227 (ea.)

Polybrominated Diphenyl Ethers (PBDEs)

See page 491.

Polychlorinated Biphenyls (PCBs)

PCB Aroclors

608 Complete Kit

Contains 1 mL each of these mixtures.
32022: 608 Calibration Mix
32006: Aroclor 1016
32007: Aroclor 1221
32008: Aroclor 1232
32009: Aroclor 1242
32010: Aroclor 1248
32011: Aroclor 1254
32012: Aroclor 1260
32005: toxaphene
32021: chlordane

cat.# 32060 (kit) kit

PCB Kit #1

1,000 µg/mL each in hexane, 1 mL/ampul
32006: Aroclor 1016
32007: Aroclor 1221
32008: Aroclor 1232
32009: Aroclor 1242
32010: Aroclor 1248
32011: Aroclor 1254
32012: Aroclor 1260

cat.# 32089 (kit) kit

PCB Kit #2

200 µg/mL each in isooctane, 1 mL/ampul
32064: Aroclor 1016
32065: Aroclor 1221
32066: Aroclor 1232
32067: Aroclor 1242
32068: Aroclor 1248
32069: Aroclor 1254
32070: Aroclor 1260

cat.# 32090 (kit) kit

PCB Kit #3

1,000 µg/mL each in hexane, 1 mL/ampul
32007: Aroclor 1221
32008: Aroclor 1232
32009: Aroclor 1242
32010: Aroclor 1248
32011: Aroclor 1254
32039: Aroclor 1016/1260

cat.# 32400 (kit) kit

Polychlorinated Biphenyls (PCBs), *cont.*

PCB Kit #4

200 µg/mL each in isooctane, 1 mL/ampul
32065: Aroclor 1221
32066: Aroclor 1232
32067: Aroclor 1242
32068: Aroclor 1248
32069: Aroclor 1254
32299: Aroclor 1016/1260

cat.# 32401 (kit) **kit**

Aroclor Solutions

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

Compound	CAS #	Solvent	Conc.	cat.#
Aroclor 1016	12674-11-2	H	1,000	32006
Aroclor 1016	12674-11-2	I	200	32064
Aroclor 1016	12674-11-2	TO	50 mg/kg	32075
Aroclor 1016	12674-11-2	TO	500 mg/kg	32076
Aroclor 1221	11104-28-2	H	1,000	32007
Aroclor 1221	11104-28-2	I	200	32065
Aroclor 1221	11104-28-2	TO	50 mg/kg	32077
Aroclor 1221	11104-28-2	TO	500 mg/kg	32078
Aroclor 1232	11141-16-5	H	1,000	32008
Aroclor 1232	11141-16-5	I	200	32066
Aroclor 1232	11141-16-5	TO	50 mg/kg	32079
Aroclor 1232	11141-16-5	TO	500 mg/kg	32080
Aroclor 1242	53469-21-9	H	1,000	32009
Aroclor 1242	53469-21-9	I	200	32067
Aroclor 1242	53469-21-9	TO	50 mg/kg	32081
Aroclor 1242	53469-21-9	TO	500 mg/kg	32082
Aroclor 1248	12672-29-6	H	1,000	32010
Aroclor 1248	12672-29-6	I	200	32068
Aroclor 1248	12672-29-6	TO	50 mg/kg	32083
Aroclor 1248	12672-29-6	TO	500 mg/kg	32084
Aroclor 1254	11097-69-1	H	1,000	32011
Aroclor 1254	11097-69-1	I	200	32069
Aroclor 1254	11097-69-1	TO	50 mg/kg	32085
Aroclor 1254	11097-69-1	TO	500 mg/kg	32086
Aroclor 1260	11096-82-5	H	1,000	32012
Aroclor 1260	11096-82-5	I	200	32070
Aroclor 1260	11096-82-5	TO	50 mg/kg	32087
Aroclor 1260	11096-82-5	TO	500 mg/kg	32088
Aroclor 1262	37324-23-5	H	1,000	32409
Aroclor 1268	11100-14-4	H	1,000	32410
Aroclor 1016/1260		H	1,000	32039
Aroclor 1016/1260		I	200	32299
Aroclor 1016/1260		A	400	32456

A = acetone; H = hexane; I = isooctane; TO = transformer oil (PCB-free)

please note

We test our transformer oil solvent to ensure that it is PCB-free.

PCB Congeners

Method 525.2 (Semivolatile Organics)

Method 525.2 PCB Congener Mix (8 components)

2-chlorobiphenyl (BZ #1)
2,3-dichlorobiphenyl (BZ #5)
2,4,5-trichlorobiphenyl (BZ #29)
2,2',4,4'-tetrachlorobiphenyl (BZ #47)
2,2',3',4,6-pentachlorobiphenyl (BZ #98)
2,2',4,4',5,6'-hexachlorobiphenyl (BZ #154)
2,2',3,3',4,4',6-heptachlorobiphenyl (BZ #171)
2,2',3,3',4,5',6,6'-octachlorobiphenyl (BZ #200)

200 µg/mL each in acetone, 1 mL/ampul
cat.# 32420 (ea.)

Method 8082, 8082A (PCBs)

PCB Congener Mix, Method 8082A (19 components)

2-chlorobiphenyl (BZ #1)
2,3-dichlorobiphenyl (BZ #5)
2,2',5-trichlorobiphenyl (BZ #18)
2,4',5-trichlorobiphenyl (BZ #31)
2,2',3,5'-tetrachlorobiphenyl (BZ #44)
2,2',5,5'-tetrachlorobiphenyl (BZ #52)
2,3',4,4'-tetrachlorobiphenyl (BZ #66)
2,2',3,4,5'-pentachlorobiphenyl (BZ #87)
2,2',4,5,5'-pentachlorobiphenyl (BZ #101)
2,3,3',4',6-pentachlorobiphenyl (BZ #110)
2,2',3,4,4',5'-hexachlorobiphenyl (BZ #138)
2,2',3,4,5,5'-hexachlorobiphenyl (BZ #141)
2,2',3,5,5',6-hexachlorobiphenyl (BZ #151)
2,2',4,4',5,5'-hexachlorobiphenyl (BZ #153)
2,2',3,3',4,4',5-heptachlorobiphenyl (BZ #170)
2,2',3,4,4',5,5'-heptachlorobiphenyl (BZ #180)
2,2',3,4,4',5',6-heptachlorobiphenyl (BZ #183)
2,2',3,4',5,5',6-heptachlorobiphenyl (BZ #187)
2,2',3,3',4,4',5,5',6-nonachlorobiphenyl (BZ #206)

100 µg/mL each in isooctane, 1 mL/ampul
cat.# 32416 (ea.)

NEW!

Compound Index for Reference Standards

See **pages 730–736.**

Polychlorinated Biphenyls (PCBs), *cont.*

PCB Congeners, *cont.*

Miscellaneous

PCB Congeners

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

Compound	CAS #	Solvent	Conc.	cat.#
2,4,4'-trichlorobiphenyl (BZ #28)	7012-37-5	I	10	32283
2,2',5,5'-tetrachlorobiphenyl (BZ #52)	35693-99-3	I	10	32284
2,2',4,5,5'-pentachlorobiphenyl (BZ #101)	37680-73-2	I	10	32285
2,3',4,4',5-pentachlorobiphenyl (BZ #118)	31508-00-6	I	10	32293
2,2',3,4,4',5'-hexachlorobiphenyl (BZ #138)	35065-28-2	I	10	32286
2,2',4,4',5,5'-hexachlorobiphenyl (BZ #153)	35065-27-1	I	10	32287
2,2',3,4,4',5,5'-heptachlorobiphenyl (BZ #180)	35065-29-3	I	10	32288
decachlorobiphenyl (BZ #209)	2051-24-3	I	10	32289

I = isooctane

PCB Congener Standard #1 (6 components)

2,4,4'-trichlorobiphenyl (BZ #28)
2,2',5,5'-tetrachlorobiphenyl (BZ #52)
2,2',4,5,5'-pentachlorobiphenyl (BZ #101)
2,2',3,4,4',5'-hexachlorobiphenyl (BZ #138)
2,2',4,4',5,5'-hexachlorobiphenyl (BZ #153)
2,2',3,4,4',5,5'-heptachlorobiphenyl (BZ #180)

10 µg/mL each in isooctane, 1 mL/ampul
cat.# 32290 (ea.)

PCB Congener Standard #2 (7 components)

2,4,4'-trichlorobiphenyl (BZ #28)
2,2',5,5'-tetrachlorobiphenyl (BZ #52)
2,2',4,5,5'-pentachlorobiphenyl (BZ #101)
2,3',4,4',5-pentachlorobiphenyl (BZ #118)
2,2',3,4,4',5'-hexachlorobiphenyl (BZ #138)
2,2',4,4',5,5'-hexachlorobiphenyl (BZ #153)
2,2',3,4,4',5,5'-heptachlorobiphenyl (BZ #180)

10 µg/mL each in isooctane, 1 mL/ampul
cat.# 32294 (ea.)

Polycyclic Aromatic Hydrocarbons (PAHs)

See pages 473–475.

Restek Offers a Full Line of Certified Reference Materials

See **pages 438–439**.

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Semivolatile Organics/Base, Neutral & Acid Extractables (BNAs)

Individual Semivolatile Surrogate and Internal Standards for EPA Methods

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

Compound	CAS #	Solvent	Conc.	cat.#
anthracene-d10	1719-06-08	D	2,000	31037
decafluorobiphenyl	434-90-2	D	2,000	31041
decafluorobiphenyl	434-90-2	A	1,000	31855
4,4'-dibromobiphenyl	92-86-4	D	2,000	31039
4,4'-dibromooctafluorobiphenyl	10386-84-2	D	2,000	31040
2-fluorobiphenyl	321-60-8	D	2,000	31091
1-fluoronaphthalene	321-38-0	D	2,000	31092
2-fluorophenol	367-12-4	D	2,000	31047
naphthalene-d8	1146-65-2	D	2,000	31043
nitrobenzene-d5	4165-60-0	D	2,000	31044
pentafluorophenol	771-61-9	D	2,000	31048
phenanthrene-d10	1517-22-2	D	2,000	31045
phenol-d6	13127-88-3	D	2,000	31049
pyridine-d5	7291-22-7	D	2,000	31046
p-terphenyl-d14	1718-51-0	D	1,000	31828
2,4,6-tribromophenol	118-79-6	M	1,000	31401

A = acetone; D = methylene chloride; M = methanol

SV Internal Standard Mix (6 components)

acenaphthene-d10
chrysene-d12
1,4-dichlorobenzene-d4
naphthalene-d8
perylene-d12
phenanthrene-d10

Each	15-pk.	25-pk.
2,000 µg/mL each in methylene chloride, 1 mL/ampul		
31206	31206.15	31206.25
4,000 µg/mL each in methylene chloride, 1 mL/ampul		
31006	31006.15	31006.25

Method 525, 525.1, 525.2 (Semivolatile Organics)

Method 525.2 Internal Standard Mix (3 components)

acenaphthene-d10
chrysene-d12
phenanthrene-d10

1,000 µg/mL each in acetone, 1 mL/ampul
cat.# 31825 (ea.)

Method 525.2 Surrogate Standard Mix (4 components)

2-nitro-*m*-xylene
perylene-d12
pyrene-d10
triphenylphosphate

1,000 µg/mL each in acetone, 1 mL/ampul
cat.# 31826 (ea.)

Method 525.2 Herbicide Analytes

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

Compound	CAS #	Solvent	Conc.	cat.#
acetochlor	34256-82-1	M	100	33208
alachlor	15972-60-8	M	100	33207
metolachlor	51218-45-2	M	100	33209

M = methanol

Semivolatile Organics/Base, Neutral & Acid Extractables (BNAs), *cont.*

Method 525, 525.1, 525.2 (Semivolatile Organics), *cont.*

Method 525.2 Herbicide Mix (3 components)

acetochlor
alachlor
metolachlor

100 µg/mL in methanol, 1 mL/ampul
cat.# 33211 (ea.)

Method 525.2 Semivolatile Mix (revised)

(28 components)

acenaphthylene
anthracene
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(ghi)perylene
benzo(k)fluoranthene
benzylbutylphthalate
bis(2-ethylhexyl)adipate
bis(2-ethylhexyl)phthalate
chrysene
dibenzo(a,h)anthracene
diethylphthalate
dimethylphthalate
di-*n*-butylphthalate
2,4-dinitrotoluene
2,6-dinitrotoluene
di-*n*-octylphthalate
fluoranthene
fluorene
hexachlorobenzene
hexachlorocyclopentadiene
indeno(1,2,3-cd)pyrene
isophorone
naphthalene
pentachlorophenol*
phenanthrene
pyrene

1,000 µg/mL each in acetone, 1 mL/ampul*
cat.# 31899 (ea.)

*pentachlorophenol at 4,000 µg/mL.

Method 525.2 PCB Congener Mix (8 components)

2-chlorobiphenyl (BZ #1)
2,3-dichlorobiphenyl (BZ #5)
2,4,5-trichlorobiphenyl (BZ #29)
2,2',4,4'-tetrachlorobiphenyl (BZ #47)
2,2',3',4,6-pentachlorobiphenyl (BZ #98)
2,2',4,4',5,6'-hexachlorobiphenyl (BZ #154)
2,2',3,3',4,4',6-heptachlorobiphenyl (BZ #171)
2,2',3,3',4,5',6,6'-octachlorobiphenyl (BZ #200)

200 µg/mL each in acetone, 1 mL/ampul
cat.# 32420 (ea.)

Organochlorine Pesticide Mix AB # 3 (20 components)

aldrin
α-BHC
β-BHC
δ-BHC
γ-BHC (lindane)
cis-chlordane
trans-chlordane
4,4'-DDD
4,4'-DDE
4,4'-DDT
dieldrin
endosulfan I
endosulfan II
endosulfan sulfate
endrin
endrin aldehyde
endrin ketone
heptachlor
heptachlor epoxide (isomer B)
methoxychlor

2,000 µg/mL each in hexane:toluene (1:1), 1 mL/ampul
cat.# 32415 (ea.)

Organophosphorus Pesticide Mix #1 (Rev), Method 525.2 (7 components)

chlorpyrifos (Dursban)
dichlorvos (DDVP)
disulfoton sulfone
ethoprop (ethoprophos)
methyl paraoxon (parathion methyl-O-analog)
mevinphos (phosdrin)
stirofos (tetrachlorvinphos)

500 µg/mL each in acetone, 1 mL/ampul
cat.# 33013 (ea.)

Organonitrogen Pesticide Mix #1 (Rev), Method 525.2

(37 components)

alachlor
ametryn
atraton
atrazine
bromacil
butachlor
butylate
chlorpropham
cyanazine (Bladex)
cycloate
diphenamid
EPTC
etridiazole (Terrazole)
fenarimol
fluridone (Sonar)
hexazinone (Velpar)
metolachlor
metribuzin
MGK-264
molinate
napropamide (Devrinol)
norflurazon
pebulate
prometon
prometryne
pronamide (propyzamide)
propachlor
propazine
simazine
simetryn
tebuthiuron
terbacil
terbutryn
triadimefon
tricyclazole (Beam)
trifluralin
vernolate

500 µg/mL each in acetone, 1 mL/ampul
cat.# 33012 (ea.)

Method 525.2 Nitrogen/Phosphorus Pesticide Mix #2

(6 components)

carboxin
diazinon
disulfoton
fenamiphos
merphos
terbufos

1,000 µg/mL each in acetone, 1 mL/ampul
cat.# 32423 (ea.)

Organochlorine Pesticide Mix #2 (Rev), Method 525.2

(8 components)

chlorobenzilate
chloroneb
chlorothalonil
DCPA (Dacthal)
heptachlor epoxide (isomer A)
trans-nonachlor
cis-permethrin
trans-permethrin

500 µg/mL each in acetone, 1 mL/ampul
cat.# 33011 (ea.)

Method 525.2 Fortification Recovery Standard

p-terphenyl-d14

1,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31828 (ea.)

Method 525.2 GC-MS Performance Check Mix

(3 components)

4,4'-DDT
DFTPP (decafluorotriphenylphosphine)
endrin

1,000 µg/mL each in acetone, 1 mL/ampul
cat.# 31827 (ea.)

Semivolatile Organics/Base, Neutral & Acid Extractables (BNAs), *cont.*

Method 625 (Semivolatiles)

Semivolatiles MegaMix® Standard, EPA Method 625 (54 components)

MEGAMIX®

acenaphthene
acenaphthylene
anthracene
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(ghi)perylene
benzo(k)fluoranthene
benzyl butyl phthalate
bis(2-chloroethoxy)methane
bis(2-chloroethyl)ether
bis(2-chloroisopropyl)ether
bis(2-ethylhexyl)phthalate
4-bromophenyl phenyl ether
4-chloro-3-methylphenol
2-chloronaphthalene
2-chlorophenol
4-chlorophenyl phenyl ether
chrysene
dibenzo(a,h)anthracene
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
2,4-dichlorophenol
diethylphthalate
2,4-dimethylphenol
dimethylphthalate
di-*n*-butylphthalate
4,6-dinitro-2-methylphenol
2,4-dinitrophenol
2,4-dinitrotoluene
2,6-dinitrotoluene
di-*n*-octylphthalate
diphenylamine*
fluoranthene
fluorene
hexachlorobenzene
hexachloro-1,3-butadiene
hexachlorocyclopentadiene*
hexachloroethane
indeno(1,2,3-cd)pyrene
isophorone
naphthalene
nitrobenzene
2-nitrophenol
4-nitrophenol
N-nitrosodimethylamine*
N-nitroso-di-*n*-propylamine
pentachlorophenol
phenanthrene
phenol
pyrene
1,2,4-trichlorobenzene
2,4,6-trichlorophenol

1,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31829 (ea.)

*Listed as an "additional compound" in Method 625 (listed compound N-nitrosodiphenylamine decomposes to MegaMix® component diphenylamine). The six other "additional compounds" are components in other Restek reference mixes used for Method 625: benzidine is included in cat.# 31030 (page 457); β-BHC, δ-BHC, endosulfan I, endosulfan II, endrin are in cat.# 32291 (page 486) and cat.# 32415 (page 486).

also available

Rxi®-5Sil MS Columns for EPA Methods 625 and 8270

Guaranteed for low GC-MS bleed, excellent phenol response, and the resolution needed to quantify critical pairs and structural isomers.

See **pages 32–33** for more information.

Method 625 (Semivolatiles), *cont.*

625 Kit

Because most laboratories do not routinely analyze pesticides, PCBs, toxaphene, and chlordane in their calibration mixtures for Method 625, these mixtures are not included in the 625 Kit. They may be purchased separately or in the 608 Complete Kit. See page 485.

Contains 1 mL each of these mixtures.
31029: 604 Phenols Mix
31030: 605 Benzidines Mix
31031: 606 Phthalate Esters Mix
31032: 607 Nitrosamines Mix
31033: 609 Nitroaromatics/Isophorone Mix
31011: 610 PAH Mix (SV Calibration Mix #5)
31034: 611 Haloethers Mix
31035: 612 Chlorinated Hydrocarbons Mix

cat.# 31036 (kit) kit

TCLP

TCLP B/N Mix (7 components)

1,4-dichlorobenzene
2,4-dinitrotoluene
hexachlorobenzene
hexachlorobutadiene
hexachloroethane
nitrobenzene
pyridine

2,000 µg/mL each in acetone, 1 mL/ampul
cat.# 31028 (ea.)

Method 3500 (Organic Extraction Surrogates)

High-Concentration Surrogates and Matrix Spike Mixtures for SW-846

- Highest concentrations commercially available—reduces cost per sample extract.
- Convenient 1 mL and 5 mL packaging.

See Method 8270, pages 499–502.

Semivolatile Organics/Base, Neutral & Acid Extractables (BNAs), *cont.*

Method 8270D, 8270C (Semivolatile Organic Compounds)

SV Internal Standard Mix (6 components)

- High purity for consistent results.
- Free quality assurance data package available online.
- Highest concentrations commercially available.

acenaphthene-d10
chrysene-d12
1,4-dichlorobenzene-d4
naphthalene-d8
perylene-d12
phenanthrene-d10

Each	15-pk.	25-pk.
2,000 µg/mL each in methylene chloride, 1 mL/ampul		
31206	31206.15	31206.25
4,000 µg/mL each in methylene chloride, 1 mL/ampul		
31006	31006.15	31006.25

Revised SV Internal Standard Mix (7 components)

acenaphthene-d10
chrysene-d12
1,4-dichlorobenzene-d4
1,4-dioxane-d8
naphthalene-d8
perylene-d12
phenanthrene-d10

Each	15-pk.	25-pk.
2,000 µg/mL each in methylene chloride, 1 mL/ampul		
31885	31885.15	31885.25
4,000 µg/mL each in methylene chloride, 1 mL/ampul		
31886	31886.15	31886.25

B/N Surrogate Mix (4/89 SOW) (3 components)

- High purity for consistent results.
- Free quality assurance data package available online.
- Highest concentrations commercially available.
- Convenient 1 mL, 5 mL, and 10 mL package sizes reduce cost per sample extract.

2-fluorobiphenyl
nitrobenzene-d5
p-terphenyl-d14

Each	15-pk.	25-pk.
1,000 µg/mL each in methylene chloride, 1 mL/ampul		
31024	31024.15	31024.25
5,000 µg/mL each in methylene chloride, 1 mL/ampul		
31062	31062.15	31062.25
5,000 µg/mL each in methylene chloride, 5 mL/ampul		
31086	31086.15	31086.25
5,000 µg/mL each in methylene chloride, 10 mL/ampul		
33028	33028.15	33028.25

Revised B/N Surrogate Mix (4 components)

2-fluorobiphenyl
nitrobenzene-d5
p-terphenyl-d14
pyrene-d10

Each	15-pk.	25-pk.
1,000 µg/mL each in methylene chloride, 1 mL/ampul		
31887	31887.15	31887.25
5,000 µg/mL each in methylene chloride, 1 mL/ampul		
31888	31888.15	31888.25
5,000 µg/mL each in methylene chloride, 5 mL/ampul		
31889	31889.15	31889.25

Acid Surrogate Mix (4/89 SOW) (3 components)

- Highest concentrations commercially available.
- Convenient 1 mL, 5 mL, and 10 mL package sizes.
- Reduces laboratory cost per sample extract.

2-fluorophenol
phenol-d6
2,4,6-tribromophenol

Each	15-pk.	25-pk.
2,000 µg/mL each in methanol, 1 mL/ampul		
31025	31025.15	31025.25
10,000 µg/mL each in methanol, 1 mL/ampul		
31063	31063.15	31063.25
10,000 µg/mL each in methanol, 5 mL/ampul		
31087	31087.15	31087.25
10,000 µg/mL each in methanol, 10 mL/ampul		
33029	33029.15	33029.25

B/N Matrix Spike Mix (6 components)

- Highest concentrations commercially available.
- Convenient 1 mL, 5 mL, and 10 mL package sizes.
- Reduces laboratory cost per sample extract.

acenaphthene
1,4-dichlorobenzene
2,4-dinitrotoluene
N-nitroso-di-*n*-propylamine
pyrene
1,2,4-trichlorobenzene

Each	15-pk.	25-pk.
1,000 µg/mL each in methanol, 1 mL/ampul		
31004	31004.15	31004.25
5,000 µg/mL each in methanol, 1 mL/ampul		
31074	31074.15	31074.25
5,000 µg/mL each in methanol, 5 mL/ampul		
31084	31084.15	31084.25
5,000 µg/mL each in methanol, 10 mL/ampul		
33030	33030.15	33030.25

Acid Matrix Spike Mix (5 components)

- Highest concentrations commercially available.
- Convenient 1 mL, 5 mL, and 10 mL package sizes.
- Reduces laboratory cost per sample extract.

4-chloro-3-methylphenol
2-chlorophenol
4-nitrophenol
pentachlorophenol
phenol

Each	15-pk.	25-pk.
2,000 µg/mL each in methanol, 1 mL/ampul		
31014	31014.15	31014.25
10,000 µg/mL each in methanol, 1 mL/ampul		
31061	31061.15	31061.25
10,000 µg/mL each in methanol, 5 mL/ampul		
31071	31071.15	31071.25
10,000 µg/mL each in methanol, 10 mL/ampul		
33031	33031.15	33031.25

Semivolatile Organics/Base, Neutral & Acid Extractables (BNAs), *cont.*

Method 8270D, 8270C (Semivolatile Organic Compounds), *cont.*

GC-MS Tuning Mixture (4 components)

benzidine
4,4'-DDT
decafluorotriphenylphosphine (DFTPP)
pentachlorophenol

1,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31615 (ea.)

SV Tuning Compound

decafluorotriphenylphosphine (DFTPP)

2,500 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31001 (ea.)

PFTBA (MS Tuning Compound)

perfluorotributylamine (PFTBA)

Neat, 1 mL/ampul
cat.# 30482 (ea.)

Neat, 1 g
cat.# 33027 (ea.)

No data pack available.

8270 B/N Calibration Check Mix (7 components)

acenaphthene
benzo(a)pyrene
1,4-dichlorobenzene
di-*n*-octyl phthalate
diphenylamine
fluoranthene
hexachlorobutadiene

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31616 (ea.)

8270 Acid Calibration Check Mix (6 components)

4-chloro-3-methylphenol
2,4-dichlorophenol
2-nitrophenol
pentachlorophenol
phenol
2,4,6-trichlorophenol

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31617 (ea.)

SV System Performance Check Mix (SPCC)

(4 components)

2,4-dinitrophenol
hexachlorocyclopentadiene
4-nitrophenol
N-nitroso-di-*n*-propylamine

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31689 (ea.)

EASIER calibration

8270 MegaMix® standard and 8270 Matrix spike mix include 3-methylphenol and 4-methylphenol at 1/2 x concentration of other components.

8270 MegaMix® Standard (76 components)

MEGAMIX®

- Fewest mixtures needed for calibration and matrix spikes.
- Mixtures formulated for maximum stability.
- Contains most routinely analyzed compounds.

acenaphthene
acenaphthylene
aniline
anthracene
azobenzene[1]
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(ghi)perylene
benzo(k)fluoranthene
benzyl alcohol
benzyl butyl phthalate
bis(2-chloroethoxy)methane
bis(2-chloroethyl)ether
bis(2-chloroisopropyl)ether
bis(2-ethylhexyl)adipate
bis(2-ethylhexyl)phthalate
4-bromophenyl phenyl ether
carbazole
4-chloroaniline
4-chloro-3-methylphenol
2-chloronaphthalene
2-chlorophenol
4-chlorophenyl phenyl ether
chrysene
dibenzo(a,h)anthracene
dibenzofuran
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
2,4-dichlorophenol
diethyl phthalate
2,4-dimethylphenol
dimethyl phthalate
di-*n*-butyl phthalate
1,2-dinitrobenzene
1,3-dinitrobenzene
1,4-dinitrobenzene
4,6-dinitro-2-methylphenol
2,4-dinitrophenol
2,4-dinitrotoluene
2,6-dinitrotoluene
di-*n*-octyl phthalate
diphenylamine[2]
fluoranthene
fluorene
hexachlorobenzene
hexachlorobutadiene
hexachlorocyclopentadiene
hexachloroethane
indeno(1,2,3-cd)pyrene
isophorone
1-methylnaphthalene
2-methylnaphthalene
2-methylphenol
3-methylphenol*
4-methylphenol*
naphthalene
2-nitroaniline
3-nitroaniline
4-nitroaniline
nitrobenzene
2-nitrophenol
4-nitrophenol
N-nitrosodimethylamine
N-nitroso-di-*n*-propylamine
pentachlorophenol
phenanthrene
phenol
pyrene
pyridine
2,3,4,6-tetrachlorophenol
2,3,5,6-tetrachlorophenol
1,2,4-trichlorobenzene
2,4,5-trichlorophenol
2,4,6-trichlorophenol

1,000 µg/mL each in methylene chloride, 1 mL/ampul*
cat.# 31850 (ea.)

*3-methylphenol and 4-methylphenol concentration is 500 µg/mL.

[1]1,2-diphenylhydrazine (8270-listed analyte) decomposes to azobenzene (mix component) in the injector.

[2]N-nitrosodiphenylamine (8270-listed analyte) decomposes to diphenylamine (mix component) in the injector.

8270 Matrix Spike Mix (76 components)

MEGAMIX®

Same as 8270 MegaMix® standard list above.

Each	15-pk.	25-pk.
200 µg/mL each in methanol:methylene chloride (80:20), 5 mL/ampul*		
31687	31687.15	31687.25
200 µg/mL each in methanol:methylene chloride (80:20), 10 mL/ampul*		
33073	33073.15	33073.25

*3-methylphenol and 4-methylphenol concentration is 100 µg/mL.

Semivolatile Organics/Base, Neutral & Acid Extractables (BNAs), *cont.*

Method 8270D, 8270C (Semivolatile Organic Compounds), *cont.*

605 Benzidines Calibration Mix (2 components)

benzidine
3,3'-dichlorobenzidine

2,000 µg/mL each in methanol, 1 mL/ampul
cat.# 31030 (ea.)

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31834 (ea.)

8270 Benzidines Mix (3 components)

benzidine
3,3'-dichlorobenzidine
3,3'-dimethylbenzidine

2,000 µg/mL each in methanol, 1 mL/ampul
cat.# 31688 (ea.)

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31852 (ea.)

8270/Appendix IX Kit

Contains 1 mL each of these mixtures.
31850: 8270 MegaMix Standard
31834: 605 Benzidines Calibration Mix
32459: Appendix IX Mix #1, Revised (Methapyrilene is not included in this revised standard.)
32460: Methapyrilene Standard
31806: Appendix IX Mix #2

cat.# 31815 (kit) kit

Appendix IX Mix #1, Revised (17 components)

2-acetylaminofluorene
4-aminobiphenyl
p-dimethylaminoazobenzene
3,3'-dimethylbenzidine (*o*-tolidine)
α,α-dimethylphenethylamine
1-naphthylamine
2-naphthylamine
N-nitrosodibutylamine
N-nitrosodiethylamine
N-nitrosomethylethylamine
N-nitrosomorpholine
N-nitrosopiperidine
N-nitrosopyrrolidine
5-nitro-*o*-toluidine
1,4-phenylenediamine
2-picoline
o-toluidine

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 32459 (ea.) NEW!

Methapyrilene Standard

2,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 32460 (ea.) NEW!

Appendix IX Mix #2 (32 components)

acetophenone
Aramite
atrazine
benzaldehyde
biphenyl
ε-caprolactam
chlorobenzilate
1-chloronaphthalene
diallate
dibenzo(a,j)acridine
2,6-dichlorophenol
7,12-dimethylbenz(a)anthracene
1,4-dioxane
diphenyl ether
ethyl methacrylate
ethyl methanesulfonate
hexachloropropene
isodrin
isosafrole (*cis* & *trans*)
kepone
3-methylcholanthrene
methyl methanesulfonate
1,4-naphthoquinone
4-nitroquinoline-N-oxide
pentachlorobenzene
pentachloroethane
pentachloronitrobenzene
phenacetin
pronamide
safrole
1,2,4,5-tetrachlorobenzene
1,3,5-trinitrobenzene

1,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31806 (ea.)

Organophosphorus Pesticide Mix, 8270/Appendix IX (9 components)

dimethoate
disulfoton
famphur
methyl parathion
O,O,O-triethyl phosphorothioate
parathion (ethyl parathion)
phorate
sulfotepp
zinophos (thionazine)

2,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 32419 (ea.)

Organochlorine Pesticide Mix AB # 3 (20 components)

aldrin
α-BHC
β-BHC
δ-BHC
γ-BHC (lindane)
cis-chlordane
trans-chlordane
4,4'-DDD
4,4'-DDE
4,4'-DDT
dieldrin
endosulfan I
endosulfan II
endosulfan sulfate
endrin
endrin aldehyde
endrin ketone
heptachlor
heptachlor epoxide (isomer B)
methoxychlor

2,000 µg/mL each in hexane:toluene (1:1), 1 mL/ampul
cat.# 32415 (ea.)

8270 Calibration Mix #1 (19 components)

benzoic acid
4-chloro-3-methylphenol
2-chlorophenol
2,4-dichlorophenol
2,6-dichlorophenol
2,4-dimethylphenol
4,6-dinitro-2-methylphenol
2,4-dinitrophenol
dinoseb
2-methylphenol
3-methylphenol
4-methylphenol
2-nitrophenol
4-nitrophenol
pentachlorophenol
phenol
2,3,4,6-tetrachlorophenol
2,4,5-trichlorophenol
2,4,6-trichlorophenol

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31618 (ea.)

8270 Calibration Mix #2 (11 components)

aniline
benzidine
4-chloroaniline
3,3'-dichlorobenzidine
diphenylamine*
2-nitroaniline
3-nitroaniline
4-nitroaniline
N-nitrosodimethylamine
N-nitrosodi-*n*-propylamine
pyridine

2,000 µg/mL each in methylene chloride:methanol (85:15), 1 mL/ampul
cat.# 31619 (ea.)

*N-nitrosodiphenylamine (8270-listed analyte) decomposes to diphenylamine (mix component) in the injector.

also available

Rxi®-5Sil MS Columns

Provide high response for 2,4-dinitrophenol, show excellent peak shape of pyridine, and produce outstanding resolution of PAHs.

See **page 64.**

Semivolatile Organics/Base, Neutral & Acid Extractables (BNAs), *cont.*

Method 8270D, 8270C (Semivolatile Organic Compounds), *cont.*

8270 Calibration Mix #3 (23 components)

Aramite
bis(2-chloroethyl)ether
bis(2-chloroethoxy)methane
bis(2-chloroisopropyl)ether
4-bromophenyl phenyl ether
chlorobenzilate
2-chloronaphthalene
4-chlorophenyl phenyl ether
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
1,3-dinitrobenzene
hexachlorobenzene
hexachlorobutadiene
hexachlorocyclopentadiene
hexachloroethane
hexachloropropene
isodrin
kepone
pentachlorobenzene
pentachloronitrobenzene
1,2,4,5-tetrachlorobenzene
1,2,4-trichlorobenzene

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31620 (ea.)

8270 Calibration Mix #4 (22 components)

acetophenone
azobenzene*
benzyl alcohol
bis(2-ethylhexyl)phthalate
butyl benzyl phthalate
dibenzofuran
diethyl phthalate
dimethyl phthalate
di-*n*-butyl phthalate
di-*n*-octyl phthalate
2,4-dinitrotoluene
2,6-dinitrotoluene
ethyl methanesulfonate
isophorone
isosafrole (*cis* & *trans*)
methyl methanesulfonate
1,4-naphthoquinone
nitrobenzene
4-nitroquinoline-1-oxide
phenacetin
safrole
1,3,5-trinitrobenzene

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31621 (ea.)

*1,2-diphenylhydrazine (8270-listed analyte) decomposes to azobenzene (mix component) in the injector.

3-Methylcholanthrene Standard

2,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31996 (ea.)

NEW!

8270 Calibration Mix #5, Revised (18 components)

acenaphthene
acenaphthylene
anthracene
benz(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(ghi)perylene
benzo(k)fluoranthene
chrysene
dibenzo(a,h)anthracene
fluoranthene
fluorene
indeno(1,2,3-cd)pyrene
1-methylnaphthalene
2-methylnaphthalene
naphthalene
phenanthrene
pyrene

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31995 (ea.)

NEW!

8270 Calibration Mix #6 (10 components)

diallate (*cis* & *trans*)
dimethoate
disulfoton
famphur
methyl parathion
parathion
phorate
pronamide
thionazine (zinophos)
O,O,O-triethyl phosphorothioate

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31623 (ea.)

Aramite

2,000 µg/mL in hexane, 1 mL/ampul
cat.# 31624 (ea.)

1,2-diphenylhydrazine

1,000 µg/mL in methanol, 1 mL/ampul
cat.# 31497 (ea.)

No data pack available.

Note that 1,2-diphenylhydrazine is an unstable compound that will oxidize to azobenzene, thereby decreasing the concentration of 1,2-diphenylhydrazine over time. For accurate calibration results, it is recommended that the concentrations of 1,2-diphenylhydrazine and azobenzene be combined. Please contact Restek Technical Service if you have any questions about this issue.

TCLP Acid Mix (6 components)

2-methylphenol
3-methylphenol
4-methylphenol
pentachlorophenol
2,4,5-trichlorophenol
2,4,6-trichlorophenol

2,000 µg/mL each in methanol, 1 mL/ampul
cat.# 31027 (ea.)

TCLP B/N Mix (7 components)

1,4-dichlorobenzene
2,4-dinitrotoluene
hexachlorobenzene
hexachlorobutadiene
hexachloroethane
nitrobenzene
pyridine

2,000 µg/mL each in acetone, 1 mL/ampul
cat.# 31028 (ea.)

8270/Appendix IX Calibration Kit (2,000 µg/mL)

Contains 1 mL each of these mixtures.
31618: 8270 Calibration Mix #1
31619: 8270 Calibration Mix #2
31620: 8270 Calibration Mix #3
31621: 8270 Calibration Mix #4
31995: 8270 Calibration Mix #5, Revised
31996: 3-Methylcholanthrene Standard
31623: 8270 Calibration Mix #6
32459: Appendix IX Mix #1, Revised (Methapyrilene is not included in this revised standard.)
32460: Methapyrilene Standard

cat.# 31627 (kit)

kit

8270 Calibration Kit (2,000 µg/mL)

Contains 1 mL each of these mixtures.
31618: 8270 Calibration Mix #1
31619: 8270 Calibration Mix #2
31620: 8270 Calibration Mix #3
31621: 8270 Calibration Mix #4
31995: 8270 Calibration Mix #5, Revised
31996: 3-Methylcholanthrene Standard

cat.# 31626 (kit)

kit

Semivolatile Organics/Base, Neutral & Acid Extractables (BNAs), *cont.*

SOM01.1 (Semivolatiles), QA Mixes

SOM01.1 Deuterated Monitoring Compound Mix SIM Compounds (2 components)

fluoranthene-d10
2-methylnaphthalene-d10

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 33913 (ea.)

04.2, 04.1, 4/89, and 3/90 SOW (Semivolatiles), QA Mixes

SV Internal Standard Mix (6 components)

acenaphthene-d10
chrysene-d12
1,4-dichlorobenzene-d4
naphthalene-d8
perylene-d12
phenanthrene-d10

Each	15-pk.	25-pk.
2,000 µg/mL each in methylene chloride, 1 mL/ampul		
31206	31206.15	31206.25
4,000 µg/mL each in methylene chloride, 1 mL/ampul		
31006	31006.15	31006.25

Revised SV Internal Standard Mix (7 components)

acenaphthene-d10
chrysene-d12
1,4-dichlorobenzene-d4
1,4-dioxane-d8
naphthalene-d8
perylene-d12
phenanthrene-d10

Each	15-pk.	25-pk.
2,000 µg/mL each in methylene chloride, 1 mL/ampul		
31885	31885.15	31885.25
4,000 µg/mL each in methylene chloride, 1 mL/ampul		
31886	31886.15	31886.25

Acid Surrogate Standard Mix (3/90 SOW) (4 components)

2-chlorophenol-d4
2-fluorophenol
phenol-d6
2,4,6-tribromophenol

1,500 µg/mL each in methanol, 1 mL/ampul
cat.# 31003 (ea.)

7,500 µg/mL each in methanol, 1 mL/ampul
cat.# 31073 (ea.)

7,500 µg/mL each in methanol, 5 mL/ampul
cat.# 31083 (ea.)

Acid Surrogate Mix (4/89 SOW) (3 components)

2-fluorophenol
phenol-d6
2,4,6-tribromophenol

Each	15-pk.	25-pk.
2,000 µg/mL each in methanol, 1 mL/ampul		
31025	31025.15	31025.25
10,000 µg/mL each in methanol, 1 mL/ampul		
31063	31063.15	31063.25
10,000 µg/mL each in methanol, 5 mL/ampul		
31087	31087.15	31087.25
10,000 µg/mL each in methanol, 10 mL/ampul		
33029	33029.15	33029.25

04.2, 04.1, 4/89, and 3/90 SOW (Semivolatiles), QA Mixes, *cont.*

Revised B/N Surrogate Mix (4 components)

2-fluorobiphenyl
nitrobenzene-d5
p-terphenyl-d14
pyrene-d10

Each	15-pk.	25-pk.
1,000 µg/mL each in methylene chloride, 1 mL/ampul		
31887	31887.15	31887.25
5,000 µg/mL each in methylene chloride, 1 mL/ampul		
31888	31888.15	31888.25
5,000 µg/mL each in methylene chloride, 5 mL/ampul		
31889	31889.15	31889.25

CLP 04.1 BNA Surrogate Mix (8 components)

2-chlorophenol-d4	1,500 µg/mL	nitrobenzene-d5	1,000
1,2-dichlorobenzene-d4	1,000	phenol-d6	1,500
2-fluorobiphenyl	1,000	*p*-terphenyl-d14	1,000
2-fluorophenol	1,500	2,4,6-tribromophenol	1,500

In methylene chloride, 1 mL/ampul
cat.# 31493 (ea.)

B/N Surrogate Standard Mix (3/90 SOW) (4 components)

1,2-dichlorobenzene-d4
2-fluorobiphenyl
nitrobenzene-d5
p-terphenyl-d14

1,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31002 (ea.)

5,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31072 (ea.)

5,000 µg/mL each in methylene chloride, 5 mL/ampul
cat.# 31082 (ea.)

B/N Surrogate Mix (4/89 SOW) (3 components)

2-fluorobiphenyl
nitrobenzene-d5
p-terphenyl-d14

Each	15-pk.	25-pk.
1,000 µg/mL each in methylene chloride, 1 mL/ampul		
31024	31024.15	31024.25
5,000 µg/mL each in methylene chloride, 1 mL/ampul		
31062	31062.15	31062.25
5,000 µg/mL each in methylene chloride, 5 mL/ampul		
31086	31086.15	31086.25
5,000 µg/mL each in methylene chloride, 10 mL/ampul		
33028	33028.15	33028.25

Acid Matrix Spike Mix (5 components)

4-chloro-3-methylphenol
2-chlorophenol
4-nitrophenol
pentachlorophenol
phenol

1,500 µg/mL each in methanol, 1 mL/ampul
cat.# 31005 (ea.)

7,500 µg/mL each in methanol, 1 mL/ampul
cat.# 31075 (ea.)

7,500 µg/mL each in methanol, 5 mL/ampul
cat.# 31085 (ea.)

Semivolatile Organics/Base, Neutral & Acid Extractables (BNAs), *cont.*

04.2, 04.1, 4/89, and 3/90 SOW (Semivolatiles), QA Mixes, *cont.*

CLP 04.1 B/N Matrix Spike Mix (4 components)

acenaphthene
2,4-dinitrotoluene
N-nitroso-di-*n*-propylamine
pyrene

1,000 µg/mL each in methanol, 1 mL/ampul
cat.# 31492 (ea.)

B/N Matrix Spike Mix (6 components)

acenaphthene
1,4-dichlorobenzene
2,4-dinitrotoluene
N-nitroso-di-*n*-propylamine
pyrene
1,2,4-trichlorobenzene

Each	15-pk.	25-pk.
1,000 µg/mL each in methanol, 1 mL/ampul		
31004	31004.15	31004.25
5,000 µg/mL each in methanol, 1 mL/ampul		
31074	31074.15	31074.25
5,000 µg/mL each in methanol, 5 mL/ampul		
31084	31084.15	31084.25
5,000 µg/mL each in methanol, 10 mL/ampul		
33030	33030.15	33030.25

up to 40% OFF list price

Special pricing on multipacks of 15 & 25!

EPA 8270 Internal, Surrogate & Spike Mixes!

- 8270 Matrix Spike Mix
- SV Internal Standard Mix
- Revised SV Internal Standard Mix
- B/N Surrogate Mix (4/89 SOW)
- Revised B/N Surrogate Mix
- Acid Surrogate Mix (4/89 SOW)
- B/N Matrix Spike Mix

Low-Concentration Semivolatiles, QA Mixes

SV Tuning Compound

decafluorotriphenylphosphine (DFTPP)

2,500 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31001 (ea.)

PFTBA (MS Tuning Compound)

perfluorotributylamine (PFTBA)

Neat, 1 mL/ampul
cat.# 30482 (ea.)

Neat, 1 g
cat.# 33027 (ea.)

No data pack available.

What separates Restek's line of certified reference materials from ordinary reference standards?

10 Critical Steps...

Learn more on **pages 438–439**.

www.restek.com/**iso**

Semivolatile Organics/Base, Neutral & Acid Extractables (BNAs), *cont.*

SOM01.1 (Semivolatiles), Calibration Mixes

SOM01.1 SVOA MegaMix® Standard, Revised (65 components)

MEGAMIX®

acenaphthene
acenaphthylene
acetophenone
anthracene
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(ghi)perylene
benzo(k)fluoranthene
benzyl butyl phthalate
biphenyl
bis(2-chloroethoxy)methane
bis(2-chloroethyl)ether
bis(2-chloroisopropyl)ether (2,2'-oxybis(1-chloropropane))
bis(2-ethylhexyl)phthalate
4-bromophenyl-phenylether
carbazole
4-chloroaniline
4-chloro-3-methylphenol
2-chloronaphthalene
2-chlorophenol
4-chlorophenyl-phenylether
chrysene
dibenzo(a,h)anthracene
dibenzofuran
3,3'-dichlorobenzidine
2,4-dichlorophenol
diethylphthalate
2,4-dimethylphenol
dimethylphthalate
di-*n*-butylphthalate
4,6-dinitro-2-methylphenol
2,4-dinitrophenol
2,4-dinitrotoluene
2,6-dinitrotoluene
di-*n*-octyl phthalate
diphenylamine[1]
fluoranthene
fluorene
hexachlorobenzene
hexachloro-1,3-butadiene (hexachloro-butadiene)
hexachlorocyclopentadiene
hexachloroethane
indeno(1,2,3-cd)pyrene
isophorone
2-methylnaphthalene
2-methylphenol (*o*-cresol)
3-methylphenol (*m*-cresol)*
4-methylphenol (*p*-cresol)*
naphthalene
2-nitroaniline
3-nitroaniline
4-nitroaniline
nitrobenzene
2-nitrophenol
4-nitrophenol
N-nitroso-di-*n*-propylamine
pentachlorophenol
phenanthrene
phenol
pyrene
1,2,4,5-tetrachlorobenzene
2,3,4,6-tetrachlorophenol
2,4,5-trichlorophenol
2,4,6-trichlorophenol

1,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31900 (ea.)

*3-methylphenol and 4-methylphenol concentration is 500 µg/mL.
[1] N-nitrosodiphenylamine (CLP-listed analyte) decomposes to diphenylamine (mix component) in the injector.

CLP/SVOA Additions Mix (3 components)

atrazine
benzaldehyde
ε-caprolactam

1,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31902 (ea.)

SOM01.1 SVOA MegaMix® Kit

MEGAMIX®

Contains 1 mL each of these mixtures.
31900: SOM01.1 SVOA MegaMix Standard, Revised
31902: CLP/SVOA Additions Mix

cat.# 31904 (kit)

kit

04.2 and 04.1 (Semivolatiles), Calibration Mixes

CLP 04.1 B/N MegaMix® Standard, Revision 2 (47 components)

MEGAMIX®

acenaphthene
acenaphthylene
acetophenone
anthracene
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(ghi)perylene
benzo(k)fluoranthene
benzyl butyl phthalate
biphenyl
bis(2-chloroethoxy)methane
bis(2-chloroethyl)ether
bis(2-chloroisopropyl)ether (2,2'-oxybis(1-chloropropane))
bis(2-ethylhexyl)phthalate
4-bromophenyl phenyl ether
carbazole
4-chloroaniline
2-chloronaphthalene
4-chlorophenyl phenyl ether
chrysene
dibenzo(a,h)anthracene
dibenzofuran
diethylphthalate
dimethylphthalate
di-*n*-butyl phthalate
2,4-dinitrotoluene
2,6-dinitrotoluene
di-*n*-octyl phthalate
diphenylamine[1]
fluoranthene
fluorene
hexachlorobenzene
hexachloro-1,3-butadiene (hexachloro-butadiene)
hexachlorocyclopentadiene
hexachloroethane
indeno(1,2,3-cd)pyrene
isophorone
2-methylnaphthalene
naphthalene
2-nitroaniline
3-nitroaniline
4-nitroaniline
nitrobenzene
N-nitroso-di-*n*-propylamine
phenanthrene
pyrene

1,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31903 (ea.)

[1] N-nitrosodiphenylamine (CLP-listed analyte) decomposes to diphenylamine (mix component) in the injector.

CLP/SVOA Additions Mix (3 components)

atrazine
benzaldehyde
ε-caprolactam

1,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31902 (ea.)

CLP 04.1 B/N MegaMix® Kit

MEGAMIX®

Contains 1 mL each of these mixtures.
31903: CLP 04.1 B/N MegaMix Standard, Revision 2
31902: CLP/SVOA Additions Mix

cat.# 31905 (kit)

kit

tech tip

CLP Semivolatiles Dilution Tip

Atrazine and benzaldehyde react quickly with the methanol stabilizer used in most brands and grades of methylene chloride. This reaction will prevent you from obtaining stable, working-level calibration standards. We prepare our CLP semivolatiles standards from methylene chloride that is stabilized with amylene and is completely free of methanol. We strongly recommend screening the methylene chloride used to dilute these mixtures and confirming that it is free of methanol.

also available

Rxi®-5Sil MS Capillary Columns

Ideal for semivolatiles analysis

See **pages 32–33** for details.

Semivolatile Organics/Base, Neutral & Acid Extractables (BNAs), *cont.*

04.2 and 04.1 (Semivolatiles), Calibration Mixes, *cont.*

CLP 04.1 Phenols Calibration Mix (14 components)

4-chloro-3-methylphenol
2-chlorophenol
2,4-dichlorophenol
2,4-dimethylphenol
2,4-dinitrophenol
2-methyl-4,6-dinitrophenol
2-methylphenol
4-methylphenol
2-nitrophenol
4-nitrophenol
pentachlorophenol
phenol
2,4,5-trichlorophenol
2,4,6-trichlorophenol

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31494 (ea.)

Benzidine Mix (2 components)

benzidine
3,3'-dichlorobenzidine

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31834 (ea.)

4/89 and 3/90 SOW (Semivolatiles), Calibration Mixes

SV Calibration Mix #1 (5 components)

benzyl alcohol
4-chloroaniline
2-nitroaniline
3-nitroaniline
4-nitroaniline

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31007 (ea.)

SV Calibration Mix #2 (15 components)

benzoic acid
4-chloro-3-methylphenol
2-chlorophenol
2,4-dichlorophenol
2,4-dimethylphenol
2,4-dinitrophenol
2-methyl-4,6-dinitrophenol
2-methylphenol
4-methylphenol
2-nitrophenol
4-nitrophenol
pentachlorophenol
phenol
2,4,5-trichlorophenol
2,4,6-trichlorophenol

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31008 (ea.)

SV Calibration Mix #3 (14 components)

bis(2-chloroethoxy)methane
bis(2-chloroethyl)ether
bis(2-chloroisopropyl)ether
bis(2-ethylhexyl)phthalate
4-bromophenyl phenyl ether
butyl benzyl phthalate
2-chloronaphthalene
4-chlorophenyl phenyl ether
dimethylphthalate
di-*n*-butylphthalate
di-*n*-octylphthalate
N-nitrosodimethylamine
N-nitroso-di-*n*-propylamine
N-nitrosodiphenylamine

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31009 (ea.)

4/89 and 3/90 SOW (Semivolatiles), Calibration Mixes, *cont.*

SV Calibration Mix #4 (13 components)

carbazole
dibenzofuran
diethyl phthalate
2,4-dinitrotoluene
2,6-dinitrotoluene
hexachlorobenzene
hexachlorobutadiene
hexachlorocyclopentadiene
hexachloroethane
isophorone
2-methylnaphthalene
nitrobenzene
1,2,4-trichlorobenzene

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31010 (ea.)

SV Calibration Mix #5 / 610 PAH Mix (16 components)

acenaphthene
acenaphthylene
anthracene
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(k)fluoranthene
benzo(ghi)perylene
chrysene
dibenzo(a,h)anthracene
fluoranthene
fluorene
indeno(1,2,3-cd)pyrene
naphthalene
phenanthrene
pyrene

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31011 (ea.)

SV Calibration Mix #6 (18 components)

aldrin
α-BHC
β-BHC
δ-BHC
γ-BHC (lindane)
4,4'-DDD
4,4'-DDE
4,4'-DDT
dieldrin
endosulfan I
endosulfan II
endosulfan sulfate
endrin
endrin aldehyde
endrin ketone
heptachlor
heptachlor epoxide (isomer B)
methoxychlor

2,000 µg/mL each in toluene:hexane (1:1), 1 mL/ampul
cat.# 31012 (ea.)

SV Calibration Mix #7 (3 components)

1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31013 (ea.)

3,3'-Dichlorobenzidine

2,000 µg/mL in methanol, 1 mL/ampul
cat.# 31026 (ea.)

2,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31835 (ea.)

605 Benzidines Calibration Mix (2 components)

benzidine
3,3'-dichlorobenzidine

2,000 µg/mL each in methanol, 1 mL/ampul
cat.# 31030 (ea.)

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31834 (ea.)

Semivolatile Organics/Base, Neutral & Acid Extractables (BNAs), *cont.*

4/89 and 3/90 SOW (Semivolatiles), Calibration Mixes, *cont.*

8270 Benzidines Mix (3 components)

benzidine
3,3'-dimethylbenzidine
3,3'-dichlorobenzidine

2,000 µg/mL each in methanol, 1 mL/ampul
cat.# 31688 (ea.)

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31852 (ea.)

CLP Semivolatile Calibration Kit #2 (without pesticides)

Contains 1 mL each of these mixtures.
31007: SV Calibration Mix #1 (anilines)
31008: SV Calibration Mix #2 (phenols)
31009: SV Calibration Mix #3 (base neutrals)
31010: SV Calibration Mix #4 (base neturals)
31011: SV Calibration Mix #5 (PAHs)
31013: SV Calibration Mix #7 (dichlorobenzenes)
31026: 3,3'-dichlorobenzidine

cat.# 31462 (kit) kit

Semivolatile Calibration Kit #3 (with benzidine)

Contains 1 mL each of these mixtures.
31007: SV Calibration Mix #1 (anilines)
31008: SV Calibration Mix #2 (phenols)
31009: SV Calibration Mix #3 (base neutrals)
31010: SV Calibration Mix #4 (base neturals)
31011: SV Calibration Mix #5 (PAHs)
31013: SV Calibration Mix #7 (dichlorobenzenes)
31030: 605 Benzidines Calibration Mix (benzidine & 3,3'-dichlorobenzidine)

cat.# 31463 (kit) kit

03.2 (Semivolatiles), Calibration Mixes

OLC 03.2 SVOA Deuterated Monitoring Compounds (DMC) (16 components)

acenaphthylene-d8
anthracene-d10
benzo(a)pyrene-d12
4-chloroaniline-d4
bis-(2-chloroethyl)ether-d8
2-chlorophenol-d4
2,4-dichlorophenol-d3
dimethylphthalate-d6
4,6-dinitro-methylphenol-d2
fluorene-d10
4-methylphenol-d8
nitrobenzene-d5
2-nitrophenol-d4
4-nitrophenol-d4
phenol-d5
pyrene-d10

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31810 (ea.)

Fortification Mix (7 components)

4,6-dinitro-2-methylphenol
2,4-dinitrophenol
2-nitroaniline
3-nitroaniline
4-nitroaniline
4-nitrophenol
2,4,5-trichlorophenol

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31813 (ea.)

03.2 (Semivolatiles), Calibration Mixes, *cont.*

3,3'-Dichlorobenzidine

2,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31835 (ea.)

Hexachlorophene

2,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31811 (ea.)

Low-Concentration Semivolatiles, Calibration Mixes

L/C Phenol Mix A (6 components)

2,4-dinitrophenol
2-methyl-4,6-dinitrophenol
4-nitrophenol
pentachlorophenol
2,4,6-tribromophenol (SS)
2,4,5-trichlorophenol

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31208 (ea.)

Must be calibrated at a level different from the other listed semivolatile compounds.

L/C Aniline Mix A (3 components)

2-nitroaniline
3-nitroaniline
4-nitroaniline

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31210 (ea.)

Must be calibrated at a level different from the other listed semivolatile compounds.

L/C Aniline Mix B

4-chloroaniline

2,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31211 (ea.)

Additional Required Low-Concentration Semivolatile Mixes:

31024:	B/N Surrogate Mix (4/89 SOW)	page 475
31009:	SV Calibration Mix #3	page 506
31010:	SV Calibration Mix #4	page 506
31011:	SV Calibration Mix #5	page 473
31026:	3,3'-dichlorobenzidine	page 442
31001:	SV Tuning Compound (DFTPP)	page 442

Note: Pesticides are not included in the EPA CLP semivolatile analytical method.

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See **pages 438–439**.

Semivolatile Organics/Base, Neutral & Acid Extractables (BNAs), *cont.*

GPC Calibration Mix

Qualitative mixture useful for determining GPC dump/collect times. The compounds are dissolved in methylene chloride at the concentrations listed.

CLP GPC Calibration Mix (5 components)

bis(2-ethylhexyl) phthalate	10 mg/mL	perylene	0.2
corn oil	250	sulfur	0.8
methoxychlor	2.0		

In methylene chloride, 1 mL/ampul
cat.# 32019 (ea.)

In methylene chloride, 5 mL/ampul
cat.# 32023 (ea.)

No data pack available.

Revised GPC Calibration Mix (5 components)

bis(2-ethylhexyl) phthalate	5 mg/mL	perylene	0.2
corn oil	250	sulfur	0.8
methoxychlor	1.0		

In methylene chloride, 1 mL/ampul
cat.# 32041 (ea.)

In methylene chloride, 5 mL/ampul
cat.# 32042 (ea.)

No data pack available.

did you know?

Our **Pesticide Matrix Spike Mix** (cat.# 32018, **page 488**) can be used as a GPC calibration verification solution.

NEW!

Compound Index for Reference Standards

See **pages 730–736.**

Toxicity Characteristic Leaching Procedure (TCLP)

Method 1311 (Toxicity Characteristic Leaching Procedure [TCLP])

TCLP VOA Mix (11 components)

benzene	1,2-dichloroethane
2-butanone (MEK)	1,1-dichloroethene
carbon tetrachloride	tetrachloroethene
chlorobenzene	trichloroethene
chloroform	vinyl chloride
1,4-dichlorobenzene	

2,000 µg/mL each in P&T methanol:water (90:10), 1 mL/ampul
cat.# 30024 (ea.)

TCLP Acid Mix (6 components)

2-methylphenol	pentachlorophenol
3-methylphenol	2,4,5-trichlorophenol
4-methylphenol	2,4,6-trichlorophenol

2,000 µg/mL each in methanol, 1 mL/ampul
cat.# 31027 (ea.)

TCLP B/N Mix (7 components)

1,4-dichlorobenzene	hexachloroethane
2,4-dinitrotoluene	nitrobenzene
hexachlorobenzene	pyridine
hexachlorobutadiene	

2,000 µg/mL each in acetone, 1 mL/ampul
cat.# 31028 (ea.)

TCLP Pesticide Mix (5 components)

γ-BHC (lindane)	heptachlor epoxide (isomer B)
endrin	methoxychlor
heptachlor	

2,000 µg/mL each in methanol, 1 mL/ampul
cat.# 32013 (ea.)

TCLP Herbicide Mix (2 components)

2,4-D (free acid)
Silvex (free acid)

2,000 µg/mL each in methanol, 1 mL/ampul
cat.# 32014 (ea.)

TCLP Toxaphene Mix

toxaphene

2,000 µg/mL in methanol, 1 mL/ampul
cat.# 32015 (ea.)

TCLP Chlordane Mix

chlordane

2,000 µg/mL in methanol, 1 mL/ampul
cat.# 32016 (ea.)

Trihalomethanes

Method 501.1, 501.2, 501.3 (Trihalomethanes)

501 Trihalomethane Mix (4 components)

bromodichloromethane
bromoform
chloroform
dibromochloromethane

200 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30036 (ea.)

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30211 (ea.)

DW-VOC Mix #1 (8 components)

benzene
carbon tetrachloride
1,4-dichlorobenzene
1,2-dichloroethane
1,1-dichloroethene
1,1,1-trichloroethane
trichloroethene
vinyl chloride

200 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30037 (ea.)

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30219 (ea.)

DW-VOC Mix #2 (12 components)

chlorobenzene
1,2-dichlorobenzene
cis-1,2-dichloroethene
trans-1,2-dichloroethene
1,2-dichloropropane
ethylbenzene
styrene
tetrachloroethene
toluene
m-xylene
o-xylene
p-xylene

200 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30038 (ea.)

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30220 (ea.)

DW-VOC Mix #3 (3 components)

methylene chloride
1,2,4-trichlorobenzene
1,1,2-trichloroethane

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30235 (ea.)

DW-VOC Kit #2 (2,000 µg/mL)

Contains 1 mL each of these mixtures.
30211: 501 Trihalomethane Mix
30219: DW-VOC Mix #1
30220: DW-VOC Mix #2
30235: DW-VOC Mix #3

cat.# 30221 (kit) kit

Technical Service

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Volatile Organics

Individual VOA Surrogate and Internal Standards for EPA Methods

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

Compound	CAS #	Solvent	Conc.	cat.#
benzene-d6	1076-43-3	PTM	2,000	30025
2-bromochlorobenzene	694-80-4	PTM	2,000	30228
4-bromochlorobenzene	106-39-8	PTM	2,000	30230
bromochloromethane	74-97-5	PTM	2,000	30225
2-bromo-1-chloropropane	3017-95-6	PTM	2,000	30226
4-bromofluorobenzene	460-00-4	PTM	2,000	30026
chlorobenzene-d5	3114-55-4	PTM	2,000	30223
1-chloro-2-fluorobenzene	348-51-6	PTM	2,000	30040
1,2-dichlorobenzene-d4	2199-69-1	PTM	2,000	30049
1,4-dichlorobutane	110-56-5	PTM	2,000	30227
1,2-dichloroethane-d4	17060-07-0	PTM	2,000	30027
1,4-difluorobenzene	540-36-3	PTM	2,000	30032
ethylbenzene-d5	20302-26-5	PTM	2,000	30028
ethylbenzene-d10	25837-05-2	PTM	2,000	30029
fluorobenzene	462-06-6	PTM	2,000	30030
pentafluorobenzene	363-72-4	PTM	2,000	30031
toluene-d8	2037-26-5	PTM	2,000	30224
α,α,α-trifluorotoluene	98-08-8	PTM	2,000	30048

PTM = Purge-and-trap grade methanol

Method 501.1, 501.2, 501.3 (Trihalomethanes)

See page 509.

Antifoam Agent for Purge-and-Trap Samples

Foam generated as purge gas passes through a sample can enter the analytical trap—and possibly the GC column. Our silica-containing antifoam agent is effective over a wide pH range and will not conflict with chromatography of target analytes. To use properly, see the instructions on the product certificate or on the product page (search "31822" at www.restek.com).

Neat, 1 mL/ampul

cat.# 31822 (ea.)

No data pack available.

Method 502.1, 502.2 (Volatile Halogenated Organics)

502.2 Internal Standard #1

1-chloro-2-fluorobenzene

2,000 µg/mL in P&T methanol, 1 mL/ampul

cat.# 30040 (ea.)

502.2 Internal Standard Mix #2 (2 components)

2-bromo-1-chloropropane
fluorobenzene

2,000 µg/mL each in P&T methanol, 1 mL/ampul

cat.# 30041 (ea.)

8021/502.2 Surrogate Mix #1 (3 components)

1-bromo-2-chloroethane
1-chloro-3-fluorobenzene
fluorobenzene

2,000 µg/mL each in P&T methanol, 1 mL/ampul

cat.# 30463 (ea.)

Volatiles MegaMix® Standard With Gases

(60 components)

benzene
bromobenzene
bromochloromethane
bromodichloromethane
bromoform
bromomethane (methyl bromide)
n-butylbenzene
sec-butylbenzene
tert-butylbenzene
carbon tetrachloride
chlorobenzene
chloroethane (ethyl chloride)
chloroform
chloromethane (methyl chloride)
2-chlorotoluene
4-chlorotoluene
dibromochloromethane
1,2-dibromo-3-chloropropane (DBCP)
1,2-dibromoethane (EDB)
dibromomethane
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
dichlorodifluoromethane (CFC-12)
1,1-dichloroethane
1,2-dichloroethane
1,1-dichloroethene
cis-1,2-dichloroethene
trans-1,2-dichloroethene
1,2-dichloropropane
1,3-dichloropropane
2,2-dichloropropane
1,1-dichloropropene
cis-1,3-dichloropropene
trans-1,3-dichloropropene
ethylbenzene
hexachloro-1,3-butadiene (hexachlorobutadiene)
isopropylbenzene (cumene)
4-isopropyltoluene (*p*-cymene)
methylene chloride (dichloromethane)
naphthalene
n-propylbenzene
styrene
1,1,1,2-tetrachloroethane
1,1,2,2-tetrachloroethane
tetrachloroethene
toluene
1,2,3-trichlorobenzene
1,2,4-trichlorobenzene
1,1,1-trichloroethane
1,1,2-trichloroethane
trichloroethene
trichlorofluoromethane (CFC-11)
1,2,3-trichloropropane
1,2,4-trimethylbenzene
1,3,5-trimethylbenzene
vinyl chloride
m-xylene
o-xylene
p-xylene

200 µg/mL each in P&T methanol, 1 mL/ampul

cat.# 30603 (ea.)

NEW!
Compound Index for Reference Standards

See **pages 730–736.**

Volatile Organics

Method 502.1, 502.2 (Volatile Halogenated Organics), *cont.*

502.2 MegaMix® Standard (54 components)

MEGAMIX®

Includes all target analytes except the six gases, which are available separately as 502.2 Calibration Mix #1 (below).

benzene
bromobenzene
bromochloromethane
bromodichloromethane
bromoform
n-butylbenzene
sec-butylbenzene
tert-butylbenzene
carbon tetrachloride
chlorobenzene
chloroform
2-chlorotoluene
4-chlorotoluene
dibromochloromethane
1,2-dibromo-3-chloropropane (DBCP)
1,2-dibromoethane
dibromomethane
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
1,1-dichloroethane
1,2-dichloroethane
1,1-dichloroethene
cis-1,2-dichloroethene
trans-1,2-dichloroethene
1,2-dichloropropane
1,3-dichloropropane
2,2-dichloropropane
1,1-dichloropropene
cis-1,3-dichloropropene
trans-1,3-dichloropropene
ethylbenzene
hexachloro-1,3-butadiene (hexachlorobutadiene)
isopropylbenzene (cumene)
4-isopropyltoluene (*p*-cymene)
methylene chloride (dichloromethane)
naphthalene
n-propylbenzene
styrene
1,1,1,2-tetrachloroethane
1,1,2,2-tetrachloroethane
tetrachloroethene
toluene
1,2,3-trichlorobenzene
1,2,4-trichlorobenzene
1,1,1-trichloroethane
1,1,2-trichloroethane
trichloroethene
1,2,3-trichloropropane
1,2,4-trimethylbenzene
1,3,5-trimethylbenzene
m-xylene
o-xylene
p-xylene

200 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30432 (ea.)

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30431 (ea.)

502.2 Calibration Mix #1 (gases) (6 components)

bromomethane
chloroethane
chloromethane
dichlorodifluoromethane (CFC-12)
trichlorofluoromethane (CFC-11)
vinyl chloride

200 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30439 (ea.)

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30042 (ea.)

502.2 Calibration Mix #2 (14 components)

bromodichloromethane
bromoform
carbon tetrachloride
chloroform
1,1-dichloroethane
1,1-dichloroethene
trans-1,2-dichloroethene
1,3-dichloropropane
2,2-dichloropropane
cis-1,3-dichloropropene
trans-1,3-dichloropropene
methylene chloride
1,1,1-trichloroethane
trichloroethene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30043 (ea.)

502.2 Calibration Mix #3 (14 components)

bromochloromethane
dibromochloromethane
1,2-dibromo-3-chloropropane
1,2-dibromoethane
dibromomethane
1,2-dichloroethane
cis-1,2-dichloroethene
1,2-dichloropropane
1,1-dichloropropene
1,1,1,2-tetrachloroethane
1,1,2,2-tetrachloroethane
tetrachloroethene
1,1,2-trichloroethane
1,2,3-trichloropropane

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30044 (ea.)

502.2 Calibration Mix #4 (9 components)

benzene
tert-butylbenzene
chlorobenzene
isopropylbenzene
n-propylbenzene
styrene
toluene
1,3,5-trimethylbenzene
m-xylene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30045 (ea.)

502.2 Calibration Mix #5 (10 components)

bromobenzene
n-butylbenzene
sec-butylbenzene
2-chlorotoluene
1,3-dichlorobenzene
ethylbenzene
1,2,4-trichlorobenzene
1,2,4-trimethylbenzene
o-xylene
p-xylene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30046 (ea.)

502.2 Calibration Mix #6 (7 components)

4-chlorotoluene
1,2-dichlorobenzene
1,4-dichlorobenzene
hexachlorobutadiene
4-isopropyltoluene
naphthalene
1,2,3-trichlorobenzene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30047 (ea.)

502.2 VOA Calibration Kit #1 (2,000 µg/mL)

Contains 1 mL each of these mixtures.
30042: 502.2 Calibration Mix #1
30043: 502.2 Calibration Mix #2
30044: 502.2 Calibration Mix #3
30045: 502.2 Calibration Mix #4
30046: 502.2 Calibration Mix #5
30047: 502.2 Calibration Mix #6

cat.# 30444 (kit) kit

502.2 VOA Calibration Kit #2 (2,000 µg/mL)

Contains 1 mL each of these mixtures.
30042: 502.2 Calibration Mix #1
30431: 502.2 MegaMix Standard

cat.# 30445 (kit) kit

502.2 VOA Calibration Kit #3 (200 µg/mL)

Contains 1 mL each of these mixtures.
30439: 502.2 Calibration Mix #1
30432: 502.2 MegaMix Standard

cat.# 30446 (kit) kit

Volatile Organics, *cont.*

Method 504.1 (Ethylene Dibromide/ Dibromochloropropane)

504.1 Calibration Mix (3 components)

1,2-dibromo-3-chloropropane
1,2-dibromoethane
1,2,3-trichloropropane

200 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30239 (ea.)

Method 522 (1,4-Dioxane)

See page 481.

Method 524.1, 524.2 (Volatile Organics)

524 Internal Standard/Surrogate Mix (3 components)

4-bromofluorobenzene
1,2-dichlorobenzene-d4
fluorobenzene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30201 (ea.)

Surrogate Standard (2 components)

4-bromofluorobenzene
α,α,α-trifluorotoluene

2,500 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30484 (ea.)

524.2 Surrogate Standard (2 components)

1-bromo-4-fluorobenzene
1,2-dichlorobenzene-d4

2,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30607 (ea.)

PFTBA (MS Tuning Compound)

perfluorotributylamine (PFTBA)

Neat, 1 mL/ampul
cat.# 30482 (ea.)

Neat, 1 g
cat.# 33027 (ea.)

No data pack available.

Antifoam Agent for Purge-and-Trap Samples

Foam generated as purge gas passes through a sample can enter the analytical trap—and possibly the GC column. Our silica-containing antifoam agent is effective over a wide pH range and will not conflict with chromatography of target analytes. To use properly, see the instructions on the product certificate or on the product page (search "31822" at www.restek.com).

Neat, 1 mL/ampul
cat.# 31822 (ea.)

No data pack available.

Method 524.1, 524.2 (Volatile Organics), *cont.*

Volatiles MegaMix® Standard With Gases

(60 components)

benzene
bromobenzene
bromochloromethane
bromodichloromethane
bromoform
bromomethane (methyl bromide)
n-butylbenzene
sec-butylbenzene
tert-butylbenzene
carbon tetrachloride
chlorobenzene
chloroethane (ethyl chloride)
chloroform
chloromethane (methyl chloride)
2-chlorotoluene
4-chlorotoluene
dibromochloromethane
1,2-dibromo-3-chloropropane (DBCP)
1,2-dibromoethane (EDB)
dibromomethane
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
dichlorodifluoromethane (CFC-12)
1,1-dichloroethane
1,2-dichloroethane
1,1-dichloroethene
cis-1,2-dichloroethene
trans-1,2-dichloroethene
1,2-dichloropropane
1,3-dichloropropane
2,2-dichloropropane
1,1-dichloropropene
cis-1,3-dichloropropene
trans-1,3-dichloropropene
ethylbenzene
hexachloro-1,3-butadiene (hexachlorobutadiene)
isopropylbenzene (cumene)
4-isopropyltoluene (*p*-cymene)
methylene chloride (dichloromethane)
naphthalene
n-propylbenzene
styrene
1,1,1,2-tetrachloroethane
1,1,2,2-tetrachloroethane
tetrachloroethene
toluene
1,2,3-trichlorobenzene
1,2,4-trichlorobenzene
1,1,1-trichloroethane
1,1,2-trichloroethane
trichloroethene
trichlorofluoromethane (CFC-11)
1,2,3-trichloropropane
1,2,4-trimethylbenzene
1,3,5-trimethylbenzene
vinyl chloride
m-xylene
o-xylene
p-xylene

200 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30603 (ea.)

502.2 Calibration Mix #1 (gases) (6 components)

bromomethane
chloroethane
chloromethane
dichlorodifluoromethane (CFC-12)
trichlorofluoromethane (CFC-11)
vinyl chloride

200 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30439 (ea.)

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30042 (ea.)

Ketones Mix, 524.2 Rev. 4.1 (5 components)

acetone
2-butanone (MEK)
1,1-dichloro-2-propanone
2-hexanone
4-methyl-2-pentanone (MIBK)

5,000 µg/mL each in P&T methanol:water (90:10), 1 mL/ampul
cat.# 30602 (ea.)

Oxygenates Standard (5 components)

diisopropyl ether (DIPE)	2,000 µg/mL	*tert*-amyl methyl ether (TAME)	2,000
ethyl-*tert*-butyl ether (ETBE)	2,000	*tert*-butyl alcohol (TBA)	10,000
tert-amyl ethyl ether (TAEE)	2,000		

In P&T methanol, 1 mL/ampul
cat.# 30619 (ea.)

Volatile Organics, *cont.*

Method 524.1, 524.2 (Volatile Organics), *cont.*

Drinking Water VOA MegaMix® Standard, 524.2 Rev. 4.1 (73 components)

MEGAMIX®

acrylonitrile
allyl chloride
benzene
bromobenzene
bromochloromethane
bromodichloromethane
bromoform
n-butylbenzene
sec-butylbenzene
tert-butylbenzene
carbon disulfide
carbon tetrachloride
chloroacetonitrile
chlorobenzene
1-chlorobutane
chlorodibromomethane (dibromochloromethane)
chloroform
2-chlorotoluene
4-chlorotoluene
1,2-dibromo-3-chloropropane (DBCP)
1,2-dibromoethane (ethylene dibromide)
dibromomethane
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
trans-1,4-dichloro-2-butene
1,1-dichloroethane
1,2-dichloroethane
1,1-dichloroethene
cis-1,2-dichloroethene
trans-1,2-dichloroethene
1,2-dichloropropane
1,3-dichloropropane
2,2-dichloropropane
1,1-dichloropropene
cis-1,3-dichloropropene
trans-1,3-dichloropropene
diethyl ether (ethyl ether)
ethylbenzene
ethyl methacrylate
hexachloro-1,3-butadiene
hexachloroethane
iodomethane (methyl iodide)
isopropylbenzene (cumene)
4-isopropyltoluene (*p*-cymene)
methacrylonitrile
methyl acrylate
methyl *tert*-butyl ether (MTBE)
methylene chloride (dichloromethane)
methyl methacrylate
naphthalene
nitrobenzene
2-nitropropane
pentachloroethane
propionitrile (ethylcyanide)
n-propylbenzene
styrene
1,1,1,2-tetrachloroethane
1,1,2,2-tetrachloroethane
tetrachloroethene
tetrahydrofuran
toluene
1,2,3-trichlorobenzene
1,2,4-trichlorobenzene
1,1,1-trichloroethane
1,1,2-trichloroethane
trichloroethene
1,2,3-trichloropropane
1,2,4-trimethylbenzene
1,3,5-trimethylbenzene
m-xylene
o-xylene
p-xylene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30601 (ea.)

524 Calibration Mix #7A (5 components)

acetone
2-butanone (MEK)
2-hexanone
4-methyl-2-pentanone (MIBK)
tetrahydrofuran

2,000 µg/mL each in P&T methanol:water (90:10), 1 mL/ampul
cat.# 30300 (ea.)

524 Calibration Mix #7B (7 components)

acrylonitrile
allyl chloride (3-chloropropene)
ethyl methacrylate
methyl acrylate
methyl methacrylate
nitrobenzene
pentachloroethane

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30304 (ea.)

524 Calibration Mix #7 Kit

Contains 1 mL each of these mixtures.
30300: 524 Calibration Mix #7A
30304: 524 Calibration Mix #7B

cat.# 30202 (kit) kit

524 Calibration Mix #8 (12 components)

carbon disulfide
chloroacetonitrile
1-chlorobutane
trans-1,4-dichloro-2-butene
1,1-dichloro-2-propanone
diethyl ether
hexachloroethane
iodomethane (methyl iodide)
methacrylonitrile
methyl *tert*-butyl ether
2-nitropropane
propionitrile

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30203 (ea.)

524 Rev. 4.0 Volatile Organics Kit (2,000 µg/mL)

Contains 1 mL each of these mixtures.
30201: 524 Internal Standard/Surrogate Mix
30042: 502.2 Calibration Mix #1
30043: 502.2 Calibration Mix #2
30044: 502.2 Calibration Mix #3
30045: 502.2 Calibration Mix #4
30046: 502.2 Calibration Mix #5
30047: 502.2 Calibration Mix #6
30300: 524 Calibration Mix #7A
30304: 524 Calibration Mix #7B
30203: 524 Calibration Mix #8

cat.# 30204 (kit) kit

524 Rev. 4.0 VOA Kit #2 (2,000 µg/mL)

Contains 1 mL each of these mixtures.
30042: 502.2 Calibration Mix #1
30431: 502.2 MegaMix Standard
30300: 524 Calibration Mix #7A
30304: 524 Calibration Mix #7B
30203: 524 Calibration Mix #8
30201: 524 Surrogate/Internal Standard Mix

cat.# 30447 (kit) kit

NEW!

Compound Index for Reference Standards

See **pages 730–736.**

Volatile Organics, *cont.*

Method 524.3 (Purgeable Organics in Drinking Water)

UCMR3 Method 524.3 Standard (9 components)

bromochloromethane	600 µg/mL	chloromethane	2,000
bromomethane	2,000	1,1-dichloroethane	300
1,3-butadiene	1,000	*n*-propylbenzene	300
sec-butylbenzene	400	1,2,3-trichloropropane	300
chlorodifluoromethane (CFC-22)	800		

In P&T methanol, 1 mL/ampul

cat.# 30642 (ea.)

NEW!

EPA 524.3 Reference Standards

- Full 82-component EPA 524.3 list using as few as three ampuls—reduce prep time and chances for error or contamination.
- EPA 524.3 VOA MegaMix® ampul includes oxygenates group—no need to order separately.
- Volatile gases prepared separately—replace shorter-life components without wasting money on full list.
- Two options for internal and surrogate standards—separate or combined mix.
- Certified reference materials (CRMs) manufactured and QC-tested in Restek's ISO-accredited labs—satisfy your ISO requirements.
- Also ideal for surface water and groundwater testing.

In support of the U.S. Safe Drinking Water Act (SDWA), Restek offers a complete set of EPA 524.3 reference standards for the monitoring of purgeable organic compounds in drinking water—using as few as three ampuls! In addition, this collection of certified reference materials (CRMs) also covers the seven volatile organic compounds (VOCs) included in the Unregulated Contaminant Monitoring Rule 3 (UCMR3), which requires monitoring of all public drinking water systems with 10,000 or more customers.

524.3 VOA MegaMix® Standard

MegaMix®

(69 components)

allyl chloride (3-chloropropene)
tert-amyl ethyl ether (TAEE)
tert-amyl methyl ether (TAME)
benzene
bromobenzene
bromochloromethane
bromodichloromethane
bromoform
tert-butanol (TBA)
n-butylbenzene
sec-butylbenzene
tert-butylbenzene
carbon disulfide
carbon tetrachloride
chlorobenzene
chloroform
1-chlorobutane (butyl chloride)
2-chlorotoluene
4-chlorotoluene
dibromochloromethane
1,2-dibromo-3-chloropropane
dibromomethane
1,2-dibromoethane (EDB)
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
1,1-dichloroethane
1,2-dichloroethane
1,1-dichloroethene
cis-1,2-dichloroethene
trans-1,2-dichloroethene
1,2-dichloropropane
1,3-dichloropropane
1,1-dichloropropene
cis-1,3-dichloropropene
trans-1,3-dichloropropene
diethyl ether (ethyl ether)
diisopropyl ether (DIPE)
ethylbenzene
ethyl-*tert*-butyl ether (ETBE)
ethyl methacrylate
hexachlorobutadiene
hexachloroethane
iodomethane (methyl iodide)
isopropylbenzene (cumene)
4-isopropyltoluene (*p*-cymene)
methyl acetate
methyl-*tert*-butyl ether (MTBE)
methylene chloride (dichloromethane)
naphthalene
pentachloroethane
n-propylbenzene
styrene
tetrachloroethene
1,1,1,2-tetrachloroethane
1,1,2,2-tetrachloroethane
tetrahydrofuran
toluene
1,2,3-trichlorobenzene
1,2,4-trichlorobenzene
1,1,1-trichloroethane
1,1,2-trichloroethane
trichloroethene
1,2,3-trichloropropane
1,2,4-trimethylbenzene
1,3,5-trimethylbenzene
m-xylene
o-xylene
p-xylene

2,000 µg/mL each in P&T methanol, 1 mL/ampul

cat.# 30013 (ea.)

NEW!

524.3 Gas Calibration Mix (7 components)

bromomethane (methyl bromide)
1,3-butadiene
chlorodifluoromethane (CFC-22)
chloromethane (methyl chloride)
dichlorodifluoromethane (CFC-12)
trichlorofluoromethane (CFC-11)
vinyl chloride

2,000 µg/mL each in P&T methanol, 1 mL/ampul

cat.# 30014 (ea.)

NEW!

524.3 Internal Standard Mix (3 components)

chlorobenzene-d5
1,4-dichlorobenzene-d4
1,4-difluorobenzene

2,000 µg/mL each in P&T methanol, 1 mL/ampul

cat.# 30015 (ea.)

NEW!

524.3 Surrogate Standard (3 components)

1-bromo-4-fluorobenzene (BFB)
methyl-d3-*tert*-butyl ether
1,2-dichlorobenzene-d4

2,000 µg/mL each in P&T methanol, 1 mL/ampul

cat.# 30016 (ea.)

NEW!

524.3 Internal Standard/Surrogate Mix (6 components)

1-bromo-4-fluorobenzene (BFB)
methyl-d3-*tert*-butyl ether
chlorobenzene-d5
1,2-dichlorobenzene-d4
1,4-dichlorobenzene-d4
1,4-difluorobenzene

2,000 µg/mL each in P&T methanol, 1 mL/ampul

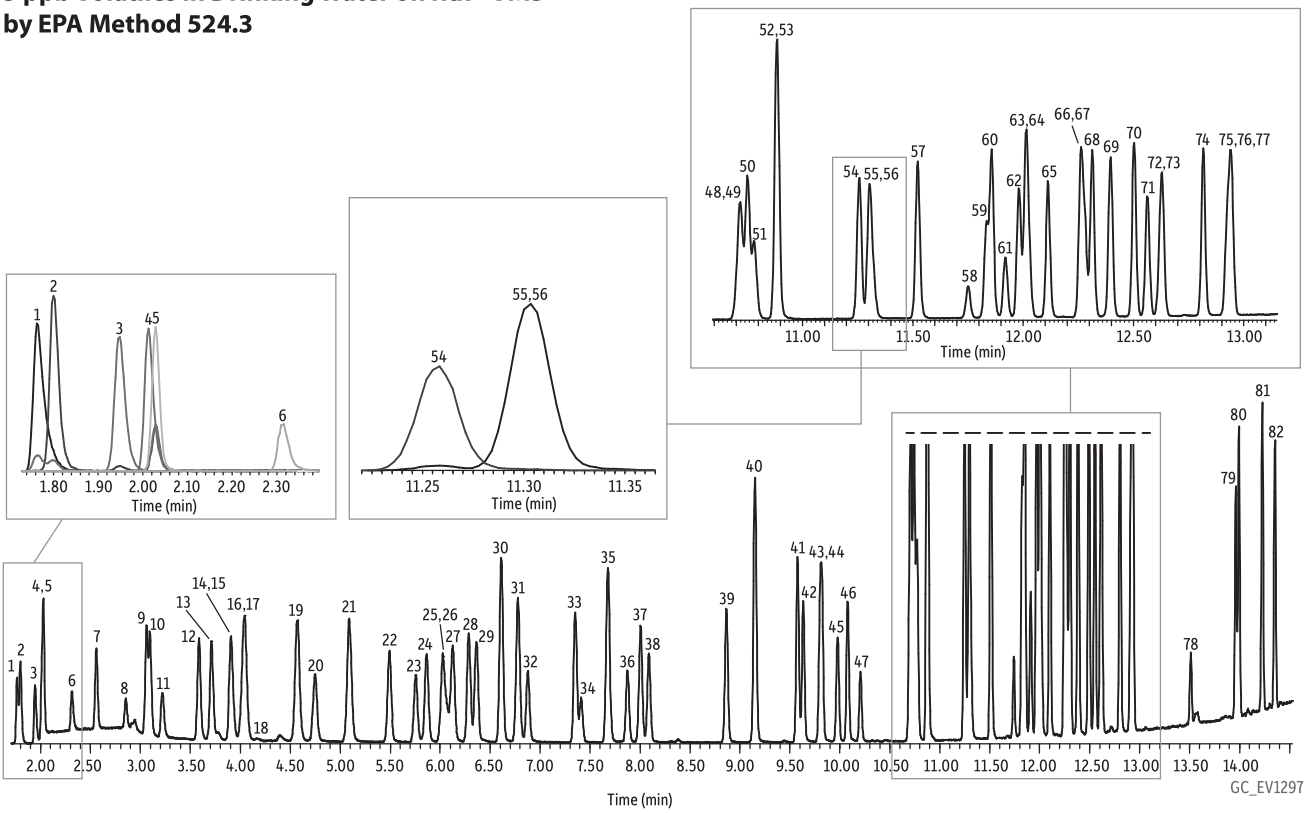
cat.# 30017 (ea.)

NEW!

Volatile Organics, *cont.*

Method 524.3 (Purgeable Organics in Drinking Water), *cont.*

5 ppb Volatiles in Drinking Water on Rtx®-VMS by EPA Method 524.3



Column	Rtx®-VMS, 30 m, 0.25 mm ID, 1.40 µm (cat.# 19915)
Sample	524.3 internal standard/surrogate mix (cat.# 30017) 524.3 gas calibration mix (cat.# 30014) 524.3 VOA MegaMix® standard (cat.# 30013)
Diluent:	RO water
Conc.:	5 ng/mL (5 mL sample)
Injection	purge and trap split (split ratio 30:1)
Liner:	Sky® 1.0mm ID straight inlet liner (cat.# 23333.1)
Inj. Temp.:	200 °C
Purge and Trap	
Instrument:	EST Encon Evolution
Trap Type:	Vocarb 3000
Purge:	11 min, flow 40 mL/min
Dry Purge:	1 min, flow 50 mL/min
Desorb:	1 min @ 260 °C, flow 30.9 mL/min
Bake:	8 min @ 265 °C
Interface Connection:	injection port
Transfer Line Temp.:	150 °C
Oven	
Oven Temp:	45 °C (hold 4.5 min) to 100 °C at 12 °C/min to 240 °C at 25 °C/min (hold 1.32 min)
Carrier Gas	He, constant flow
Flow Rate:	0.9 mL/min
Detector	MS
Mode:	Scan

Scan Program:

Group	Start Time (min)	Scan Range (amu)	Scan Rate (scans/sec)
1	1.5	47–300	5.4
2	2.9	35–300	5.19

Transfer Line Temp.:	240 °C
Analyzer Type:	Quadrupole
Source Temp.:	230 °C
Quad Temp.:	150 °C
Electron Energy:	70 eV
Solvent Delay Time:	1.5 min
Tune Type:	BFB
Ionization Mode:	EI
Instrument	Agilent 7890A GC & 5975C MSD
Acknowledgement	EST Analytical provided the Centurion robotic autosampler and Encon Evolution P&T concentrator.

Peaks

1. Dichlorodifluoromethane
2. Chlorodifluoromethane
3. Chloromethane
4. Vinyl chloride
5. 1,3-Butadiene
6. Bromomethane
7. Trichlorofluoromethane
8. Diethyl ether
9. 1,1-Dichloroethene
10. Carbon disulfide
11. Methyl iodide
12. Allyl chloride
13. Methylene chloride
14. *trans*-1,2-Dichloroethene
15. Methyl acetate
16. MTBE-d3 (SS)
17. MTBE
18. *tert*-Butyl alcohol (TBA)
19. Diisopropyl ether (DIPE)
20. 1,1-Dichloroethane
21. *tert*-Butyl ethyl ether (ETBE)
22. *cis*-1,2-Dichloroethene
23. Bromochloromethane
24. Chloroform
25. Carbon tetrachloride
26. Tetrahydrofuran
27. 1,1,1-Trichloroethane
28. 1,1-Dichloropropene
29. 1-Chlorobutane
30. Benzene
31. *tert*-Amyl methyl ether (TAME)
32. 1,2-Dichloroethane
33. Trichloroethene
34. 1,4-Difluorobenzene
35. *tert*-Amyl ethyl ether (TAEE)
36. Dibromomethane
37. 1,2-Dichloropropane
38. Bromodichloromethane
39. *cis*-1,3-Dichloropropene
40. Toluene
41. Tetrachloroethene
42. *trans*-1,3-Dichloropropene
43. 1,1,2-Trichloroethane
44. Ethyl methacrylate
45. Dibromochloromethane
46. 1,3-Dichloropropane
47. 1,2-Dibromoethane
48. Chlorobenzene-d5
49. Chlorobenzene
50. Ethylbenzene
51. 1,1,1,2-Tetrachloroethane
52. *m*-Xylene
53. *p*-Xylene
54. *o*-Xylene
55. Styrene
56. Bromoform
57. Isopropylbenzene
58. 4-Bromofluorobenzene (SS)
59. Bromobenzene
60. *n*-Propylbenzene
61. 1,1,2,2-Tetrachloroethane
62. 2-Chlorotoluene
63. 1,3,5-Trimethylbenzene
64. 1,2,3-Trichloropropane
65. 4-Chlorotoluene
66. *tert*-Butylbenzene
67. Pentachloroethane
68. 1,2,4-Trimethylbenzene
69. *sec*-Butylbenzene
70. 4-Isopropyltoluene
71. 1,3-Dichlorobenzene
72. 1,4-Dichlorobenzene-D4
73. 1,4-Dichlorobenzene
74. *n*-Butylbenzene
75. Hexachloroethane
76. 1,2-Dichlorobenzene-D4 (SS)
77. 1,2-Dichlorobenzene
78. 1,2-Dibromo-3-chloropropane
79. Hexachlorobutadiene
80. 1,2,4-Trichlorobenzene
81. Naphthalene
82. 1,2,3-Trichlorobenzene

Volatile Organics, *cont.*

Method 601 (Purgeable Hydrocarbons)

VOA Purgeable Halocarbon Mix #1 (23 components)

bromodichloromethane
bromoform
carbon tetrachloride
chlorobenzene
2-chloroethyl vinyl ether
chloroform
dibromochloromethane
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
1,1-dichloroethane
1,2-dichloroethane
1,1-dichloroethene
trans-1,2-dichloroethene
1,2-dichloropropane
cis-1,3-dichloropropene
trans-1,3-dichloropropene
methylene chloride
1,1,2,2-tetrachloroethane
tetrachloroethene
1,1,1-trichloroethane
1,1,2-trichloroethane
trichloroethene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30212 (ea.)

Method 602 (Purgeable Aromatics)

602 Purgeable Aromatics Calibration Mix

(7 components)

benzene
chlorobenzene
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
ethylbenzene
toluene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30035 (ea.)

Method 603 (Acrolein/Acrylonitrile)

Acrolein/Acrylonitrile (2 components)

acrolein
acrylonitrile

2,000 µg/mL each in DI water, 1 mL/ampul
cat.# 30600 (ea.)

Must ship overnight on ice.
This product has a limited shelf life. We recommend that you order only the ampul quantity that meets your immediate needs.

Acrolein

5,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30645 (ea.)

5,000 µg/mL in water, 1 mL/ampul
cat.# 30646 (ea.)

This product has a limited shelf life. We recommend that you order only the ampul quantity that meets your immediate needs.

Acrylonitrile

2,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30246 (ea.)

Method 624 (Purgeable Halocarbons)

Volatiles MegaMix® Standard, EPA Method 624 (26 components)

benzene
bromodichloromethane
bromoform
carbon tetrachloride
chlorobenzene
2-chloroethyl vinyl ether
chloroform
dibromochloromethane
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
1,1-dichloroethane
1,2-dichloroethane
1,1-dichloroethene
trans-1,2-dichloroethene
1,2-dichloropropane
cis-1,3-dichloropropene
trans-1,3-dichloropropene
ethylbenzene
methylene chloride
1,1,2,2-tetrachloroethane
tetrachloroethene
toluene
1,1,1-trichloroethane
1,1,2-trichloroethane
trichloroethene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30497 (ea.)

624 Internal Standard Mix (3 components)

bromochloromethane
2-bromo-1-chloropropane
1,4-dichlorobutane

1,500 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30023 (ea.)

624 Surrogate Standard Mix (3 components)

4-bromofluorobenzene
fluorobenzene
pentafluorobenzene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30243 (ea.)

Surrogate Standard (2 components)

4-bromofluorobenzene
α,α,α-trifluorotoluene

2,500 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30484 (ea.)

624 Calibration Mix #1 (gases) (5 components)

bromomethane
chloroethane
chloromethane
trichlorofluoromethane (CFC-11)
vinyl chloride

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30020 (ea.)

624 Calibration Mix #2 (12 components)

benzene
carbon tetrachloride
chlorobenzene
2-chloroethyl vinyl ether
dibromochloromethane
1,1-dichloroethane
1,1-dichloroethene
1,2-dichloropropane
methylene chloride
tetrachloroethene
1,1,2-trichloroethane
trichloroethene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30021 (ea.)

Volatile Organics, *cont.*

Method 624 (Purgeable Halocarbons), *cont.*

624 Calibration Mix #3 (14 components)

bromodichloromethane
bromoform
chloroform
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
1,2-dichloroethane
trans-1,2-dichloroethene
cis-1,3-dichloropropene
trans-1,3-dichloropropene
ethylbenzene
1,1,2,2-tetrachloroethane
toluene
1,1,1-trichloroethane

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30022 (ea.)

624 Complete Kit

Contains 1 mL each of these mixtures.
30020: 624 Calibration Mix #1
30021: 624 Calibration Mix #2
30022: 624 Calibration Mix #3
30023: 624 Internal Standard Mix
30243: 624 Surrogate Standard Mix

cat.# 30244 (kit) **kit**

624 Kit

Contains 1 mL each of these mixtures.
30020: 624 Calibration Mix #1
30021: 624 Calibration Mix #2
30022: 624 Calibration Mix #3
30023: 624 Internal Standard Mix

cat.# 30055 (kit) **kit**

Method 8010 (Halogenated Volatile Organics)

624 Internal Standard Mix (3 components)

bromochloromethane
2-bromo-1-chloropropane
1,4-dichlorobutane

1,500 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30023 (ea.)

502.2 Calibration Mix #1 (gases) (6 components)

bromomethane
chloroethane
chloromethane
dichlorodifluoromethane (CFC-12)
trichlorofluoromethane (CFC-11)
vinyl chloride

200 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30439 (ea.)

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30042 (ea.)

also available

Gas Regulators

See **pages 279–281.**

Method 8010 (Halogenated Volatile Organics), *cont.*

BTEX Standard (6 components)

benzene
ethylbenzene
toluene
m-xylene
o-xylene
p-xylene

200 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30051 (ea.)

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30213 (ea.)

2,000 µg/mL each in P&T methanol (*m*- & *p*-xylene at 1,000 µg/mL), 1 mL/ampul
cat.# 30488 (ea.)

tech tip

To analyze compounds listed in Methods 8010 and 8020 concurrently, add BTEX standard to the calibration curve mix.

BTEX Gas Mix (6 components)

benzene
ethylbenzene
toluene
m-xylene
o-xylene
p-xylene

cylinder design

Cylinder Construction: aluminum
Cylinder Fitting: CGA-180 outlet

Spectra (Linde) 104 L Cylinders:

Size: 8 x 24 cm
Volume/Pressure: 104 liters of gas @ 1,800 psi
Weight: 1.5 lb/0.7 kg

Scotty (Air Liquide) 110 L Cylinders:

Size: 8.3 x 29.5 cm
Volume/Pressure: 110 liters of gas @ 1,800 psi
Weight: 2.2 lb/1 kg
U.S. DOT Specs: 3AL2216

1 ppm in nitrogen, 104 liters @ 1,800 psi
cat.# 34414 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi **NEW!**
cat.# 26361 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi (Pi-marked cylinder)
cat.# 34414-PI (ea.)

100 ppb in nitrogen, 104 liters @ 1,800 psi
cat.# 34428 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi **NEW!**
cat.# 26362 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi (Pi-marked cylinder)
cat.# 34428-PI (ea.)

No data pack available.

Gas standards are subject to hazardous materials shipping fees by most freight carriers. All calibration gas standards are nonreturnable due to DOT hazardous shipping requirements.

Volatile Organics, *cont.*

Method 8011 (1,2-Dibromoethane, 1,2-Dibromo-3-chloropropane)

8011 Calibration Mix—EDB/DBCP (2 components)

1,2-dibromo-3-chloropropane (DBCP)
1,2-dibromoethane (EDB)

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30062 (ea.)

Method 8020 (Aromatic Volatile Organics)

Internal and Surrogate Standards for Method 8020

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

Compound	CAS #	Solvent	Conc.	cat.#
4-bromofluorobenzene	460-00-4	PTM	2,000	30026
1,4-difluorobenzene	540-36-3	PTM	2,000	30032
fluorobenzene	462-06-6	PTM	2,000	30030
α,α,α-trifluorotoluene	98-08-8	PTM	2,000	30048

PTM = Purge-and-trap grade methanol

8020A Calibration Mix (10 components)

benzene
chlorobenzene
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
ethylbenzene
toluene
m-xylene
o-xylene
p-xylene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30222 (ea.)

Method 8021 (Volatile Organics)

502.2 Internal Standard Mix #2 (2 components)

2-bromo-1-chloropropane
fluorobenzene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30041 (ea.)

8021/502.2 Surrogate Mix #1 (3 components)

1-bromo-2-chloroethane
1-chloro-3-fluorobenzene
fluorobenzene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30463 (ea.)

Restek Offers a Full Line of Certified Reference Materials

See **pages 438–439**.

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www.restek.com/iso

Method 8240 (Volatile Organic Compounds [VOCs])

502.2 Calibration Mix #1 (gases) (6 components)

bromomethane
chloroethane
chloromethane
dichlorodifluoromethane (CFC-12)
trichlorofluoromethane (CFC-11)
vinyl chloride

200 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30439 (ea.)

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30042 (ea.)

VOA Calibration Mix #1 (ketones) (4 components)

acetone
2-butanone (MEK)
2-hexanone
4-methyl-2-pentanone (MIBK)

5,000 µg/mL each in P&T methanol:water (90:10), 1 mL/ampul
cat.# 30006 (ea.)

VOA Purgeable Halocarbon Mix #1 (23 components)

bromodichloromethane
bromoform
carbon tetrachloride
chlorobenzene
2-chloroethyl vinyl ether
chloroform
dibromochloromethane
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
1,1-dichloroethane
1,2-dichloroethane
1,1-dichloroethene
trans-1,2-dichloroethene
1,2-dichloropropane
cis-1,3-dichloropropene
trans-1,3-dichloropropene
methylene chloride
1,1,2,2-tetrachloroethane
tetrachloroethene
1,1,1-trichloroethane
1,1,2-trichloroethane
trichloroethene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30212 (ea.)

8240 Volatiles Mix #1A (12 components)

allyl chloride
benzyl chloride
1,2-dibromo-3-chloropropane
1,2-dibromoethane
dibromomethane
cis-1,4-dichloro-2-butene
trans-1,4-dichloro-2-butene
1,4-dioxane
iodomethane
pentachloroethane
1,1,1,2-tetrachloroethane
1,2,3-trichloropropane

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30217 (ea.)

8240 Volatiles Mix #2A (3 components)

carbon disulfide
2-picoline
pyridine

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30218 (ea.)

restek innovation!

Xylene-Free, Highly Purified Chloroprene Standard
The R&D chemists at Restek developed a novel procedure that produces a pure, quantitative chloroprene solution specially stabilized in purge-and-trap grade methanol. The entire procedure is performed under carefully monitored conditions to prevent any contamination or polymerization of the highly reactive, neat chloroprene. The final solution is specially stabilized, allowing analysts to make dilutions for working standards in unmodified purge-and-trap grade methanol.

Note: Because chloroprene is not analyzed by many laboratories, it is not included in our 8240 VOA mixes. Chloroprene is included in our 8260B MegaMix® calibration mix. Refer to **page 520.**

Volatile Organics, *cont.*

Method 8240 (Volatile Organic Compounds [VOCs]), *cont.*

8240 Nitriles Mix (7 components)

acrylonitrile
ethyl methacrylate
malononitrile
methacrylonitrile
methyl methacrylate
propionitrile
styrene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30215 (ea.)

8240 Alcohols Mix (5 components)

allyl alcohol
2-chloroethanol
ethanol
isobutyl alcohol
propargyl alcohol

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30214 (ea.)

Glycols Standard (2 components)

ethylene glycol
propylene glycol

50,000 µg/mL each in DI water, 1 mL/ampul
cat.# 30471 (ea.)

BTEX Standard (6 components)

benzene
ethylbenzene
toluene
m-xylene
o-xylene
p-xylene

200 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30051 (ea.)

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30213 (ea.)

2,000 µg/mL each in P&T methanol (*m*- & *p*-xylene at 1,000 µg/mL), 1 mL/ampul
cat.# 30488 (ea.)

BTEX Gas Mix (6 components)

benzene
ethylbenzene
toluene
m-xylene
o-xylene
p-xylene

1 ppm in nitrogen, 104 liters @ 1,800 psi
cat.# 34414 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi
cat.# 26361 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi (Pi-marked cylinder)
cat.# 34414-PI (ea.)

100 ppb in nitrogen, 104 liters @ 1,800 psi
cat.# 34428 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi
cat.# 26362 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi (Pi-marked cylinder)
cat.# 34428-PI (ea.)

No data pack available.

cylinder design

Spectra (Linde)
104 L Cylinders:
Aluminum construction
Size: 8 x 24 cm
Volume/Pressure:
104 liters of gas @ 1,800 psi
CGA-180 outlet fitting.
Weight: 1.5 lb/0.7 kg

Scotty (Air Liquide)
110 L Cylinders:
Aluminum construction
Size: 8.3 x 29.5 cm
Volume/Pressure:
110 liters of gas @ 1,800 psi
CGA-180 outlet fitting.
Weight: 2.2 lb/1 kg
U.S. DOT Specs: 3AL2216

Gas standards are subject to hazardous materials shipping fees by most freight carriers. All calibration gas standards are nonreturnable due to DOT hazardous shipping requirements.

Method 8260, 8260A, 8260B (Volatile Organic Compounds [VOCs]), *cont.*

8260A Internal Standard Mix (3 components)

chlorobenzene-d5
1,4-dichlorobenzene-d4
fluorobenzene

2,500 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30241 (ea.)

8260 Internal Standard Mix (4 components)

chlorobenzene-d5
1,4-dichlorobenzene-d4
1,4-difluorobenzene
pentafluorobenzene

2,500 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30074 (ea.)

8260A Surrogate Mix (4 components)

4-bromofluorobenzene
dibromofluoromethane
1,2-dichloroethane-d4
toluene-d8

2,500 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30240 (ea.)

8260 Surrogate Mix (3 components)

4-bromofluorobenzene
dibromofluoromethane
toluene-d8

2,500 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30073 (ea.)

8260B Matrix Spike Mix (5 components)

benzene
chlorobenzene
1,1-dichloroethene
toluene
trichloroethylene

2,500 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30479 (ea.)

8240/8260 System Performance Check Mix (5 components)

bromoform
chlorobenzene
chloromethane
1,1-dichloroethane
1,1,2,2-tetrachloroethane

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30075 (ea.)

4-Bromofluorobenzene

2,500 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30067 (ea.)

10,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30082 (ea.)

1,4-Dioxane-d8

2,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30614 (ea.)

Volatile Organics, *cont.*

Method 8260, 8260A, 8260B (Volatile Organic Compounds [VOCs]), *cont.*

PFTBA (MS Tuning Compound)

perfluorotributylamine (PFTBA)

Neat, 1 mL/ampul
cat.# 30482 (ea.)

Neat, 1 g
cat.# 33027 (ea.)

No data pack available.

8260B MegaMix® Calibration Mix

MEGAMIX®

(76 components)

acetonitrile
acrylonitrile
allyl chloride
benzene
bromobenzene
bromochloromethane
bromodichloromethane
bromoform
n-butylbenzene
sec-butylbenzene
tert-butylbenzene
carbon disulfide
carbon tetrachloride
chlorobenzene
2-chloroethanol
chloroform
chloroprene
2-chlorotoluene
4-chlorotoluene
dibromochloromethane
1,2-dibromo-3-chloropropane (DBCP)
1,2-dibromoethane (EDB)
dibromomethane
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
cis-1,4-dichloro-2-butene
trans-1,4-dichloro-2-butene
1,1-dichloroethane
1,2-dichloroethane
1,1-dichloroethene
cis-1,2-dichloroethene
trans-1,2-dichloroethene
1,2-dichloropropane
1,3-dichloropropane
2,2-dichloropropane
1,1-dichloropropene
cis-1,3-dichloropropene
trans-1,3-dichloropropene
diethyl ether (ethyl ether)
1,4-dioxane
ethylbenzene
ethyl methacrylate
hexachloro-1,3-butadiene
iodomethane
isobutyl alcohol
isopropylbenzene (cumene)
4-isopropyl toluene (*p*-cymene)
methacrylonitrile
methyl acrylate
methyl methacrylate
methylene chloride (dichloromethane)
naphthalene
nitrobenzene
2-nitropropane
pentachloroethane
propionitrile
n-propylbenzene
styrene
1,1,1,2-tetrachloroethane
1,1,2,2-tetrachloroethane
tetrachloroethene
tetrahydrofuran
toluene
1,2,3-trichlorobenzene
1,2,4-trichlorobenzene
1,1,1-trichloroethane
1,1,2-trichloroethane
trichloroethene
1,2,3-trichloropropane
1,1,2-trichlorotrifluororethane (CFC-113)
1,2,4-trimethylbenzene
1,3,5-trimethylbenzene
m-xylene
o-xylene
p-xylene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30633 (ea.)

8260B MegaMix® calibration mix
also available without pentachloroethane (cat.# 30152).

2-Chloroethyl Vinyl Ether

2,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30265 (ea.)

8260B MegaMix® Calibration Mix Kit

MEGAMIX®

Contains 1 mL each of these mixtures.
30633: 8260B MegaMix Calibration Mix
30265: 2-chlorethyl vinyl ether

cat.# 30475 (kit)

kit

8240/8260 Calibration Check Mix (6 components)

chloroform
1,1-dichloroethene
1,2-dichloropropane
ethylbenzene
toluene
vinyl chloride

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30427 (ea.)

502.2 Calibration Mix #1 (gases) (6 components)

bromomethane
chloroethane
chloromethane
dichlorodifluoromethane (CFC-12)
trichlorofluoromethane (CFC-11)
vinyl chloride

200 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30439 (ea.)

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30042 (ea.)

8260B Acetate Mix (5 components)

vinyl acetate
ethyl acetate
isopropyl acetate
n-propyl acetate
n-butyl acetate

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30477 (ea.)

8260B Acetate Mix (Revised) (7 components)

n-amyl acetate
butyl acetate
ethyl acetate
isopropyl acetate
methyl acetate
propyl acetate
vinyl acetate

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30489 (ea.)

California Oxygenates Mix (5 components)

diisopropyl ether (DIPE)	2,000 µg/mL	*tert*-butyl alcohol	10,000
ethyl-*tert*-butyl ether (ETBE)	2,000	methyl *tert*-butyl ether (MTBE)	2,000
tert-amyl methyl ether (TAME)	2,000		

In P&T methanol, 1 mL/ampul
cat.# 30465 (ea.)

Oxygenates (6 components)

tert-amyl ethyl ether (TAEE)	2,000 µg/mL	diisopropyl ether (DIPE)	2,000
tert-amyl methyl ether (TAME)	2,000	ethyl-*tert*-butyl ether (ETBE)	2,000
tert-butyl alcohol (TBA)	10,000	methyl *tert*-butyl ether (MTBE)	2,000

In P&T methanol, 1 mL/ampul
cat.# 30626 (ea.)

Volatile Organics, *cont.*

Method 8260, 8260A, 8260B (Volatile Organic Compounds [VOCs]), *cont.*

Single-Component Oxygenates Solutions

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

Compound	CAS #	Solvent	Conc.	cat.#
tert-amyl alcohol	75-85-4	PTM	10,000	30631
tert-amyl ethyl ether (TAEE)	919-94-8	PTM	2,000	30617
tert-amyl methyl ether (TAME)	994-05-8	PTM	2,000	30629
tert-butanol	75-65-0	PTM	50,000	30470
tert-butanol-d9	25725-11-5	PTM	20,000	30618
diisopropyl ether (DIPE)	108-20-3	PTM	2,000	30627
ethanol	64-17-5	PTM	2,000	30288
ethanol	64-17-5	W	10,000	30466
ethyl-*tert*-butyl ether (ETBE)	637-92-3	PTM	2,000	30628
methanol	67-56-1	W	10,000	30467
methyl *tert*-butyl ether (MTBE)	1634-04-4	PTM	2,000	30402

PTM = purge-and-trap grade methanol; W = DI water

also available

Rtx®-VMS Column

Your best choice for EPA Method 8260

- Fastest cycle times for VOCs.
- Tuned selectivity for VOCs.
- Excellent separation of gases.

See **page 67** for more information.

Acrolein

5,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30645 (ea.)

5,000 µg/mL in water, 1 mL/ampul
cat.# 30646 (ea.)

This product has a limited shelf life. We recommend that you order only the ampul quantity that meets your immediate needs.

1,2-Dichlorotetrafluoroethane (CFC-114)

2,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30476 (ea.)

Chloroprene

A pure, quantitative chloroprene solution, specially stabilized in purge-and-trap grade methanol to allow dilutions for working standards in unmodified P&T methanol. The entire preparation procedure is performed under carefully monitored conditions to prevent any contamination or polymerization of the highly reactive, neat chloroprene.

5,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30238 (ea.)

Vinyl Acetate

2,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30216 (ea.)

8260A Volatile Organics Kit (2,000 µg/mL)

Changes in this revision of the method include modification of the recommended internal standard and surrogate solutions.

Contains 1 mL each of these mixtures.
30042: 502.2 Calibration Mix #1
30043: 502.2 Calibration Mix #2
30044: 502.2 Calibration Mix #3
30045: 502.2 Calibration Mix #4
30046: 502.2 Calibration Mix #5
30047: 502.2 Calibration Mix #6
30067: 4-bromofluorobenzene (2,500 µg/mL)
30240: 8260A Surrogate Mix (2,500 µg/mL)
30241: 8260A Internal Standard Mix (2,500 µg/mL)
30075: 8240/8260 System Performance Check Mix
30005: VOA Matrix Spike Mix (2,500 µg/mL)

cat.# 30242 (kit) **kit**

8260 Volatile Organics Kit (2,000 µg/mL)

Contains 1 mL each of these mixtures.
30042: 502.2 Calibration Mix #1
30043: 502.2 Calibration Mix #2
30044: 502.2 Calibration Mix #3
30045: 502.2 Calibration Mix #4
30046: 502.2 Calibration Mix #5
30047: 502.2 Calibration Mix #6
30067: 4-bromofluorobenzene (2,500 µg/mL)
30073: 8260 Surrogate Mix (2,500 µg/mL)
30074: 8260 Internal Standard Mix (2,500 µg/mL)
30075: 8240/8260 System Performance Check Mix
30005: VOA Matrix Spike Mix (2,500 µg/mL)

cat.# 30076 (kit) **kit**

TCLP VOA Mix (11 components)

benzene
2-butanone (MEK)
carbon tetrachloride
chlorobenzene
chloroform
1,4-dichlorobenzene
1,2-dichloroethane
1,1-dichloroethene
tetrachloroethene
trichloroethene
vinyl chloride

2,000 µg/mL each in P&T methanol:water (90:10), 1 mL/ampul
cat.# 30024 (ea.)

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See **pages 438–439**.

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Volatile Organics, *cont.*

SOM01.1 (Volatiles), QA Mixes

SOM01.1 VOA Non-Ketone Deuterated Monitoring Compounds (11 components)

benzene-d6
chloroethane-d5
chloroform-d
1,2-dichlorobenzene-d4
1,2-dichloroethane-d4
1,1-dichloroethene-d2
1,2-dichloropropane-d6
1,3-dichloropropene-d4*
1,1,2,2-tetrachloroethane-d2
toluene-d8
vinyl chloride-d3

500 µg/mL each in deuterated methanol (MeOD), 1 mL/ampul
cat.# 30624 (ea.)

*Mix of *cis* and *trans* isomers. Exact proportions will be reported on the data sheet.

SOM01.1 VOA Ketone Deuterated Monitoring Compounds (2 components)

2-butanone-d5
2-hexanone-d5

500 µg/mL each in deuterium oxide (D_2O), 1 mL/ampul
cat.# 30625 (ea.)

SOM01.1 VOA DMC Kit

500 µg/mL. 1 mL each of these mixtures.
30624: Non-Ketones
30625: Ketones
500 µg/mL. 1 mL each of these mixtures.
cat.# 30630 (kit)

kit

04.2, 04.1, and 10/92 SOW (Volatiles), QA Mixes

CLP 04.1 VOA Internal Standard/SMC Spike Mix (6 components)

bromochloromethane
4-bromofluorobenzene
chlorobenzene-d5
1,2-dichloroethane-d4
1,4-difluorobenzene
toluene-d8

2,500 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30457 (ea.)

VOA Internal Standard Mix (3 components)

bromochloromethane
1,4-difluorobenzene
chlorobenzene-d5

2,500 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30011 (ea.)

VOA Surrogate Spike Mix (3 components)

4-bromofluorobenzene
1,2-dichloroethane-d4
toluene-d8

2,500 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30004 (ea.)

VOA Matrix Spike Mix (5 components)

benzene
chlorobenzene
1,1-dichloroethene
toluene
trichloroethene

2,500 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30005 (ea.)

04.2, 04.1, and 10/92 SOW (Volatiles), QA Mixes, *cont.*

VOA Screening Mix #1 (5 components)

benzene
ethylbenzene
toluene
o-xylene
p-xylene

1,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30001 (ea.)

VOA Screening Mix #2 (2 components)

n-dodecane
n-nonane

1,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30002 (ea.)

VOA Tuning Compound

4-bromofluorobenzene

5,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30003 (ea.)

PFTBA (MS Tuning Compound)

perfluorotributylamine (PFTBA)

Neat, 1 mL/ampul
cat.# 30482 (ea.)

Neat, 1 g
cat.# 33027 (ea.)

No data pack available.

L/C VOA Lab Control Sample

We prepare the L/C VOA lab control sample in two parts. Sample #1 contains all compounds except vinyl chloride because this compound is extremely volatile and must be replaced frequently. Sample #2 contains vinyl chloride.

L/C VOA Lab Control Sample #1 (11 components)

benzene
bromoform
carbon tetrachloride
1,2-dibromoethane
1,4-dichlorobenzene
1,2-dichloroethane
1,2-dichloropropane
cis-1,3-dichloropropene
tetrachloroethene
1,1,2-trichloroethane
trichloroethene

2,500 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30092 (ea.)

L/C VOA Lab Control Sample #2

vinyl chloride

2,500 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30093 (ea.)

L/C VOA Internal Standard Mix (3 components)

chlorobenzene-d5
1,4-dichlorobenzene-d4
1,4-difluorobenzene

2,500 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30091 (ea.)

Volatile Organics, *cont.*

04.2 and 04.1 (Volatiles), Calibration Mixes

CLP 04.1 VOA CAL2000 MegaMix® Standard

MEGAMIX®

(40 components)

benzene
bromodichloromethane
bromoform
carbon disulfide
carbon tetrachloride
chlorobenzene
chloroform
cyclohexane
dibromochloromethane
1,2-dibromo-3-chloropropane (DBCP)
1,2-dibromoethane
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
1,1-dichloroethane
1,2-dichloroethane
1,1-dichloroethene
cis-1,2-dichloroethene
trans-1,2-dichloroethene
1,2-dichloropropane
cis-1,3-dichloropropene
trans-1,3-dichloropropene
ethylbenzene
isopropylbenzene
methyl acetate
methyl *tert*-butyl ether (MTBE)
methylcyclohexane
methylene chloride
styrene
1,1,2,2-tetrachloroethane
tetrachloroethene
toluene
1,2,4-trichlorobenzene
1,1,1-trichloroethane
1,1,2-trichloroethane
trichloroethene
1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113)
m-xylene
o-xylene
p-xylene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30456 (ea.)

502.2 Calibration Mix #1 (gases) (6 components)

bromomethane
chloroethane
chloromethane
dichlorodifluoromethane (CFC-12)
trichlorofluoromethane (CFC-11)
vinyl chloride

200 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30439 (ea.)

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30042 (ea.)

VOA Calibration Mix #1 (ketones) (4 components)

acetone
2-butanone (MEK)
2-hexanone
4-methyl-2-pentanone (MIBK)

5,000 µg/mL each in P&T methanol:water (90:10), 1 mL/ampul
cat.# 30006 (ea.)

CLP 04.1 VOA Kit #3

Contains 1 mL each of these mixtures.
30006: VOA Calibration Mix #1 (ketones)
30042: 502.2 Calibration Mix #1 (gases)
30456: CLP 04.1 VOA CAL2000 MegaMix Standard

cat.# 30460 (kit)

kit

3/90 SOW (Volatiles), Calibration Mixes

CLP VOA CAL2000 MegaMix® Standard

MEGAMIX®

(28 components)

benzene
bromodichloromethane
bromoform
carbon disulfide
carbon tetrachloride
chlorobenzene
chloroform
dibromochloromethane
1,1-dichloroethane
1,2-dichloroethane
1,1-dichloroethene
cis-1,2-dichloroethene
trans-1,2-dichloroethene
1,2-dichloropropane
cis-1,3-dichloropropene
trans-1,3-dichloropropene
ethylbenzene
methylene chloride
styrene
1,1,2,2-tetrachloroethane
tetrachloroethene
toluene
1,1,1-trichloroethane
1,1,2-trichloroethane
trichloroethene
m-xylene
o-xylene
p-xylene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30632 (ea.)

Vinyl Acetate

2,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30216 (ea.)

CLP VOA CAL2000 MegaMix® Kit

MEGAMIX®

Contains 1 mL each of these mixtures.
30632: CLP VOA CAL2000 MegaMix Standard
30216: vinyl acetate

cat.# 30438 (kit)

kit

VOA Calibration Mix #2 (7 components)

benzene
carbon disulfide
ethylbenzene
toluene
vinyl acetate
o-xylene
p-xylene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30007 (ea.)

VOA Calibration Mix #3 (10 components)

carbon tetrachloride
chlorobenzene
chloroform
1,1-dichloroethane
1,1-dichloroethene
1,2-dichloropropane
methylene chloride
1,1,2-trichloroethane
trichloroethene
m-xylene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30008 (ea.)

NEW!

Compound Index for Reference Standards

See **pages 730–736.**

Volatile Organics, *cont.*

3/90 SOW (Volatiles), Calibration Mixes, *cont.*

VOA Calibration Mix #4 (12 components)

bromodichloromethane
bromoform
dibromochloromethane
1,2-dichloroethane
cis-1,2-dichloroethene
trans-1,2-dichloroethene
cis-1,3-dichloropropene
trans-1,3-dichloropropene
styrene
1,1,2,2-tetrachloroethane
tetrachloroethene
1,1,1-trichloroethane

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30009 (ea.)

VOA Calibration Mix #5 (gases) (4 components)

bromomethane
chloroethane
chloromethane
vinyl chloride

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30010 (ea.)

CLP VOA Calibration Kit #2

Contains 1 mL each of these mixtures.
30006: VOA Calibration Mix #1 (ketones)
30010: VOA Calibration Mix #5 (gases)
30632: CLP VOA CAL2000 MegaMix Standard
30216: vinyl acetate

cat.# 30442 (kit) **kit**

OLC 03.2 (Volatiles), Calibration Mixes

OLC 03.2 VOA MegaMix® Standard

MEGAMIX®

(42 components)

benzene
bromochloromethane
bromodichloromethane
bromoform
carbon disulfide
carbon tetrachloride
chlorobenzene
chloroform
cyclohexane
dibromochloromethane (chlorodibromomethane)
1,2-dibromo-3-chloropropane (DBCP)
1,2-dibromoethane (EDB)
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
1,1-dichloroethane
1,2-dichloroethane
1,1-dichloroethene
cis-1,2-dichloroethene
trans-1,2-dichloroethene
1,2-dichloropropane
cis-1,3-dichloropropene
trans-1,3-dichloropropene
ethylbenzene
isopropylbenzene (cumene)
methyl acetate
methylcyclohexane
methyl *tert*-butyl ether (MTBE)
methylene chloride (dichloromethane)
styrene
1,1,2,2-tetrachloroethane
tetrachloroethene
toluene
1,2,3-trichlorobenzene
1,2,4-trichlorobenzene
1,1,1-trichloroethane
1,1,2-trichloroethane
trichloroethene
1,1,2-trichlorotrifluoroethane (CFC-113)
m-xylene*
o-xylene
p-xylene*

2,000 µg/mL each in P&T methanol, 1 mL/ampul*
cat.# 30492 (ea.)

**m*-xylene and *p*-xylene concentration is 1,000 µg/mL.

Additional VOA Calibration Mixes Required:

30006: VOA Calibration Mix #1 page 480
30007: VOA Calibration Mix #2 page 523
30008: VOA Calibration Mix #3 page 523
30009: VOA Calibration Mix #4 page 524
30010: VOA Calibration Mix #5 page 524
30003: VOA Tuning Compound page 441

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International-Specific

Canada

C50 in Toluene

n-pentacontane (C50)

10 µg/mL in toluene, 1 mL/ampul

cat.# 31685 (ea.)

CCME F1 Retention Time Marker (3 components)

n-decane (C10)
n-hexane (C6)
toluene

2,000 µg/mL each in methanol, 1 mL/ampul

cat.# 30611 (ea.)

CCME PHC Calibration Mix (3 components)

n-decane (C10)
n-hexadecane (C16)
n-tetratriacontane (C34)

5,000 µg/mL each in toluene, 1 mL/ampul

cat.# 31684 (ea.)

Canadian Drinking Water Triazine Herbicides Mix (7 components)

alachlor
atrazine
cyanazine (Bladex)
metolachlor
metribuzin
prometryne
simazine

500 µg/mL each in acetone, 1 mL/ampul

cat.# 31864 (ea.)

Canadian Drinking Water Phenoxyacid Herbicides Mix (11 components)

bromoxynil
2,4-D
dicamba
2,4-dichlorophenol
diclofop methyl
dinoseb
pentachlorophenol
picloram
2,4,5-T
2,3,4,6-tetrachlorophenol
2,4,6-trichlorophenol

1,000 µg/mL each in acetone, 1 mL/ampul

cat.# 31868 (ea.)

Canadian Drinking Water Carbamates Mix (5 components)

aldicarb
bendiocarb
carbaryl (Sevin)
carbofuran
triallate

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

cat.# 31865 (ea.)

Canadian Drinking Water OP Pesticides Mix (9 components)

azinphos methyl (Guthion)
chlorpyrifos (Dursban)
diazinon
dimethoate
malathion
parathion (ethyl)
phorate
temephos (Abate)
terbufos

1,000 µg/mL each in acetonitrile, 1 mL/ampul

cat.# 31867 (ea.)

Canada - Atlantic Provinces

Atlantic RBCA EPH Mix (11 components)

acenaphthene
anthracene
benzo(a)pyrene
chrysene
n-decane (C10)
n-dodecane (C12)
n-dotriacontane (C32)
n-heneicosane (C21)
n-hexadecane (C16)
n-octacosane (C28)
naphthalene

1,000 µg/mL each in hexane:methylene chloride (85:15), 1 mL/ampul

cat.# 31872 (ea.)

Atlantic RBCA VPH Mix (12 components)

benzene
n-decane (C10)
ethylbenzene
n-heptane (C7)
n-hexane (C6)
1-methyl-3-ethylbenzene
n-octane (C8)
toluene
1,2,4-trimethylbenzene
1,3,5-trimethylbenzene
o-xylene
p-xylene

1,000 µg/mL each in P&T methanol, 1 mL/ampul

cat.# 31871 (ea.)

What separates Restek's line of certified reference materials from ordinary reference standards?

10 Critical Steps...

Learn more on **pages 438–439**.

www.restek.com/iso

International-Specific, *cont.*

Europe

Organophosphorus Pesticide Mix, European Formulation (16 components)

acephate	200 µg/mL	methamidophos	500
azinphos methyl (Guthion)	400	methidathion	200
chlorpyrifos	100	omethoate	1,000
demeton-S-methyl	200	pirimiphos methyl	100
dichlorvos (DDVP)	500	profenfos	200
dimethoate	200	pyrazophos	500
ethion	200	tokuthion (prothiofos)	200
malathion	200	tolclofos-methyl	100

In acetone, 1 mL/ampul

cat.# 32418 (ea.)

PCB Congener Standard #1 (6 components)

2,4,4'-trichlorobiphenyl (BZ #28)
2,2',5,5'-tetrachlorobiphenyl (BZ #52)
2,2',4,5,5'-pentachlorobiphenyl (BZ #101)
2,2',3,4,4',5'-hexachlorobiphenyl (BZ #138)
2,2',4,4',5,5'-hexachlorobiphenyl (BZ #153)
2,2',3,4,4',5,5'-heptachlorobiphenyl (BZ #180)

10 µg/mL each in isooctane, 1 mL/ampul

cat.# 32290 (ea.)

PCB Congener Standard #2 (7 components)

2,4,4'-trichlorobiphenyl (BZ #28)
2,2',5,5'-tetrachlorobiphenyl (BZ #52)
2,2',4,5,5'-pentachlorobiphenyl (BZ #101)
2,3',4,4',5-pentachlorobiphenyl (BZ #118)
2,2',3,4,4',5'-hexachlorobiphenyl (BZ #138)
2,2',4,4',5,5'-hexachlorobiphenyl (BZ #153)
2,2',3,4,4',5,5'-heptachlorobiphenyl (BZ #180)

10 µg/mL each in isooctane, 1 mL/ampul

cat.# 32294 (ea.)

Desethyl-atrazine

1,000 µg/mL in acetone, 1 mL/ampul

cat.# 32445 (ea.)

NEW!

Compound Index for Reference Standards

See **pages 730–736.**

Japan

Japan Calibration Mix (9 components)

acrylonitrile
benzene
1,3-butadiene
chloroform
1,2-dichloroethane
dichloromethane
tetrachloroethylene
trichloroethylene
vinyl chloride

cylinder design

Cylinder Construction: aluminum
Cylinder Fitting: CGA-180 outlet

Spectra (Linde) 104 L Cylinders:

Size: 8 x 24 cm
Volume/Pressure:
104 liters of gas
@ 1,800 psi
Weight: 1.5 lb/0.7 kg

Scotty (Air Liquide) 110 L Cylinders:

Size: 8.3 x 29.5 cm
Volume/Pressure:
110 liters of gas
@ 1,800 psi
Weight: 2.2 lb/1 kg
U.S. DOT Specs: 3AL2216

1 ppm in nitrogen, 104 liters @ 1,800 psi

cat.# 34418 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi

cat.# 26367 (ea.)

NEW!

1 ppm in nitrogen, 110 liters @ 1,800 psi (Pi-marked cylinder)

cat.# 34418-PI (ea.)

No data pack available.

Gas standards are subject to hazardous materials shipping fees by most freight carriers. All calibration gas standards are nonreturnable due to DOT hazardous shipping requirements.

also available

Gas Regulators

See **pages 279–281.**

Drinking Water Odor Standard (2 components)

- Reference mix of the two most common odor-causing compounds.
- Convenient concentration for purge-and-trap analysis: 100 µg/mL in methanol.

Unpleasant odor in drinking water is associated with the growth and decay of microorganisms. The threshold value for these compounds is low (10 ppt) and purge-and-trap analyses usually are used to quantify them.

(+/–)-geosmin
2-methylisoborneol

100 µg/mL in P&T methanol, 1 mL/ampul

cat.# 30608 (ea.)

International-Specific, *cont.*

ISO/DIS 9377 Water Quality Testing

- For GC analysis of total petroleum hydrocarbons (TPH) in water.
- Calibration standard available as Diesel #2/motor oil and Diesel #2/mineral oil.

Reference mixtures for ISO/DIS 9377 (German H-53), a gas chromatography–flame ionization detection (GC-FID) method.

Diesel #2/Motor Oil (2 components)

diesel fuel #2 composite
motor oil

5,000 µg/mL each in hexane, 1 mL/ampul

cat.# 31682 (ea.)

Diesel #2/Mineral Oil (2 components)

diesel fuel #2 composite
mineral oil

5,000 µg/mL each in hexane, 1 mL/ampul

cat.# 31676 (ea.)

Standard Mixture Stock Solution (2 components)

diesel #2 (additive-free)
mineral oil (additive-free [i.e., USP grade] bp 325–460 or C18–C32 retention time range)

5,000 µg/mL each in cyclohexane, 1 mL/ampul (prepares 8 mL of 1.25 µg/µL calibration curve high point) Total hydrocarbon concentration is 10,000 µg/mL.

cat.# 31630 (ea.)

Quality Control Standard Mixture, Revised (2 components)

- Updated reference materials for GC analysis of TPH in water.
- Determination of hydrocarbon oil index—applicable to drinking, surface, waste, and treated water.

diesel #2 (additive-free)
motor oil (additive-free bp 325–460 or C18–C32 retention time range)

500 µg/mL each in acetone, 1 mL/ampul (1 mL is enough mix to spike one 900 mL quality control sample). Total hydrocarbon concentration is 1,000 µg/mL.

cat.# 31641 (ea.)

Quality Control Standard Mixture (2 components)

- For GC analysis of total petroleum hydrocarbons (TPH) in water.
- Environmentally safer than previous methods.
- Calibration standard available as Diesel #2/motor oil and Diesel #2/mineral oil.

diesel #2 (additive-free)
mineral oil (additive-free [i.e., USP grade] bp 391–522 or C24–C40 retention time range)

500 µg/mL each in acetone, 1 mL/ampul (1 mL is enough mix to spike one quality control sample). Total hydrocarbon concentration is 1,000 µg/mL.

cat.# 31631 (ea.)

System Performance Test Standard Mixture of *n*-Alkanes (16 components)

n-decane (C10)
n-dodecane (C12)
n-tetradecane (C14)
n-hexadecane (C16)
n-octadecane (C18)
n-eicosane (C20)
n-docosane (C22)
n-tetracosane (C24)
n-hexacosane (C26)
n-octacosane (C28)
n-triacontane (C30)
n-dotriacontane (C32)
n-tetratriacontane (C34)
n-hexatriacontane (C36)
n-octatriacontane (C38)
n-tetracontane (C40)

50 µg/mL each in hexane, 1 mL/ampul

cat.# 31678 (ea.)

Extraction Solvent Stock Solution #1 (2 components)

n-decane (C10) 20 µL/L
n-tetracontane (C40) 20 mg/L

In hexane, 5 mL/ampul

cat.# 31679 (ea.)

Extraction Solvent Stock Solution #2 (2 components)

n-decane (C10) 20 µL/L
n-tetracontane (C40) 20 mg/L

In hexane, 20 mL/ampul

cat.# 31680 (ea.)

Stearyl Stearate Test Solution

stearyl stearate

2,000 µg/mL in hexane, 10 mL/ampul

cat.# 31681 (ea.)

2,000 µg/mL in cyclohexane, 10 mL/ampul (enough to check one Florisil cartridge)

cat.# 31636 (ea.)

Florisil® Cartridge Quality Control Standard Mixture, Rev. 2 (2 components)

diesel fuel #2 composite
mineral oil

1,000 µg/mL each in hexane, 10 mL/ampul

cat.# 31677 (ea.)

n-Tetracontane (C40)

Neat, 100 mg

cat.# 31859 (ea.)

n-Decane (C10)

Neat, 1 mL/ampul

cat.# 31858 (ea.)

Stearyl Stearate

Neat, 100 mg

cat.# 31860 (ea.)

Reference Standards

Foods, Flavors & Fragrances

Derivatization Reagents....446–447
Fatty Acid Methyl Esters (FAMEs)....529–531
Fatty Acids....531–532
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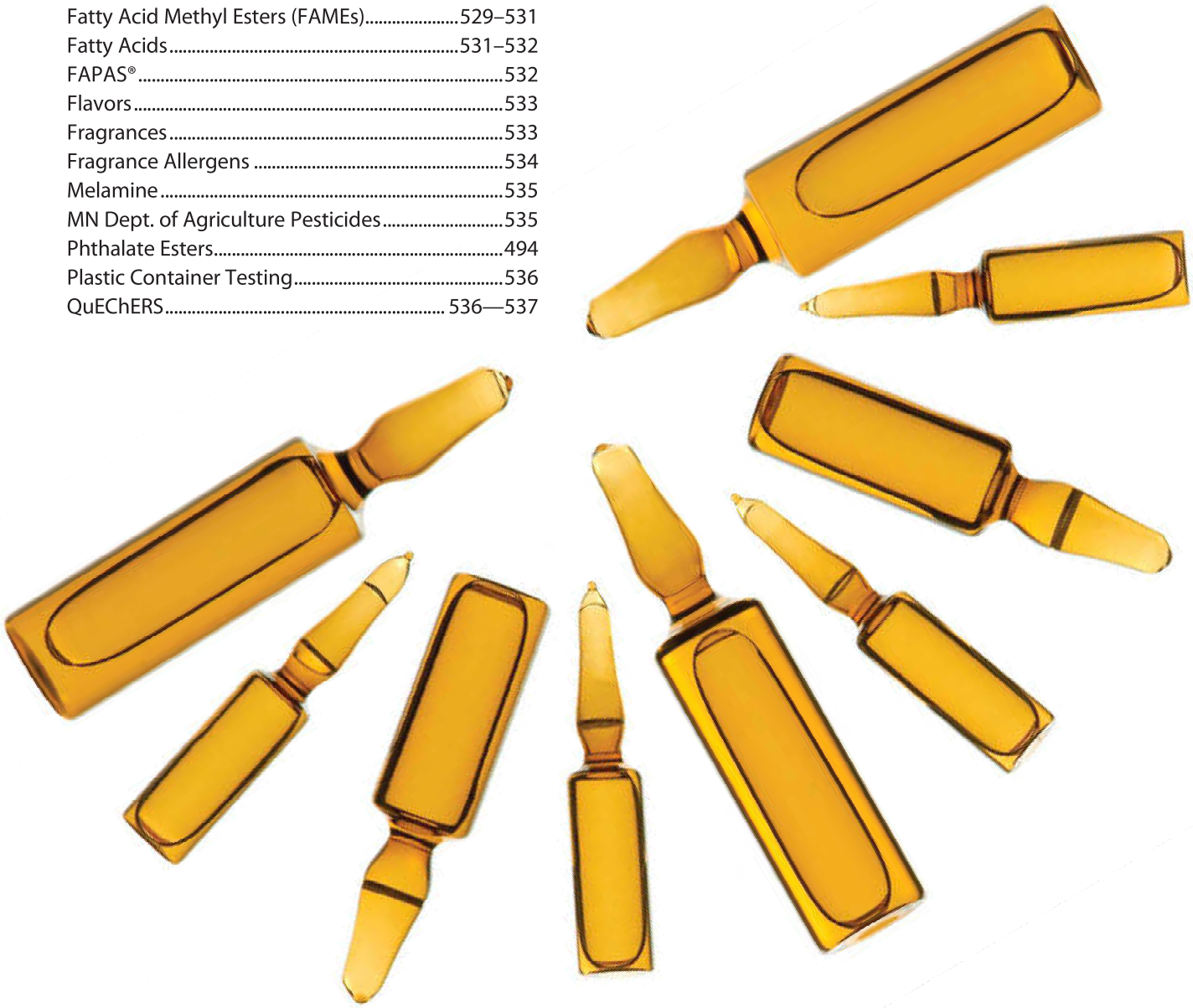

Derivatization Reagents

See pages 446–447.

Fatty Acid Methyl Esters (FAMEs)

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 lignocerate	1.0
C24:1	methyl nervonate	1.0

cat.# 35066 (100 mg)

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 (C18:1 *cis*-6)	8.0
methyl petroselaidate (C18:1 *trans*-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

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

No data pack available.

NLEA FAME Mix (28 components)

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

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

No data pack available.

Fatty Acid Methyl Esters (FAMEs), *cont.*

Food Industry FAME Mix (37 components)

Chain	% by Weight	Chain	% by Weight
C4:0	4.0	C18:2 (all-*cis*-9,12)	2.0
C6:0	4.0	C18:3 (all-*cis*-6,9,12)	2.0
C8:0	4.0	C18:3 (all-*cis*-9,12,15)	2.0
C10:0	4.0	C20:0	4.0
C11:0	2.0	C20:1 (*cis*-11)	2.0
C12:0	4.0	C20:2 (all-*cis*-11,14,)	2.0
C13:0	2.0	C20:3 (all-*cis*-8,11,14)	2.0
C14:0	4.0	C20:3 (all-*cis*-11,14,17)	2.0
C14:1 (*cis*-9)	2.0	C20:4 (all-*cis*-5,8,11,14)	2.0
C15:0	2.0	C20:5 (all-*cis*-5,8,11,14,17)	2.0
C15:1 (*cis*-10)	2.0	C21:0	2.0
C16:0	6.0	C22:0	4.0
C16;1 (*cis*-9)	2.0	C22:1 (*cis*-13)	2.0
C17:0	2.0	C22:2 (all-*cis*-13,16)	2.0
C17:1 (*cis*-10)	2.0	22:6 (all-*cis*-4,7,10,13,16,19)	2.0
C18:0	4.0	C23:0	2.0
C18:1 (*trans*-9)	2.0	C24:0	4.0
C18:1 (*cis*-9)	4.0	C24:1 (*cis*-15)	2.0
C18:2 (all-*trans*-9,12)	2.0		

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

No data pack available.

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Fatty Acid Methyl Esters (FAMEs), *cont.*

Neat Fatty Acid Methyl Esters

Use these materials to prepare specific mixtures not commercially available. These products are of the highest purity available, typically 99% by GC-FID analysis. Each compound is packaged under a nitrogen blanket to ensure product stability. A certificate of analysis is provided with each ampul.

Chain	Description	CAS #	qty.	cat.#
C6:0	methyl caproate	106-70-7	100 mg	35037
C7:0	methyl heptanoate	106-73-0	100 mg	35038
C8:0	methyl caprylate	111-11-5	100 mg	35039
C9:0	methyl nonanoate	1731-84-6	100 mg	35040
C10:0	methyl caprate	110-42-9	100 mg	35041
C11:0	methyl undecanoate	1731-86-8	100 mg	35042
C12:0	methyl laurate	111-82-0	100 mg	35043
C13:0	methyl tridecanoate	1731-88-0	100 mg	35044
C14:0	methyl myristate	124-10-7	100 mg	35045
C14:1 Δ 9 *cis*	methyl myristoleate	56219-06-8	100 mg	35046
C15:0	methyl pentadecanoate	7132-64-1	100 mg	35047
C16:0	methyl palmitate	112-39-0	100 mg	35048
C16:1 Δ 9 *cis*	methyl palmitoleate	1120-25-8	100 mg	35049
C17:0	methyl heptadecanoate	1731-92-6	100 mg	35050
C18:0	methyl stearate	112-61-8	100 mg	35051
C18:1 Δ 9 *cis*	methyl oleate	112-62-9	100 mg	35052
C18:2 Δ 9,12 *cis*	methyl linoleate	112-63-0	100 mg	35053
C18:3 Δ 9,12,15 *cis*	methyl linolenate	301-00-8	100 mg	35054
C19:0	methyl nonadecanoate	1731-94-8	100 mg	35055
C20:0	methyl arachidate	1120-28-1	100 mg	35056
C20:1 Δ 11 *cis*	methyl eicosenoate	2390-09-2	100 mg	35057
C20:2 Δ 11,14 *cis*	methyl eicosadienoate	2463-02-7	100 mg	35058
C20:3 Δ 11,14,17 *cis*	methyl eicosatrienoate	55682-88-7	100 mg	35059
C20:4 Δ 5,8,11,14 *cis*	methyl arachidonate	2566-89-4	100 mg	35060
C21:0	methyl heneicosanoate	6064-90-0	100 mg	35061
C22:0	methyl behenate	929-77-1	100 mg	35062
C22:1 Δ 13 *cis*	methyl erucate	1120-34-9	100 mg	35063
C24:0	methyl lignocerate	2442-49-1	100 mg	35064
C24:1 Δ 15 *cis*	methyl nervonate	2733-88-2	100 mg	35065

No data pack available.

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Fatty Acid Methyl Esters (FAMEs), *cont.*

Quantitative Fatty Acid Methyl Ester (FAME) Mixtures

These mixtures can be used for quantification (AOCS Method CE 1–62) and approximate the compositions of the following types of oils:

AOCS #1: corn, poppy seed, cotton seed, soybean, walnut, safflower, sunflower, rice, bran, and sesame oil
AOCS #2: linseed, perilla, hempseed, and rubberseed oil
AOCS #3: peanut, rapeseed, and mustard seed oil
AOCS #4: olive, teaseed, and neatsfoot oil
AOCS #5: coconut, palm kernel, babassu, and ouri-curi oil
AOCS #6: lard, beef or mutton tallow, and palm oil
FAME #1: oils of mid-range chain lengths (C16–C18)
FAME #2: oils of short- to mid-range chain lengths (C6–C14)
FAME #3: oils of short- to mid-range chain lengths (C8–C16)
FAME #4: oils of mid-range to long chain lengths (C16–C24)
FAME #5: oils of mid-range to long chain lengths (C16–C24)
FAME #6: oils of long chain lengths (C20–C21)
FAME #7: oils of short chain lengths (C6–C10)
FAME #8: oils of short- to mid-range chain lengths (C11–C15)
FAME #9: oils of mid-range to long chain lengths (C16–C20)
FAME #12: oils of mid-range to long chain lengths (C13–C21)
FAME #13: mustard seed oil
FAME #14: cocoa butter
FAME #15: peanut oil

Mix	cat.#	methyl caproate (6:0)	methyl heptanoate (7:0)	methyl caprylate (8:0)	methyl nonanoate (9:0)	methyl caprate (10:0)	methyl undecanoate (11:0)	methyl laurate (12:0)	methyl tridecanoate (13:0)	methyl myristate (14:0)	methyl pentadecanoate (15:0)	methyl palmitate (16:0)	methyl palmitoleate (16:1)	methyl heptadecanoate (17:0)	methyl stearate (18:0)	methyl oleate (18:1)	methyl linoleate (18:2)	methyl linolenate (18:3)	methyl nonadecanoate (19:0)	methyl arachidate (20:0)	methyl eicosenoate (20:1)	methyl eicosadienoate (20:2)	methyl homo γ-linolenate (20:3)	methyl arachidonate (20:4)	methyl heneicosanoate (21:0)	methyl behenate (22:0)	methyl erucate (22:1)	methyl docosadienoate (22:2)	methyl lignocerate (24:0)	methyl nervonate (24:1)
		Composition of each mixture listed as a weight/weight % basis (minimum 50 mg/ampul)																												
AOCS #1	35022											6.0			3.0	35.0	50.0	3.0		3.0										
AOCS #2	35023											7.0			5.0	18.0	36.0	34.0												
AOCS #3	35024									1.0		4.0			3.0	45.0	15.0	3.0		3.0						3.0	20.0		3.0	
AOCS #4	35025											11.0			3.0	80.0	6.0													
AOCS #5	35026			7.0		5.0		48.0		15.0		7.0			3.0	12.0	3.0													
AOCS #6	35027									2.0		30.0	3.0		14.0	41.0	7.0	3.0												
FAME #1	35010											20.0			20.0	20.0	20.0	20.0												
FAME #2	35011	20.0		20.0		20.0		20.0		20.0																				
FAME #3	35012			20.0		20.0		20.0		20.0																				
FAME #4	35013											20.0			20.0					20.0						20.0			20.0	
FAME #5	35014												20.0			20.0					20.0						20.0			20.0
FAME #6	35015																			20.0	20.0	20.0	20.0	20.0						
FAME #7	35016	20.0	20.0	20.0	20.0	20.0																								
FAME #8	35017						20.0	20.0	20.0	20.0	20.0																			
FAME #9	35018											20.0		20.0	20.0				20.0	20.0										
FAME #12	35021								20.0		20.0			20.0					20.0						20.0					
FAME #13	35034											3.0	1.0		2.0	20.0	15.0	10.0		1.0	10.0	2.0				1.0	30.0	2.0	1.0	2.0
FAME #14	35035									0.1		26.3	0.4	0.3	33.7	34.3	3.1	0.2		1.3	0.1					0.2				
FAME #15	35036											10.0			3.0	50.0	30.0			1.5	1.5					3.0			1.0	

Composition of each compound listed as a weight/weight % basis.

Fatty Acids

EP 2.4.22 Composition of Fatty Acids by GC Mix 1

(6 components)

Description	% by Weight
methyl arachidate (C20:0)	40
methyl dodecanoate (C12:0)	5
methyl myristate (C14:0)	5
methyl oleate (C18:1 [*cis*9])	20
methyl palmitate (C16:0)	10
methyl stearate (C18:0)	20

100 mg total

cat.# 35100 (ea.)

No data pack available.

EP 2.4.22 Composition of Fatty Acids by GC Mix 2

(5 components)

Description	% by Weight
methyl caproate (C6:0)	10
methyl caprylate (C8:0)	10
methyl decanoate (C10:0)	20
methyl dodecanoate (C12:0)	20
methyl myristate (C14:0)	40

100 mg total

cat.# 35101 (ea.)

No data pack available.

Fatty Acids, *cont.*

Standard Methods for the Examination of Water and Wastewater Method 5560: Organic and Volatile Acids

The measurement of organic acids, either by adsorption and elution from a chromatographic column or by distillation, can be used as a control test for anaerobic digestion. The chromatographic separation method is presented for organic acids (5560B), while a method using distillation (5560C) is presented for volatile acids. A new method using gas chromatography is included for the determination of acetic, propionic, butyric, isobutyric, valeric, and isovaleric acids (5560D).

Free Fatty Acids Test Standard (6 components)

acetic acid	isovaleric acid
butyric acid (C4:0)	propionic acid
isobutyric acid	valeric acid

1,000 µg/mL each in water, 1 mL/ampul

cat.# 35272 (ea.)

Food Analysis Performance Assessment Scheme (FAPAS®)

FAPAS® Food Testing Program*

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.

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
cis-chlordane	endrin
trans-chlordane	heptachlor
4,4'-DDD	heptachlor epoxide (isomer B)
4,4'-DDE	hexachlorobenzene
2,4'-DDT	oxychlordane
4,4'-DDT	

100 µg/mL each in acetone, 1 mL/ampul

cat.# 32412 (ea.)

Food Analysis Performance Assessment Scheme (FAPAS®), *cont.*

FAPAS® Food Testing Program*, *cont.*

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

Varied concentrations. Suitable for GC-ECD analysis.

aldrin	10 µg/mL	dieldrin	20
α-BHC	10	α-endosulfan (I)	10
β-BHC	10	β-endosulfan (II)	20
γ-BHC (lindane)	10	endosulfan sulfate	20
cis-chlordane	10	endrin	20
trans-chlordane	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, 1 mL/ampul

cat.# 32414 (ea.)

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

Equal concentration of all compounds. Suitable for GC-FPD, GC-NPD, and GC-MS analysis.

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

100 µg/mL each in acetone, 1 mL/ampul

cat.# 32413 (ea.)

*Use of Restek calibration mixtures by laboratories participating in the FAPAS® program is voluntary; 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

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- Save money

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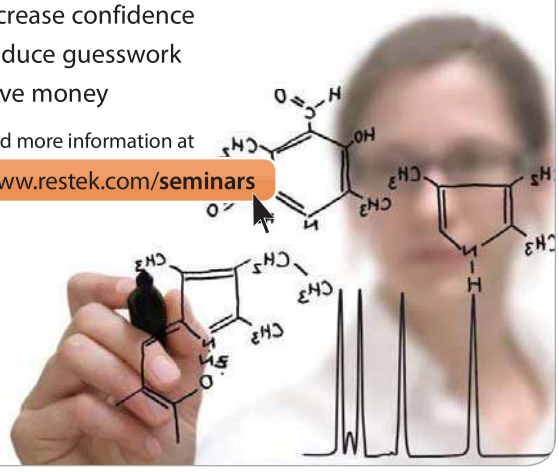


Flavors

Fruit Juice Organic Acid Standard (5 components)

citric acid	2,000 µg/ml	quinic acid	2,000
fumaric acid	10*	tartaric acid	2,000
malic acid	2,000		

In water, 1 mL/ampul
cat.# 35080 (ea.)

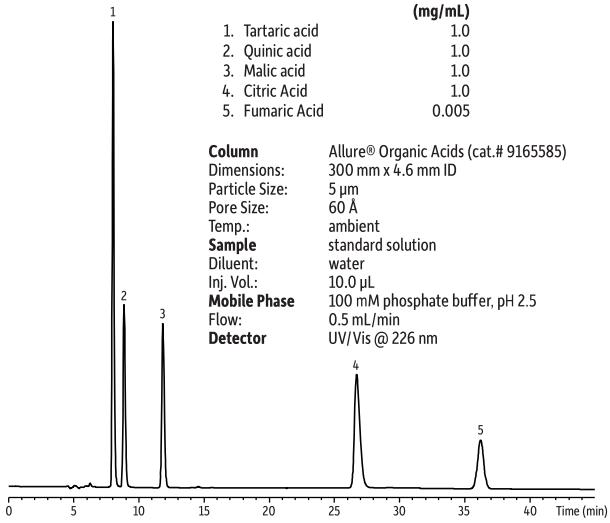
In water, 5 mL/ampul
cat.# 35081 (ea.)

*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 Standard on Allure® Organic Acids

Peaks	Conc. (mg/mL)
1. Tartaric acid	1.0
2. Quinic acid	1.0
3. Malic acid	1.0
4. Citric Acid	1.0
5. Fumaric Acid	0.005

Column	Allure® Organic Acids (cat.# 9165585)
Dimensions:	300 mm x 4.6 mm ID
Particle Size:	5 µm
Pore Size:	60 Å
Temp.:	ambient
Sample	standard solution
Diluent:	water
Inj. Vol.:	10.0 µL
Mobile Phase	100 mM phosphate buffer, pH 2.5
Flow:	0.5 mL/min
Detector	UV/Vis @ 226 nm



LC_0238

Fragrances

Fragrance Materials Test Mix (12 components)

- Performance evaluation for essential oils and fragrance chemicals.
- System suitability mixture for GC systems and analytical columns.
- Convenient 0.5 mL quantity for easy dilution to recommended working solution.

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 0.5 mL of neat mixture to 10 mL 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, 0.5 mL in an amber ampul
cat.# 31807 (ea.)

No data pack available.

Searching Online for Reference Standards?

Find a Specific **Compound**

Enter a compound name, synonym, or CAS # in our **Reference Standards Search Tool**.

www.restek.com/**reference**

Find Specific **Documentation**

Locate MSDSs, Certificates, & Datapacks by cat. # or lot # with our **Reference Standards Documentation Search**.

www.restek.com/**documents**

Fragrance Allergens

Fragrance Allergen Standards Kit

- Highly stable formulation has a minimum shelf life of 18 months.
- Fully resolves 31 fragrance allergens with one analysis on an Rxi®-17 column.
- Ideal for GC-MS analysis following IFRA methodology.
- Helps you meet EU requirements defined in the European Cosmetics Directive.
- All components included at 400 ppm to allow dilution for calibration curves and use with different solvents.
- Exceeds purity requirements outlined in IFRA method.

To help protect consumers with allergies, the 7th Amendment to the European Cosmetics Directive mandates that finished cosmetic products and personal care products must indicate if they contain excess amounts of any allergen on a list of 26 compounds. Of those 26, 24 are volatile chemicals that can be determined through GC-MS analysis, and version 3 of the method outlined by the International Fragrance Association (IFRA) does just that.

This specially formulated reference standard kit exceeds IFRA purity requirements and contains all 24 EU-defined fragrance allergens detectable by GC-MS, along with seven additional potential allergens. When analyzed on a Restek Rxi®-17 column following the IFRA method, all required compounds and isomers resolve clearly with no coelutions. This time-saving mix is also incredibly robust with a shelf life of over one and a half years, so you can stock an already-made standard instead of spending the time to create a new batch for every analysis.

Whether you manufacture fragrances in Europe, sell to European consumers, or simply wish to test for allergens in your products, choose the reference standard mix that helps you follow IFRA methodology in one convenient, long-lasting formulation.

MTBE Solvent Blank

methyl *tert*-butyl ether (MTBE)	CAS # 1634-04-4	Neat

1-Fluoronaphthalene (Internal Standard)

1-fluoronaphthalene	CAS # 321-38-0	20 µg/mL

Fragrance Allergen Standard A (Includes Internal Standard)

α-amylcinnamaldehyde*†	CAS # 122-40-7	400 µg/mL
cinnamal*	CAS # 104-55-2	400
citral*†	CAS # 5392-40-5	400
3,7-dimethyl-7-hydroxyoctanal*	CAS # 107-75-5	400
1-fluoronaphthalene	CAS # 321-38-0	20
α-hexylcinnamaldehyde*†	CAS # 101-86-0	400
lilial*	CAS # 80-54-6	400
lyral*†	CAS # 31906-04-4	400
phenylacetaldehyde**	CAS # 122-78-1	400

Fragrance Allergen Standard B (Includes Internal Standard)

α-amylcinnamic alcohol*†	CAS # 101-85-9	400 µg/mL
benzyl alcohol*	CAS # 100-51-6	400
cinnamyl alcohol*	CAS # 104-54-1	400
citronellol*	CAS # 106-22-9	400
eugenol*	CAS # 97-53-0	400
farnesol*†	CAS # 4602-84-0	400
1-fluoronaphthalene	CAS # 321-38-0	20
geraniol*	CAS # 106-24-1	400
isoeugenol*	CAS # 97-54-1	400
linalool*	CAS # 78-70-6	400
4-methoxybenzyl alcohol*	CAS # 105-13-5	400
methyl eugenol**	CAS # 93-15-2	400

Fragrance Allergen Standard C (Includes Internal Standard)

4-allylanisole**	CAS # 140-67-0	400 µg/mL
benzyl benzoate*	CAS # 120-51-4	400
benzyl cinnamate*	CAS # 103-41-3	400
benzyl salicylate*	CAS # 118-58-1	400
camphor**	CAS # 76-22-2	400
1,8-cineole**	CAS # 470-82-6	400
coumarin*	CAS # 91-64-5	400
1-fluoronaphthalene	CAS # 321-38-0	20
limonene*	CAS # 138-86-3	400
iso-α-methylionone*	CAS # 127-51-5	400
methyl 2-nonynoate**	CAS # 111-80-8	400
methyl 2-octynoate*	CAS # 111-12-6	400
safrole**	CAS # 94-59-7	400

*Compound listed in 7th Amendment to the European Cosmetics Directive.
**Additional potential allergens included in this formulation.
†Compounds defined as two isomers resulting in two chromatographic peaks.

Contains 1 mL each of these mixtures (in methyl *tert*-butyl ether).

cat.# 33105 (kit)

NEW! kit

NEW! Compound Index for Reference Standards

See **pages 730–736.**

Melamine

Melamine Analysis Kit

Kit includes:
Column:
Rxi-5Sil MS w/5-meter Integra-Guard
Standards:
33247: 1 mL Melamine Stock Standard (1,000 µg/mL)
33248: 1 mL Cyanuric Acid Stock Standard (1,000 µg/mL)
33249: 1 mL Ammelide Stock Standard (1,000 µg/mL)
33250: 1 mL Ammeline Stock Standard (1,000 µg/mL)
33251: 1 mL Benzoguanamine Internal Standard (1,000 µg/mL)
33253: 1 mL Melamine Mix Standard (1,000 µg/mL)
Derivatization Reagent:
35607: BSTFA w/1% TMCS, 25 g vial
Accessories:
50 mL empty centrifuge tubes, 10-pk.
13 mm, 0.45 µm nylon syringe filters, 20-pk.
Easy-to-follow instructions with procedural checklists to assist with laboratory documentation.

Contains contents listed above.

cat.# 33254 (kit) kit

*Kit contains a 10-pk. of tubes and 20-pk. of filters. 50-pk. of tubes (cat.# 26239) and 100-pk. of filters (cat.# 26147) sold separately.

Melamine and Related Analogs Stock Standard

(4 components)

ammelide
ammeline
cyanuric acid
melamine

1,000 µg/mL each in diethylamine:water (20:80), 1 mL/ampul
cat.# 33253 (ea.)

Melamine Stock Standard

1,000 µg/mL in diethylamine:water (20:80), 1 mL/ampul
cat.# 33247 (ea.)

Cyanuric Acid Stock Standard

1,000 µg/mL in diethylamine:water (20:80), 1 mL/ampul
cat.# 33248 (ea.)

Ammelide Stock Standard

1,000 µg/mL in diethylamine:water (20:80), 1 mL/ampul
cat.# 33249 (ea.)

Ammeline Stock Standard

1,000 µg/mL in diethylamine:water (20:80), 1 mL/ampul
cat.# 33250 (ea.)

Benzoguanamine Internal Standard

1,000 µg/mL in pyridine, 1 mL/ampul
cat.# 33251 (ea.)

MN Dept. of Agriculture Pesticides

Minnesota Ag List 1 Pesticides Mix A (16 components)

acetochlor
alachlor
atrazine
cyanazine
desethylatrazine
desisopropylatrazine
dimethenamid*
ethalfluralin
metolachlor
metribuzin
pendimethalin
prometon
propachlor
propazine
simazine
trifluralin

200 ppm each in acetone, 1 mL/ampul
cat.# 32406 (ea.)

*Added to Minnesota Department of Agriculture List 1 pesticide (neutrals) incident investigation requirements, effective January 1, 2000.[1] CAS # 87674-68-8 manufactured by several companies under various trade names.
[1]Analytical Lists for Pesticide Incident Investigations, Minnesota Department of Agriculture, Guidance Document 26 (3/99), St. Paul, MN. For a copy, visit their website at: **www.mda.state.mn.us**

Minnesota Ag List 1 Pesticides Mix B (6 components)

chlorpyrifos
EPTC
fonofos
phorate
terbufos
triallate

200 ppm each in acetone, 1 mL/ampul
cat.# 32407 (ea.)

Minnesota Ag List 1 Pesticide Kit

Contains 1 mL each of these mixtures.
32406: Minnesota Ag List Pesticides Mix A
32407: Minnesota Ag List Pesticides Mix B

cat.# 32408 (kit) kit

also available

Rxi®-5Sil MS Column
Ideal for pesticide and melamine analysis

For details, see **page 32**.
See **page 492** for chromatogram.

Phthalate Esters

See page 494.

Plastic Container Testing

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, LC separation, and UV detection. Restek offers a variety of reversed phase LC columns suitable for these separations. Restek also designed a reference standard 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	

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

cat.# 31628 (ea.)

No data pack available.

Other Additives Available From Restek on a Custom Basis

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 not listed and can obtain most compounds you may need. Visit **www.restek.com/solutions** to request yours today!

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

QuEChERS

QuEChERS Standards

- Ready to use for QuEChERS extractions—no dilutions necessary.
- Support for GC and LC with MS, MS/MS, and selective detectors.

Pesticide analysis is fast and simple using QuEChERS methods. Use these cost-effective QuEChERS standards for even greater lab efficiency. Standards are compatible with all major methods, including mini-multiresidue, AOAC, and European procedures. Save time with convenient mixes or make your own blend using our full line of single-component solutions.

QuEChERS Internal Standard Mix for GC-ECD Analysis (4 components)

PCB 18	PCB 52
PCB 28	tris-(1,3-dichloroisopropyl)phosphate

50 µg/mL each in acetonitrile, 5 mL/ampul

cat.# 33265 (ea.)

QuEChERS Internal Standard Mix for GC-NPD and LC-MS/MS Analysis (2 components)

triphenyl phosphate	20 µg/mL
tris-(1,3-dichloroisopropyl)phosphate	50 µg/mL

In acetonitrile, 5 mL/ampul

cat.# 33266 (ea.)

QuEChERS Internal Standard Mix for GC-MS Analysis (6 components)

PCB 18	50 µg/mL	triphenyl phosphate	20
PCB 28	50	tris-(1,3-dichloroisopropyl)phosphate	50
PCB 52	50	triphenylmethane	10

In acetonitrile, 5 mL/ampul

cat.# 33267 (ea.)

QuEChERS Internal Standard Mix for LC-MS/MS Analysis

nicarbazin

10 µg/mL in acetonitrile, 5 mL/ampul

cat.# 33261 (ea.)

QuEChERS Quality Control Standards for GC-MS Analysis

Cat.# 33268:	**Cat.# 33264:**
PCB 138	anthracene
PCB 153	

50 µg/mL each in acetonitrile, 5 mL/ampul

cat.# 33268 (ea.)

100 µg/mL in acetonitrile, 5 mL/ampul

cat.# 33264 (ea.)

QuEChERS, *cont.*

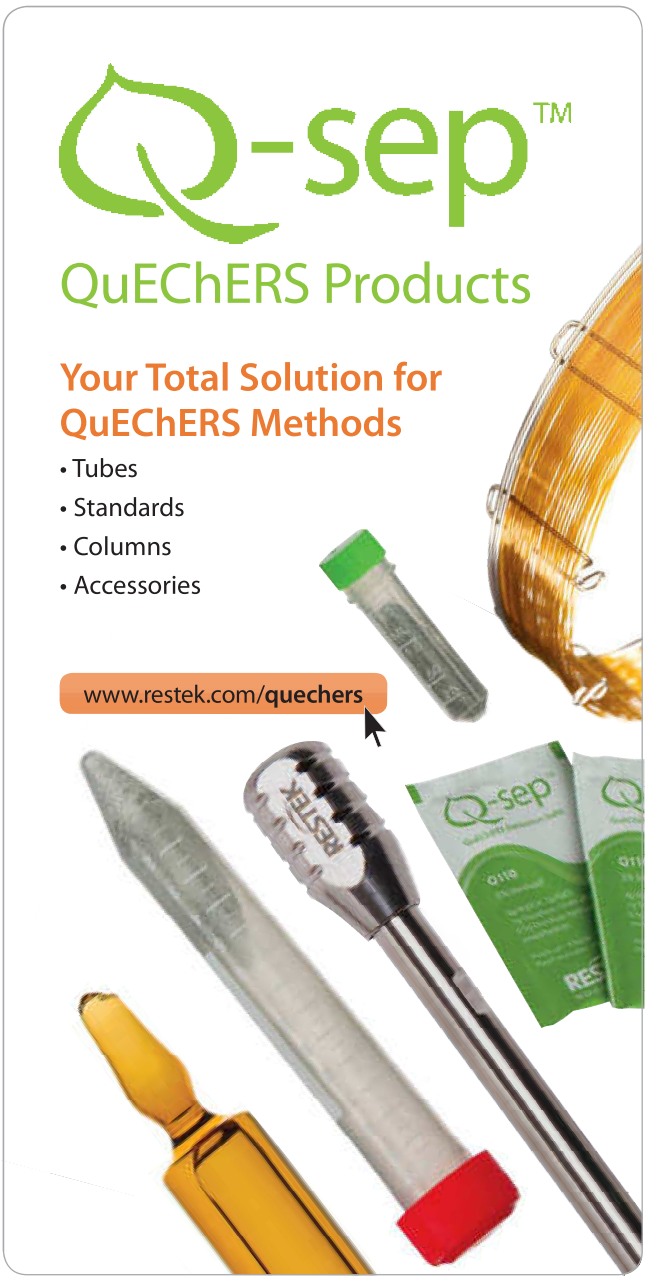
QuEChERS Standards, *cont.*

QuEChERS Single-Component Reference Standards

Concentration is µg/mL.

Compound	CAS #	Solvent	Conc.	cat.#
PCB 18 (5 mL)	37680-65-2	ACN	50	33255
PCB 28 (5 mL)	7012-37-5	ACN	50	33256
PCB 52 (5 mL)	35693-99-3	ACN	50	33257
PCB 138 (5 mL)	35065-28-2	ACN	50	33262
PCB 153 (5 mL)	35065-27-1	ACN	50	33263
triphenylmethane (5 mL)	519-73-3	ACN	10	33260
triphenylphosphate (5 mL)	115-86-6	ACN	20	33258
tris(1,3-dichloroisopropyl)phosphate (5 mL)	13674-87-8	ACN	50	33259

ACN = acetonitrile



QuEChERS Standards for AOAC Official Method 2007.01

- Ready to use for generating text mixes, calibration standards, and spiking experiments.
- Reliable standards produced according to specifications defined in AOAC Official Method 2007.01.
- Cost-effective QuEChERS standards can be used without dilutions for greater lab efficiency.

Following QuEChERS methods is even quicker and easier when you use Restek method-specific chemical standards for AOAC Official Method 2007.01 (Pesticide Residues in Foods by Acetonitrile Extraction and Partitioning with Magnesium Sulfate). Our suite of AOAC QuEChERS standards includes internal standards mix, triphenylphosphate (TPP) solution, and QC spike mix. Each standard can be used directly without dilutions because they are formulated to the exact concentrations prescribed by AOAC Method 2007.01.

AOAC QuEChERS IS Solution (2 components)

α-BHC-d6 (α-HCH-d6)
parathion-d10

40 µg/mL each in acetonitrile, 5 mL/ampul
cat.# 31963 (ea.)

NEW!

AOAC QuEChERS Triphenylphosphate Solution

2 µg/mL in acetonitrile:acetic acid (99:1), 5 mL/ampul
cat.# 31964 (ea.)

NEW!

AOAC QuEChERS QC Spike Mix (27 components)

atrazine
azoxystrobin
bifenthrin
carbaryl (Sevin)
chlorothalonil
chlorpyrifos (Dursban)
chlorpyrifos methyl
lambda-cyhalothrin
cyprodinil
2,4'-DDD
dichlorvos (DDVP)
endosulfan sulfate
ethion
imazalil
imidacloprid
kresoxim methyl
linuron
methamidophos
methomyl
cis-permethrin
trans-permethrin
procymidone
pymetrozine
tebuconazole (Folicur)
thiabendazole
tolylfluanid
trifluralin

40 µg/mL each in acetonitrile:acetic acid (99.9:0.1), 5 mL/ampul
cat.# 31999 (ea.)

NEW!

Reference Standards

Petroleum & Petrochemical

Biodiesel 539
Finished Motor Oil & Aviation Gasoline 540
PCBs in Transformer Oil 540
Simulated Distillation 541
Spark Ignition Engine Fuels 542–543
Sulfur 544–547
- Sulfur in Diesel Fuel 544
- Sulfur in Gasoline 545
- Sulfur in Isooctane 546
- Sulfur in Mineral Oil 547

Biodiesel

ASTM Method D6584-10 and EN14105 (Biodiesel)

Determining Free and Total Glycerin in B100 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. D6584-10 and DIN EN14105 are test methods 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

1,000 µg/mL in pyridine, 1 mL/ampul
cat.# 33024 (ea.)

1,000 µg/mL in pyridine, 5 mL/ampul
cat.# 33032 (ea.)

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

5,000 µg/mL in pyridine, 1 mL/ampul
cat.# 33022 (ea.)

Glycerin

500 µg/mL in pyridine, 1 mL/ampul
cat.# 33020 (ea.)

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

5,000 µg/mL in pyridine, 1 mL/ampul
cat.# 33021 (ea.)

Monopalmitin

5,000 µg/mL in pyridine, 1 mL/ampul
cat.# 33026 (ea.)

Tricaprin (1,2,3-tricaprinoylglycerol)

8,000 µg/mL in pyridine, 1 mL/ampul
cat.# 33025 (ea.)

8,000 µg/mL in pyridine, 5 mL/ampul
cat.# 33033 (ea.)

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

5,000 µg/mL in pyridine, 1 mL/ampul
cat.# 33023 (ea.)

Diesel:Biodiesel (80:20) Blend Standard

The biodiesel component is methyl soyate.

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31880 (ea.)

MXT® Capillary Columns

Ideal for High-Temperature GC Analysis

- Metal tubing won't become brittle at high temperatures (430 °C).
- Exclusive Siltek® layer makes the internal surface as inert as deactivated fused silica.
- Can be tightly coiled well under 4.5" without breaking, even under stress.
- Column efficiency (Trennzahl valve) is similar to that of fused silica.

See **pages 90–101** or visit www.restek.com/mxt

Finished Motor Oil & Aviation Gasoline

ASTM D3606-10 (Determination of Benzene & Toluene in Finished Motor & Aviation Gasoline by GC)

ASTM D3606 Calibration Kit Without Internal Standard

Contains 25 mL each of these mixtures.
30647: ASTM D3606 Calibration Standard #1 Without Internal Standard
30648: ASTM D3606 Calibration Standard #2 Without Internal Standard
30649: ASTM D3606 Calibration Standard #3 Without Internal Standard
30650: ASTM D3606 Calibration Standard #4 Without Internal Standard
30651: ASTM D3606 Calibration Standard #5 Without Internal Standard
30652: ASTM D3606 Calibration Standard #6 Without Internal Standard
30653: ASTM D3606 Calibration Standard #7 Without Internal Standard

cat.# 30672 (kit) **kit**

Find complete compound lists for our **D3606 reference standards** at

www.restek.com/**D3606standards**

ASTM D3606 Calibration Kit With MEK Internal Standard

Contains 1 mL each of these mixtures.
30654: ASTM D3606 Calibration Standard #1 With MEK Internal Standard
30655: ASTM D3606 Calibration Standard #2 With MEK Internal Standard
30656: ASTM D3606 Calibration Standard #3 With MEK Internal Standard
30657: ASTM D3606 Calibration Standard #4 With MEK Internal Standard
30658: ASTM D3606 Calibration Standard #5 With MEK Internal Standard
30659: ASTM D3606 Calibration Standard #6 With MEK Internal Standard
30660: ASTM D3606 Calibration Standard #7 With MEK Internal Standard

cat.# 30673 (kit) **kit**

ASTM D3606 Calibration Kit With *sec*-Butanol Internal Standard

Contains 1 mL each of these mixtures.
30661: ASTM D3606 Calibration Standard #1 With *sec*-Butanol Internal Standard
30662: ASTM D3606 Calibration Standard #2 With *sec*-Butanol Internal Standard
30663: ASTM D3606 Calibration Standard #3 With *sec*-Butanol Internal Standard
30664: ASTM D3606 Calibration Standard #4 With *sec*-Butanol Internal Standard
30665: ASTM D3606 Calibration Standard #5 With *sec*-Butanol Internal Standard
30666: ASTM D3606 Calibration Standard #6 With *sec*-Butanol Internal Standard
30667: ASTM D3606 Calibration Standard #7 With *sec*-Butanol Internal Standard

cat.# 30674 (kit) **kit**

ASTM D3606 Backflush Standard

2,2,4-trimethylpentane (isooctane)

5% vol/vol in nonane, 1 mL/ampul

cat.# 30671 (ea.)

PCBs in Transformer Oil

ASTM Method D4059-00 (PCB Standards in Oil)

ASTM Method D4059-00 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, 5 mL
cat.# 32424 (ea.)

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

No data pack available.

Aroclor Standards

Volume is 1 mL/ampul.

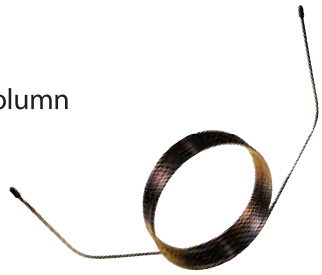
Compound	CAS #	Solvent	Conc.	cat.#
Aroclor 1016	12674-11-2	TO	50 mg/kg	32075
Aroclor 1016	12674-11-2	TO	500 mg/kg	32076
Aroclor 1221	11104-28-2	TO	50 mg/kg	32077
Aroclor 1221	11104-28-2	TO	500 mg/kg	32078
Aroclor 1232	11141-16-5	TO	50 mg/kg	32079
Aroclor 1232	11141-16-5	TO	500 mg/kg	32080
Aroclor 1242	53469-21-9	TO	50 mg/kg	32081
Aroclor 1242	53469-21-9	TO	500 mg/kg	32082
Aroclor 1248	12672-29-6	TO	50 mg/kg	32083
Aroclor 1248	12672-29-6	TO	500 mg/kg	32084
Aroclor 1254	11097-69-1	TO	50 mg/kg	32085
Aroclor 1254	11097-69-1	TO	500 mg/kg	32086
Aroclor 1260	11096-82-5	TO	50 mg/kg	32087
Aroclor 1260	11096-82-5	TO	500 mg/kg	32088

TO = transformer oil (PCB-free)

also available

D3606 Application Column
(2 column set)

See **page 120** for details.



Simulated Distillation

ASTM Simulated Distillation Petroleum Fractions

ASTM D2887-08 Calibration Mix (20 components)

American Society for Testing and Materials (ASTM International) Method D2887-08 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 sufficiently low to permit sampling at ambient temperature.

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

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

5% w/w, Neat, 1 g /ampul
cat.# 31675 (ea.)

No data pack available.
*Orders in the U.S. ship FedEx only. Call for options when shipping outside the U.S.

ASTM Methods D2887 and D3710-95

These calibration mixtures are made with pure, highly characterized neat material and are prepared using NIST-traceable balances 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)
n-hexane (C6)	6	*n*-octadecane (C18)	5
n-heptane (C7)	6	*n*-eicosane (C20)	2
n-octane (C8)	8	*n*-tetracosane (C24)	2
n-nonane (C9)	8	*n*-octacosane (C28)	1
n-decane (C10)	12	*n*-dotriacontane (C32)	1
n-undecane (C11)	12	*n*-hexatriacontane (C36)	1
n-dodecane (C12)	12	*n*-tetracontane (C40)	1
n-tetradecane (C14)	12	*n*-tetratetracontane (C44)	1
n-hexadecane (C16)	10		

Packaged 1 mL/ampul
cat.# 31222 (ea.)

No data pack available.

D3710-95 Calibration Mix (16 components)

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

Packaged 1 mL/ampul
cat.# 31223 (ea.)

No data pack available.

ASTM Method 6352-04 (Polywax® Standards)

Polywax Standards

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

Volume is 1 mL/ampul.

Compound	CAS #	Solvent	Conc.	cat.#
Polywax 500	9002-88-4	Neat	1 g	36224
Polywax 655	9002-88-4	Neat	1 g	36225
Polywax 850	9002-88-4	Neat	1 g	36226
Polywax 1000	9002-88-4	Neat	1 g	36227

No data pack available.

Petroleum Standards

These petroleum standards are gravimetrically prepared, NIST-traceable by weight, and have been 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-dimethlybenzenethiol
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-pentadecanethiolol
60 ppm total sulfur by weight from 1-hexadecanethiol
30 ppm total sulfur by weight from 1-octadecanethiol
Balance: toluene:isooctane (1:15)

1 mL pre-scored amber ampul.
cat.# 33049 (ea.)

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

1 mL pre-scored amber ampul.
cat.# 33050 (ea.)

Restek Offers a Full Line of Certified Reference Materials
See **pages 438–439**.
QUALITY ISO 9001 • 17025 • Guide 34
www.restek.com/iso

Spark Ignition Engine Fuels

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

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.

Oxy Set-Up Blend (30 components)

Gravimetrically prepared and NIST-traceable.

benzene	1.00%	1-methylcyclopentene	0.50%
tert-butanol	0.50%	1-methyl-2-ethylbenzene	0.50%
cyclohexane	28.9%	1-methylnaphthalene	0.25%
n-decane	1.00%	5-methylnonane	0.20%
2,3-dimethylbutane	0.50%	naphthalene	0.50%
trans-1,2-dimethylcyclopentane	0.50%	*n*-nonane	2.00%
2,3-dimethylheptane	0.20%	*n*-octane	2.00%
dodecane	0.25%	*n*-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%
n-heptane	2.00%	2,2,3-trimethylpentane	0.52%
n-hexane	2.00%	2,3,3-trimethylpentane	0.50%
2-methylbutene-2	2.50%	undecane	0.50%
methyl *tert*-butyl ether	10.0%	*p*-xylene	1.00%

2 mL prescored ampul

cat.# 33034 (ea.)

DHA PONA VI Mix

PONA-VI (PONA 6) is a qualitative mixture of various gasoline and refinery materials prepared to provide nearly every component that may be encountered in feedstock and finished gasolines. Some oxygenates have been added to allow this blend to be used for DHA method setup.

Contact us for component listing.

Neat, 0.1 mL in Autosampler Vial

cat.# 30723 (ea.)

No data pack available.

DHA PIONA Blend (136 components)

Paraffins		2-methylhexane	0.85%	**Napthenes**		1-*tert*-butyl-2-methylbenzene	0.47%
decane	1.75%	3-methylhexane	0.43%	ctc-123-TMCYC6	0.70%	1,2-diethylbenzene	0.19%
dodecane	1.75%	2-methylnonane	0.29%	cyclohexane	0.91%	1,2-dimethyl-3-ethylbenzene	0.49%
heptane	1.74%	3-methylnonane	0.95%	cyclopentane	1.81%	1,2-dimethyl-4-ethylbenzene	0.21%
hexane	1.75%	2-methyloctane	0.22%	*cis*-1,2-dimethylcyclohexane	1.60%	1,3-dimethyl-2-ethylbenzene	0.18%
nonane	1.74%	3-methyloctane	1.27%	*trans*-1,2-dimethylcyclohexane	0.68%	1,3-dimethyl-5-ethylbenzene	0.09%
octane	1.75%	2-methylpentane	1.15%	*trans*-1,4-dimethylcyclohexane	0.91%	1,4-dimethyl-2-ethylbenzene	0.47%
pentadecane	1.74%	3-methylpentane	1.91%	*trans*-1,2-dimethylcyclopentane	0.70%	ethylbenzene	1.87%
pentane	1.74%	2,2,3-trimethylbutane	0.12%	*cis*-1,3-dimethylcyclopentane	0.70%	1-ethyl-2-methylbenzene	0.35%
tetradecane	1.75%	2,2,3-trimethylpentane	0.67%	*trans*-1,3-dimethylcyclopentane	1.11%	1-ethyl-3-methylbenzene	0.63%
tridecane	1.74%	**Olefins**		ethylcyclopentane	1.50%	1-ethyl-4-methylbenzene	0.47%
undecane	1.74%	1-decene	0.42%	1-ethyl-1-methylcyclopentane	0.28%	hexylbenzene	1.17%
Iso-Paraffins		1-heptene	1.26%	isobutylcyclohexane	0.68%	isobutylbenzene	0.70%
3,3-diethylpentane	0.35%	*cis*-2-heptene	0.63%	isobutylcyclopentane	0.25%	isopropylbenzene	0.47%
2,3-dimethylbutane	0.43%	*trans*-2-heptene	0.10%	isopropylcyclohexane	0.90%	2-methylbutylbenzene	0.02%
2,3-dimethylheptane	0.21%	*cis*-3-heptene	0.63%	isopropylcyclopentane	0.25%	1-methyl-2-isopropylbenzene	0.63%
2,5-dimethylheptane	0.68%	*trans*-3-heptene	0.25%	methylcyclohexane	0.70%	1-methyl-3-isopropylbenzene	0.24%
3,3-dimethylheptane	0.32%	1-hexene	2.10%	methylcyclopentane	1.13%	1-methyl-4-isopropylbenzene	0.93%
3,4-dimethylheptane	0.15%	*cis*-2-hexene	0.43%	*trans*-1-methyl-2-(4MP)		1-methyl-2-*n*-propylbenzene	0.49%
3,5-dimethylheptane	0.43%	*trans*-2-hexene	0.42%	cyclopentane	0.68%	1-methyl-3-*n*-propylbenzene	0.47%
2,2-dimethylhexane	0.14%	2-methyl-1,3-butadiene	0.68%	*trans*-1-methyl-		1-methyl-4-*n*-propylbenzene	0.47%
2,3-dimethylhexane	0.62%	2-methyl-1-butene	0.40%	2-propylcyclohexane	0.92%	pentylbenzene	0.47%
2,4-dimethylhexane	0.26%	3-methyl-1-butene	0.27%	*n*-propylcyclopentane	0.84%	*n*-propylbenzene	0.70%
2,5-dimethylhexane	1.06%	2-methyl-1-nonene	0.63%	1,1,2-trimethylcyclohexane	0.35%	1,2,4,5-tetramethylbenzene	0.19%
2,2-dimethyloctane	0.38%	2-methyl-2-pentene	0.64%	1,1,4-trimethylcyclohexane	1.20%	toluene	2.83%
3,3-dimethyloctane	0.15%	4-methyl-1-pentene	0.63%	ctc-1,2,4-trimethylcyclohexane	0.20%	1,2,4-triethylbenzene	0.23%
2,2-dimethylpentane	0.44%	1-nonene	1.29%	ctt-1,2,4-trimethylcyclohexane	0.35%	1,3,5-triethylbenzene	0.47%
2,3-dimethylpentane	0.85%	*trans*-2-nonene	0.43%	ccc-1,3,5-trimethylcyclohexane	0.45%	1,2,4-trimethylbenzene	0.47%
2,4-dimethylpentane	1.08%	*cis*-3-nonene	0.56%	ccc-1,2,3-trimethylcyclopentane	0.15%	1,3,5-trimethylbenzene	0.09%
3,3-dimethylpentane	0.42%	*trans*-3-nonene	0.43%	ctc-1,2,3-trimethylcyclopentane	0.72%	*m*-xylene	0.70%
3-ethylhexane	0.05%	*cis*-4-nonene	0.81%	**Aromatics**		*p*-xylene	0.24%
3-ethyloctane	0.19%	1-octene	2.11%	benzene	1.88%	*o*-xylene	0.71%
3-ethylpentane	0.16%	*cis*-2-octene	0.43%	*n*-butylbenzene	0.47%		
isopentane	0.29%	*trans*-2-octene	0.63%	*sec*-butylbenzene	0.70%		
3-methylcycloheptane	1.07%	1-pentene	1.63%	*tert*-butylbenzene	0.47%		
4-methylcycloheptane	0.26%	*cis*-2-pentene	0.37%	*tert*-1-butyl-3,5-dimethylbenzene	0.76%		
2-methylheptane	0.85%	*trans*-2-pentene	0.36%	1-*tert*-butyl-4-ethylbenzene	0.47%		

Neat, 0.1 mL in Autosampler Vial

cat.# 30712 (ea.)

No data pack available.

Spark Ignition Engine Fuels, *cont.*

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

DHA Paraffins Mix (11 components)

decane	9.11%	pentadecane	9.09%
dodecane	9.13%	pentane	9.06%
heptane	9.08%	tetradecane	9.14%
hexane	9.11%	tridecane	9.05%
nonane	9.08%	undecane	9.05%
octane	9.10%		

Neat, 0.1 mL in Autosampler Vial

cat.# 30713 (ea.)

No data pack available.

DHA Isoparaffins Mix (34 components)

3,3-diethylpentane	1.87%	3-ethylhexane	0.29%
2,3-dimethylbutane	2.27%	3-ethyloctane	1.04%
2,3-dimethylheptane	1.12%	3-ethylpentane	0.85%
2,5-dimethylheptane	3.64%	isopentane	1.53%
3,3-dimethylheptane	1.71%	3-methylcycloheptane	5.73%
3,4-dimethylheptane	0.80%	4-methylcycloheptane	1.41%
3,5-dimethylheptane	2.27%	2-methylheptane	4.54%
2,2-dimethylhexane	0.76%	2-methylhexane	4.54%
2,3-dimethylhexane	3.29%	3-methylhexane	2.28%
2,4-dimethylhexane	1.40%	2-methylnonane	1.53%
2,5-dimethylhexane	5.69%	3-methylnonane	5.10%
2,2-dimethyloctane	2.05%	2-methyloctane	1.20%
3,3-dimethyloctane	0.78%	3-methyloctane	6.81%
2,2-dimethylpentane	2.36%	2-methylpentane	6.17%
2,3-dimethylpentane	4.54%	3-methylpentane	10.23%
2,4-dimethylpentane	5.77%	2,2,3-trimethylbutane	0.64%
3,3-dimethylpentane	2.23%	2,2,3-trimethylpentane	3.56%

Neat, 0.1 mL in Autosampler Vial

cat.# 30715 (ea.)

No data pack available.

DHA Aromatics Mix (38 components)

benzene	8.20%	isopropylbenzene	2.07%
n-butylbenzene	2.06%	2-methylbutylbenzene	0.11%
sec-butylbenzene	3.07%	1-methyl-2-isopropylbenzene	2.76%
tert-butylbenzene	2.04%	1-methyl-3-isopropylbenzene	1.05%
tert-1-butyl-3,5-dimethylbenzene	3.31%	1-methyl-4-isopropylbenzene	4.09%
1-*tert*-butyl-4-ethylbenzene	2.05%	1-methyl-2-*n*-propylbenzene	2.13%
1-*tert*-butyl-2-methylbenzene	2.05%	1-methyl-3-*n*-propylbenzene	2.06%
1,2-diethylbenzene	0.84%	1-methyl-4-*n*-propylbenzene	2.06%
1,2-dimethyl-3-ethylbenzene	2.13%	pentylbenzene	2.05%
1,2-dimethyl-4-ethylbenzene	0.90%	*n*-propylbenzene	3.07%
1,3-dimethyl-2-ethylbenzene	0.79%	1,2,4,5-tetramethylbenzene	0.85%
1,3-dimethyl-5-ethylbenzene	0.39%	toluene	12.36%
1,4-dimethyl-2-ethylbenzene	2.05%	1,2,4-triethylbenzene	1.02%
ethylbenzene	8.18%	1,3,5-triethylbenzene	2.04%
1-ethyl-2-methylbenzene	1.55%	1,2,4-trimethylbenzene	2.05%
1-ethyl-3-methylbenzene	2.77%	1,3,5-trimethylbenzene	0.41%
1-ethyl-4-methylbenzene	2.05%	*m*-xylene	3.08%
hexylbenzene	5.11%	*p*-xylene	1.03%
isobutylbenzene	3.08%	*o*-xylene	3.10%

Neat, 0.1 mL in Autosampler Vial

cat.# 30717 (ea.)

No data pack available.

DHA Naphthenes Mix (27 components)

ctc-123-TMCYC6	3.40%	methylcyclohexane	3.39%
cyclohexane	4.41%	methylcyclopentane	5.48%
cyclopentane	8.75%	*trans*-1-methyl-2-(4MP) cyclopentane	3.31%
cis-1,2-dimethylcyclohexane	7.74%	*trans*-1-methyl-2-propyl cyclohexane	4.43%
trans-1,2-dimethylcyclohexane	3.29%	*n*-propylcyclopentane	4.06%
trans-1,4-dimethylcyclohexane	4.38%	1,1,2-trimethylcyclohexane	1.69%
trans-1,2-dimethylcyclopentane	3.37%	1,1,4-trimethylcyclohexane	5.83%
cis-1,3-dimethylcyclopentane	3.39%	ctc-1,2,4-trimethylcyclohexane	0.98%
trans-1,3-dimethylcyclopentane	5.36%	ctt-1,2,4-trimethylcyclohexane	1.70%
ethylcyclopentane	7.25%	ccc-1,3,5-trimethylcyclohexane	2.16%
1-ethyl-1-methylcyclopentane	1.35%	ccc-1,2,3-trimethylcyclopentane	0.73%
isobutylcyclohexane	3.28%	ctc-1,2,3-trimethylcyclopentane	3.48%
isobutylcyclopentane	1.23%		
isopropylcyclohexane	4.37%		
isopropylcyclopentane	1.20%		

Neat, 0.1 mL in Autosampler Vial

cat.# 30719 (ea.)

No data pack available.

DHA Olefins Mix (26 components)

1-decene	2.27%	2-methyl-2-pentene	3.43%
1-heptene	6.81%	4-methyl-1-pentene	3.41%
cis-2-heptene	3.42%	1-nonene	6.94%
trans-2-heptene	0.52%	*trans*-2-nonene	2.29%
cis-3-heptene	3.41%	*cis*-3-nonene	3.02%
trans-3-heptene	1.37%	*trans*-3-nonene	2.29%
1-hexene	11.30%	*cis*-4-nonene	4.38%
cis-2-hexene	2.30%	1-octene	11.37%
trans-2-hexene	2.26%	*cis*-2-octene	2.32%
2-methyl-1,3-butadiene	3.69%	*trans*-2-octene	3.42%
2-methyl-1-butene	2.18%	1-pentene	8.76%
3-methyl-1-butene	1.48%	*cis*-2-pentene	2.01%
2-methyl-1-nonene	3.42%	*trans*-2-pentene	1.94%

Neat, 0.1 mL in Autosampler Vial

cat.# 30721 (ea.)

No data pack available.

NEW!

Compound Index for Reference Standards

See **pages 730–736.**

Sulfur in Diesel Fuel

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 200 mL amber bottle.

cat.# 33051 (ea.)

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 200 mL amber bottle.

cat.# 33052 (ea.)

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 200 mL amber bottle.

cat.# 33053 (ea.)

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 200 mL amber bottle.

cat.# 33054 (ea.)

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 200 mL amber bottle.

cat.# 33055 (ea.)

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 200 mL amber bottle.

cat.# 33056 (ea.)

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 20 mL bottles.

cat.# 33060 (kit) **kit**

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 20 mL bottles.

cat.# 33061 (kit) **kit**

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 20 mL bottles.

cat.# 33062 (kit) **kit**

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See **pages 438–439**.

Sulfur in Gasoline

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 5 mL amber bottles.

cat.# 33043 (kit) **kit**

Check Standard SG 25

25 ppm sulfur from di-*n*-butylsulfide in gasoline by weight. Set of five 5 mL amber bottles.

cat.# 33044 (ea.)

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 5 mL amber bottles.

cat.# 33045 (kit) **kit**

Check Standard SG 75

75 ppm sulfur from di-*n*-butylsulfide in gasoline by weight. Set of five 5 mL amber bottles.

cat.# 33046 (ea.)

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 5 mL amber bottles.

cat.# 33047 (kit) **kit**

Check Standard SG 175

175 ppm sulfur from di-*n*-butylsulfide in gasoline by weight. Set of five 5 mL amber bottles.

cat.# 33048 (ea.)

please note

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

Sulfur in Isooctane

Sulfur in Isooctane Calibration Kits and Check Standards

ASTM Methods D3120, D4045, D5453, D6920

Cal Kit SISO 0.125–2.5 ppm

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 0.125–2.5 ppm range. Set of six 1 mL pre-scored ampuls.
cat.# 33035 (kit) **kit**

Check Standard SISO 0.75

0.75 ppm total sulfur by weight from di-*n*-butylsulfide in isooctane.
Set of five 1 mL pre-scored ampuls.
cat.# 33036 (ea.)

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 1 mL pre-scored ampuls.
cat.# 33037 (kit) **kit**

Check Standard SISO 30

30 ppm total sulfur by weight from di-*n*-butylsulfide in isooctane.
Set of five 1 mL pre-scored ampuls.
cat.# 33038 (ea.)

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 50–100 ppm range. Set of seven 1 mL pre-scored ampuls.
cat.# 33039 (kit) **kit**

Check Standard SISO 300

300 ppm total sulfur by weight from di-*n*-butylsulfide in isooctane.
Set of five 1 mL pre-scored ampuls.
cat.# 33040 (ea.)

Sulfur in Isooctane Calibration Kits and Check Standards, *cont.*

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 1 mL pre-scored ampuls.
cat.# 33041 (kit) **kit**

Check Standard SISO 3000

3000 pm total sulfur by weight from di-*n*-butylsulfide in isooctane.
Set of five 1 mL pre-scored ampuls.
cat.# 33042 (ea.)

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 1 mL pre-scored amber ampuls.
cat.# 33057 (kit) **kit**

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 1 mL pre-scored amber ampuls.
cat.# 33058 (kit) **kit**

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 1 mL pre-scored amber ampuls.
cat.# 33059 (kit) **kit**

Sulfur in Mineral Oil

Sulfur in Mineral Oil Calibration Kits and Check Standards

ASTM Methods D2622, D3120, D4045, D4294, D5453, 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 100 mL bottles.

cat.# 33063 (kit) **kit**

Check Standard SMO 11

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

cat.# 33064 (ea.)

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 100 mL bottles.

cat.# 33065 (kit) **kit**

Check Standard SMO 30

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

cat.# 33066 (ea.)

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 100 mL bottles.

cat.# 33067 (kit) **kit**

Check Standard SMO 350

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

cat.# 33068 (ea.)

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 100 mL bottles.

cat.# 33069 (kit) **kit**

Check Standard SMO 3000

3000 w/w ppm total sulfur from di-*n*-butylsulfide. 1 liter bottle.

cat.# 33070 (ea.)

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 100 mL bottles.

cat.# 33071 (kit) **kit**

Check Standard SMO 37000

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

cat.# 33072 (ea.)

please note

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

Reference Standards

Pharmaceutical

Fatty Acids 549
Limit of Diethylene & Ethylene Glycol Standards 549
Pharmaceutical Compounds in Drinking Water 550
Plastic Container Testing 550
Residual Solvents 551–553

Fatty Acids

Composition of Fatty Acids by GC

EP 2.4.22 Composition of Fatty Acids by GC Mix 1

(6 components)

Description	% by Weight	Description	% by Weight
methyl arachidate (C20:0)	40	methyl oleate (C18:1[*cis*9])	20
methyl dodecanoate (C12:0)	5	methyl palmitate (C16:0)	10
methyl myristate (C14:0)	5	methyl stearate (C18:0)	20

100 mg total

cat.# 35100 (ea.)

No data pack available.

EP 2.4.22 Composition of Fatty Acids by GC Mix 2

(5 components)

Description	% by Weight	Description	% by Weight
methyl caproate (C6:0)	10	methyl dodecanoate (C12:0)	20
methyl caprylate (C8:0)	10	methyl myristate (C14:0)	40
methyl decanoate (C10:0)	20		

100 mg total

cat.# 35101 (ea.)

No data pack available.

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Limit of Diethylene & Ethylene Glycol Standards

Meet new FDA Guidance for Industry: Testing of Glycerin for Diethylene Glycol with our new diethylene glycol (DEG) and ethylene glycol limit standards. This guidance emphasizes the importance of screening raw material for the presence of diethylene glycol. Under cGMPs, drug manufacturers—not just glycerin manufacturers—must now test glycerin prior to use to prevent DEG contamination in finished products. FDA has worked extensively with USP to modify the glycerin monograph, and these standards support the revised USP method.

Glycerin Standard Mix (3 components)

diethylene glycol	0.5 mg/mL
ethylene glycol	0.5
glycerin	20

In P&T methanol, 1 mL/ampul

cat.# 31891 (ea.)

Propylene Glycol Standard Mix (3 components)

diethylene glycol	0.5 mg/mL
ethylene glycol	0.5
propylene glycol	20

In P&T methanol, 1 mL/ampul

cat.# 31892 (ea.)

Sorbitol Standard Mix (2 components)

diethylene glycol
ethylene glycol

0.8 mg/mL each in acetone:water (96:4), 1 mL/ampul

cat.# 31893 (ea.)

Glycol Internal Standard Mix

2,2,2-trichloroethanol

10 mg/mL in P&T methanol, 1 mL/ampul

cat.# 31894 (ea.)

Pharmaceutical Compounds in Drinking Water

Pharmaceuticals Mix #1 (8 components)

acetaminophen
caffeine
carbamazepine
ciprofloxacin HCL
erythromycin USP
fluoxetine HCl
sulfamethoxazole
trimethoprim

200 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 31116 (ea.)

NEW!

Steroids and Mixed Pharmaceuticals Mix

(10 components)

bisphenol A
diclofenac sodium salt
17-beta-estradiol
estrone
17-alpha-ethynylestradiol
4-para-nonylphenol
4-*tert*-octylphenol
primidone
progestrone
testosterone

200 µg/mL each in acetonitrile, 1 mL/ampul
cat.# 31117 (ea.)

NEW!

Pharmaceuticals Mix #2 (4 components)

gemfibrozil
ibuprofen
naproxen
triclosan

200 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 31118 (ea.)

NEW!

NEW!

Compound Index for Reference Standards

See **pages 730–736.**

Plastic Container Testing

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, LC separation, and UV detection. Restek offers a variety of reversed phase LC columns suitable for these separations. Restek also designed a reference standard 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
erucamide slip
vitamin E
Irgafos 168
Irganox 3114
Irganox 1010
Irganox 1076

50 µg/mL each in isopropanol, 1 mL/ampul
cat.# 31628 (ea.)

No data pack available.

Other Additives Available From Restek on a Custom Basis

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 not listed and can obtain most compounds you may need. Visit **www.restek.com/solutions** to request yours today!

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

Residual Solvents

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 1 mL/ampul.

Compound	CAS #	Solvent	Conc.	cat.#
acetonitrile	75-05-8	DMSO	2.05 mg/mL	36281
benzene	71-43-2	DMSO	10 mg/mL	36282
carbon tetrachloride	56-23-5	DMSO	20 mg/mL	36283
chlorobenzene	108-90-7	DMSO	1.8 mg/mL	36284
chloroform	67-66-3	DMSO	0.3 mg/mL	36285
cyclohexane	110-82-7	DMSO	19.4 mg/mL	36286
1,1-dichloroethene	75-35-4	DMSO	40 mg/mL	36287
1,2-dichloroethane	107-06-2	DMSO	25 mg/mL	36288
cis-1,2-dichloroethylene	156-59-2	DMSO	4.67 mg/mL	36289
trans-1,2-dichloroethylene	156-60-5	DMSO	4.67 mg/mL	36290
1,2-dimethoxyethane	173201-80-4	DMSO	0.5 mg/mL	36291
N,N-dimethylacetamide	127-19-5	DMSO	5.45 mg/mL	36292
N,N-dimethylformamide	68-12-2	DMSO	4.4 mg/mL	36293
1,4-dioxane	123-91-1	DMSO	1.9 mg/mL	36294
2-ethoxyethanol	110-80-5	DMSO	0.8 mg/mL	36295
ethylbenzene	100-41-4	DMSO	1.84 mg/mL	36296
ethylene glycol	3775-85-7	DMSO	3.1 mg/mL	36297
formamide	75-12-7	DMSO	1.1 mg/mL	36298
hexane	8031-34-3	DMSO	1.45 mg/mL	36299
methanol	67-56-1	DMSO	15 mg/mL	36401
2-methoxyethanol	109-86-4	DMSO	0.25 mg/mL	36402
methylbutylketone	591-78-6	DMSO	0.25 mg/mL	36400
methylcyclohexane	108-87-2	DMSO	5.9 mg/mL	36403
methylene chloride (dichloromethane)	75-09-2	DMSO	3 mg/mL	36404
N-methylpyrrolidone	872-50-4	DMSO	2.65 mg/mL	36405
nitromethane	75-52-5	DMSO	0.25 mg/mL	36406
pyridine	110-86-1	DMSO	1 mg/mL	36407
sulfolane	126-33-0	DMSO	0.8 mg/mL	36413
tetrahydrofuran (THF)	109-99-9	DMSO	3.6 mg/mL	36408
tetralin	119-64-2	DMSO	0.5 mg/mL	36409
toluene	108-88-3	DMSO	4.45 mg/mL	36410
1,1,1-trichloroethane	71-55-6	DMSO	50 mg/mL	36411
trichloroethene	79-01-6	DMSO	0.4 mg/mL	36412
m-xylene	108-38-3	DMSO	6.51 mg/mL	36414
o-xylene	95-47-6	DMSO	0.97 mg/mL	36415
p-xylene	106-42-3	DMSO	1.52 mg/mL	36416

DMSO = dimethyl sulfoxide

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

Residual Solvents - Class 1 (5 components)

benzene	10 mg/mL
carbon tetrachloride	20
1,2-dichloroethane	25
1,1-dichloroethene	40
1,1,1-trichloroethane	50

In dimethyl sulfoxide, 1 mL/ampul

cat.# 36279 (ea.)

Residual Solvents Class 2 - Mix A (15 components)

acetonitrile	2.05 mg/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, 1 mL/ampul

cat.# 36271 (ea.)

Residual Solvents Class 2 - Mix B (8 components)

chloroform	60 µg/mL	nitromethane	50
1,2-dimethoxyethane	100	pyridine	200
n-hexane (C6)	290	tetralin	100
2-hexanone	50	trichloroethene	80

In dimethyl sulfoxide, 1 mL/ampul

cat.# 36280 (ea.)

Residual Solvents Class 2 - Mix C (8 components)

2-ethoxyethanol	800 µg/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, 1 mL/ampul

cat.# 36273 (ea.)

Residual Solvents, *cont.*

USP <467>, *cont.*

The Class 1 mixtures below reflect the requirements of USP23/NF18 effective January 1, 1995 to December 31, 1999. While these mixtures do not meet the current USP guidelines, many still use these mixtures to obtain a detectable benzene peak for the direct injection methods, Method I and Method V.

USP <467> Calibration Mixture #3 (5 components)

benzene	100 µg/mL	methylene chloride	500
chloroform	50	trichloroethene	100
1,4-dioxane	100		

In dimethyl sulfoxide, 1 mL/ampul

cat.# 36004 (ea.)

USP <467> Calibration Mixture #4 (5 components)

benzene	2 µg/mL	methylene chloride	600
chloroform	60	trichloroethene	80
1,4-dioxane	380		

In methanol, 1 mL/ampul

cat.# 36006 (ea.)

USP <467> Calibration Mixture #5 (5 components)

benzene	2 µg/mL	methylene chloride	600
chloroform	60	trichloroethene	80
1,4-dioxane	380		

In dimethyl sulfoxide, 1 mL/ampul

cat.# 36007 (ea.)

USP <467> Calibration Mix #6 (4 components)

chloroform	60 µg/mL	methylene chloride	600
1,4-dioxane	380	trichloroethene	80

In methanol, 1 mL/ampul

cat.# 36008 (ea.)

USP <467> Calibration Mix #7 (4 components)

chloroform	60 µg/mL	methylene chloride	600
1,4-dioxane	380	trichloroethene	80

In dimethyl sulfoxide, 1 mL/ampul

cat.# 36009 (ea.)

OVI retention index

For a list of OVI retention times, see **pages 683–684**.

Ethylene Oxide

The test for ethylene oxide is specified in many individual drug monographs of USP24/NF19. The limit test concentration is currently 10 ppm. While the specific test solution and method will vary depending on the particular drug monograph, the solution below is suitable for most tests. Call Technical Service or your local Restek representative if your test requires a different ethylene oxide solution.

500 µg/mL in dimethyl sulfoxide, 1 mL/ampul

cat.# 36005 (ea.)

50 mg/mL in methylene chloride, 1 mL/ampul

cat.# 30620 (ea.)

Ethylene oxide is available in other solvents and concentrations. Request your custom formulation at **www.restek.com/solutions**

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Save time and money with mixes prepared to your specific solvent set and concentrations. *The more you buy, the less you pay per ampul!*

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Residual Solvents, *cont.*

European Pharmacopoeia Method

Residual Solvents - Class 1 (5 components)

benzene	10 mg/mL
carbon tetrachloride	20
1,2-dichloroethane	25
1,1-dichloroethene	40
1,1,1-trichloroethane	50

In dimethyl sulfoxide, 1 mL/ampul

cat.# 36279 (ea.)

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

chlorobenzene	360 µg/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, 1 mL/ampul

cat.# 36274 (ea.)

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See **pages 438–439**.

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

acetonitrile	410 µg/mL	2-hexanone	50
chloroform	60	methanol	3,000
1,2-dimethoxyethane	100	nitromethane	50
N,N-dimethylacetamide	1,090	pyridine	200
1,4-dioxane	380	tetralin	100

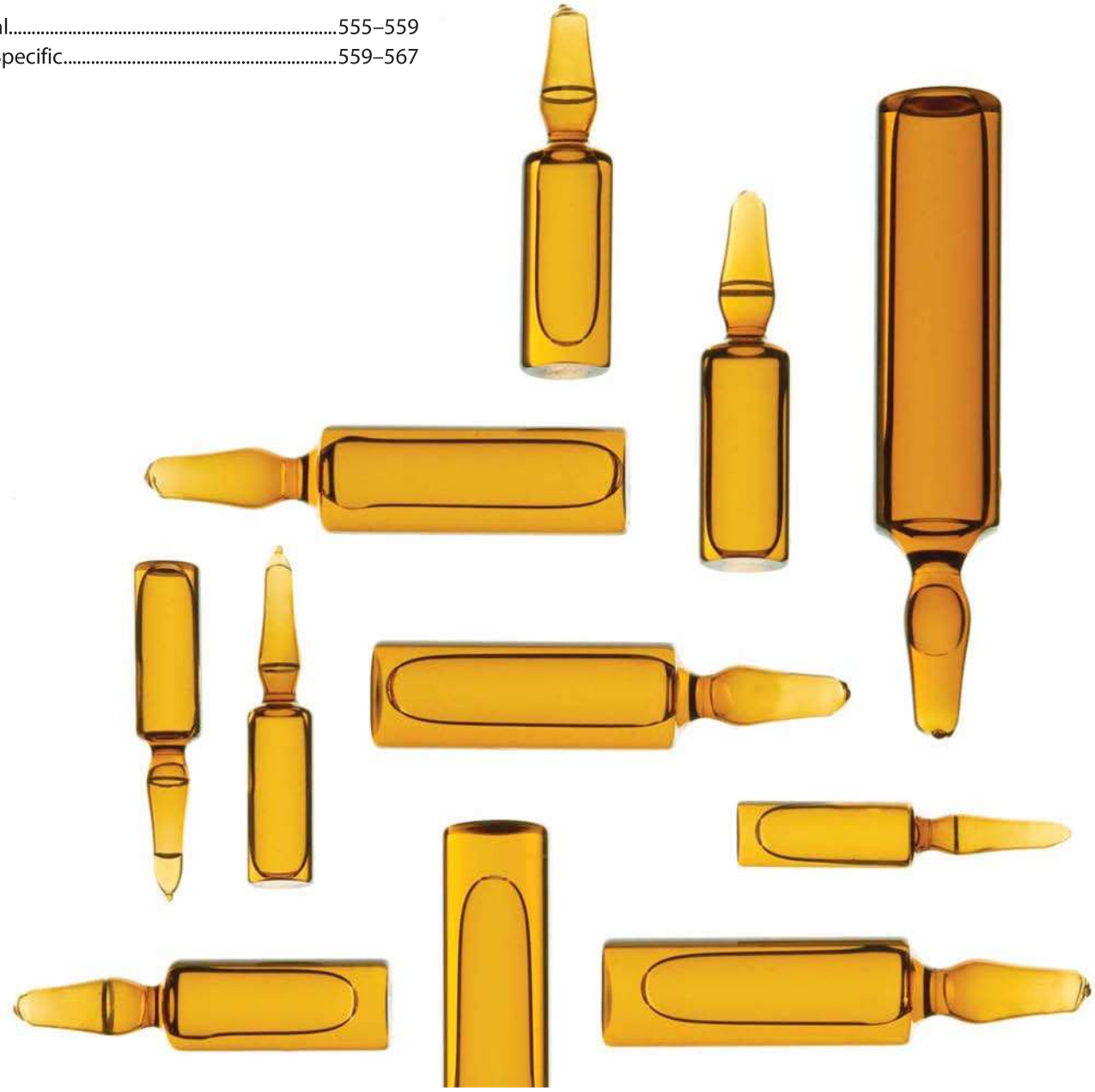
Prepared in water:dimethyl sulfoxide (80:20), 1 mL/ampul

cat.# 36270 (ea.)

Reference Standards

Leaking Underground Storage Tank (LUST) Recovery Act Program Methods

General.....555–559
State-Specific.....559–567



General

Retention Time Standards

Used during initial sample screening to determine retention time windows for each petroleum product. Gasoline generally elutes in the window from C6 to C10 (or C12), and diesel fuel from C10 (or C12) to C24 (or C28). Retention above C24 (or C28) indicates oil or lubricant contamination.

Leaking Underground Storage Tank Retention Time Standard (7 components)

n-hexane (C6)
n-decane (C10)
n-dodecane (C12)
n-tetracosane (C24)
n-octacosane (C28)
n-triacontane (C30)
n-tetracontane (C40)

25 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31200 (ea.)

Retention Time Marker Standard (3 components)

n-decane (C10)
n-pentacosane (C25)
n-hexatriacontane (C36)

1,000 µg/mL each in hexane, 1 mL/ampul
cat.# 31637 (ea.)

Retention Time Marker (3 components)

n-hexane (C6)
n-decane (C10)
n-dodecane (C12)

1,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30483 (ea.)

TNRCC 1005 Retention Time Markers Mix

(4 components)

- Easily determine the retention time window for each boiling point range.
- Prepared in *n*-pentane according to EPA requirements.

n-hexane (C6)
n-dodecane (C12)
n-octacosane (C28)
n-pentatriacontane (C35)

200 µg/mL each in pentane, 1 mL/ampul
cat.# 31698 (ea.)

Retention Time Marker - Alaska (4 components)

n-hexane (C6)
n-decane (C10)
n-pentacosane (C25)
n-hexatriacontane (C36)

1,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31819 (ea.)

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See **pages 438–439**.

Fuel Composite Standards

Unleaded Gasoline Composite Standard

2,500 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30081 (ea.)

50,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30205 (ea.)

50,000 µg/mL in P&T methanol, 5 mL/ampul
cat.# 30206 (ea.)

Diesel Fuel #2 Composite Standard

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31093 (ea.)

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31258 (ea.)

50,000 µg/mL in methylene chloride, 5 mL/ampul
cat.# 31259 (ea.)

Kerosene Composite Standard

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31094 (ea.)

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31256 (ea.)

50,000 µg/mL in methylene chloride, 5 mL/ampul
cat.# 31257 (ea.)

Motor Oil Composite Standards

Motor Oil Composite Standard

Prepared from an equal-volume blend of 5W30, 10W30, 10W40, and 20W50 motor oils. After blending, a precisely weighed amount of the composite is added to a volumetric flask to produce the standard.

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31464 (ea.)

Used Motor Oil Composite Standard

Prepared from an equal-volume blend from five gasoline-powered vehicles (belonging to Restek employees). After blending, a precisely weighed amount of the composite is added to a volumetric flask to produce the standard.

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31465 (ea.)

also available

Other fuels, oils, and lubricant oils available on request as custom products.

General, *cont.*

Single-Source Fuels

Unleaded Gasoline Standard

Prepared from a single-source (one-refinery) product.

unleaded gasoline: unweathered

5,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30096 (ea.)

Kerosene Standard

Prepared from a single-source (one-refinery) product.

kerosene: unweathered

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31229 (ea.)

Diesel Fuel #2 Standard

Prepared from a single-source (one-refinery) product.

diesel fuel #2: unweathered

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31233 (ea.)

Fuel Oil #4 Standard

Fuel oil #4 is typically used in limited applications in which the fuel cannot be preheated prior to burning. The fuel is a blend of distillate (fuel oil #2) and residual (fuel oil #6) to meet ASTM viscosity specifications. Fuel oil #4 used to prepare this mixture has a kinematic viscosity of 21.9 at 38 °C (100 °F) measured using ASTM D-445.

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31216 (ea.)

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31244 (ea.)

Fuel Oil #5 Standard

Fuel oil #5 is typically used in applications in which there is little or no preheating of the fuel prior to burning. A blend of distillate (fuel oil #2) and residual (fuel oil #6), the fuel oil #5 used to prepare this mixture has a kinematic viscosity of 106.5 at 38 °C (100 °F) measured using ASTM D-445.

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31217 (ea.)

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31246 (ea.)

Fuel Oil #6 Standard

This fuel, sometimes called bunker C or residual, is a black viscous oil. Applications in which it may be used require the ability to preheat the fuel prior to pumping and burning.

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31218 (ea.)

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31248 (ea.)

50,000 µg/mL in methylene chloride, 5 mL/ampul
cat.# 31249 (ea.)

Diesel:Biodiesel (80:20) Blend Standard

The biodiesel component is methyl soyate.

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31880 (ea.)

Aviation Gas Standard

100-octane, low-lead fuel used in piston-type aircraft.

2,500 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30094 (ea.)

50,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30207 (ea.)

Jet Fuel A Standard

Commercial jet fuel A.

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31215 (ea.)

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31242 (ea.)

50,000 µg/mL in methylene chloride, 5 mL/ampul
cat.# 31243 (ea.)

Creosote Oil Standard

Creosote oil, a widely used wood preservative produced by distilling coal tar, contains chemicals that are classified as carcinogens (e.g., benzo(a)pyrene).

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31838 (ea.)

Hydraulic Oil Standard

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31839 (ea.)

General, *cont.*

Military Fuels (Jet Propellant)

JP-4 Military Fuel Standard

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31219 (ea.)

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31250 (ea.)

50,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30472 (ea.)

JP-5 Military Fuel Standard

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31220 (ea.)

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31252 (ea.)

JP-8 Military Fuel Standard

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31262 (ea.)

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31254 (ea.)

Fuel Oil Degradation Test

Subsurface degradation of fuel oil spills can be estimated by examining the ratios of C17/pristane and C18/phytane.[1] To assist in identifying these four compounds from the complex fuel oil analysis, we offer a product that contains these compounds for retention time determination.

Fuel Oil Degradation Mix (4 components)

heptadecane (C17)
octadecane (C18)
pristane (2,6,10,14-tetramethylpentadecane)
phytane (2,6,10,14-tetramethylhexadecane)

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31240 (ea.)

[1]Interpretation of Gas Chromatographic Data in Subsurface Hydrocarbon Investigations, R. Senn and M. Johnson, Ground Water Monitoring Review, Winter 1987.

Mineral Spirits

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

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

Mineral Spirits Standards (Unweathered)

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31225 (ea.)

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31260 (ea.)

50,000 µg/mL in methylene chloride, 5 mL/ampul
cat.# 31261 (ea.)

Stoddard Solvent Standard

Stoddard solvent is also known as Type I mineral spirits, Texsolve S, or Varsol® 1 mineral spirits. We offer this reference material for those who need to calibrate Stoddard solvent separately. This standard is dissolved in methanol for analysis by either direct injection or purge-and-trap.

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

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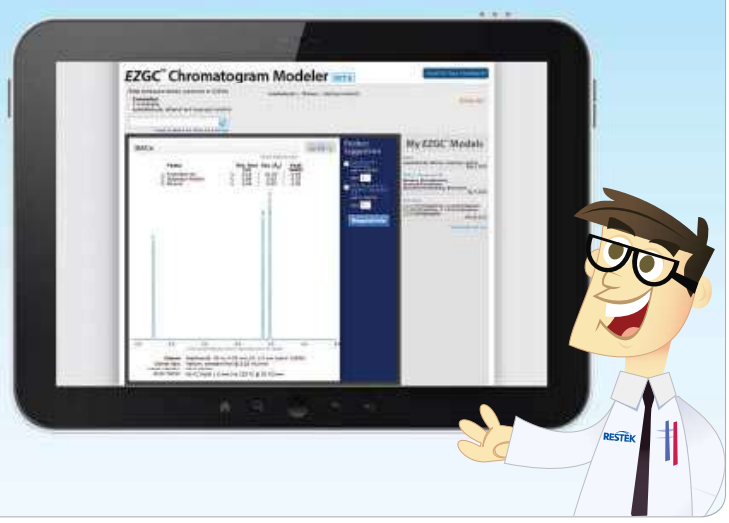

General, *cont.*

Petroleum Volatile Organic Compounds (PVOCs), Gasoline Range Organics (GRO) & Benzene-Toluene-Ethylbenzene-Xylenes (BTEX)

PVOC Mix (California) (7 components)

benzene	*m*-xylene
ethylbenzene	*o*-xylene
methyl *tert*-butyl ether (MTBE)	*p*-xylene
toluene	

1,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30231 (ea.)

PVOC/GRO Mix (Wisconsin) (10 components)

benzene	1,2,4-trimethylbenzene
ethylbenzene	1,3,5-trimethylbenzene
methyl *tert*-butyl ether (MTBE)	*m*-xylene
naphthalene	*o*-xylene
toluene	*p*-xylene

1,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30095 (ea.)

GRO Mix (9 components)

benzene	1,2,4-trimethylbenzene
ethylbenzene	2,2,4-trimethylpentane (isooctane)
3-methylpentane	*m*-xylene
naphthalene	*o*-xylene
toluene	

1,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30069 (ea.)

GRO Mix (EPA) (9 components)

benzene	500 µg/mL	1,2,4-trimethylbenzene	1,000
ethylbenzene	500	2,2,4-trimethylpentane	1,500
heptane	500	*m*-xylene	1,000
2-methylpentane	1,500	*o*-xylene	1,000
toluene	1,500		

In P&T methanol, 1 mL/ampul
cat.# 30065 (ea.)

Gasoline Component Standard (10 components)

benzene	500 µg/mL	1,2,4-trimethylbenzene	1,000
ethylbenzene	500	2,2,4-trimethylpentane	1,500
heptane	500	*m*-xylene	1,000
2-methylpentane	1,500	*o*-xylene	1,000
toluene	1,500	*p*-xylene	1,000

10,000 µg/mL total in P&T methanol, 1 mL/ampul
cat.# 30486 (ea.)

BTEX Standard (6 components)

benzene	*m*-xylene
ethylbenzene	*o*-xylene
toluene	*p*-xylene

200 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30051 (ea.)

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30213 (ea.)

2,000 µg/mL each in P&T methanol (*m*- & *p*-xylene at 1,000 µg/mL), 1 mL/ampul
cat.# 30488 (ea.)

BTEX Gas Mix (6 components)

benzene	*m*-xylene
ethylbenzene	*o*-xylene
toluene	*p*-xylene

1 ppm in nitrogen, 104 liters @ 1,800 psi
cat.# 34414 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi
cat.# 26361 (ea.)

1 ppm in nitrogen, 110 liters @ 1,800 psi (Pi-marked cylinder)
cat.# 34414-PI (ea.)

100 ppb in nitrogen, 104 liters @ 1,800 psi
cat.# 34428 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi
cat.# 26362 (ea.)

100 ppb in nitrogen, 110 liters @ 1,800 psi (Pi-marked cylinder)
cat.# 34428-PI (ea.)

No data pack available.

See page 425 for regulators.

cylinder design

Spectra (Linde)
104 L Cylinders:
Aluminum construction
Size: 8 x 24 cm
Volume/Pressure:
104 liters of gas @ 1,800 psi
CGA-180 outlet fitting.
Weight: 1.5 lb/0.7 kg

Scotty (Air Liquide)
110 L Cylinders:
Aluminum construction
Size: 8.3 x 29.5 cm
Volume/Pressure:
110 liters of gas @ 1,800 psi
CGA-180 outlet fitting.
Weight: 2.2 lb/1 kg
U.S. DOT Specs: 3AL2216

Certified BTEX in Unleaded Gas Composite Standard (9 components)

Certified for:

benzene*	toluene*
ethylbenzene*	*m*-xylene*
isopropyl benzene*	*o*-xylene*
methyl *tert*-butyl ether (MTBE)*	*p*-xylene*
naphthalene*	

5,500 ppm gasoline in P&T methanol, 1 mL/ampul
cat.# 30237 (ea.)

*Concentration differs from lot to lot. See online certificate of analysis for certified concentrations.

Certified Aromatics in Gasoline (16 components)

Certified for:

benzene*	*n*-propylbenzene*
ethylbenzene*	toluene*
m-ethyltoluene*	1,2,3-trimethylbenzene*
o-ethyltoluene*	1,2,4-trimethylbenzene*
p-ethyltoluene*	1,3,5-trimethylbenzene*
isopropylbenzene*	*m*-xylene*
methyl *tert*-butyl ether (MTBE)*	*o*-xylene*
naphthalene*	*p*-xylene*

5,500 ppm gasoline in P&T methanol, 1 mL/ampul
cat.# 30485 (ea.)

*Concentration differs from lot to lot. See online certificate of analysis for certified concentrations.

Certified PAHs in Diesel (7 components)

Certified for:

acenaphthene*	2-methylnaphthalene*
acenaphthylene*	naphthalene*
fluorene*	phenanthrene*
1-methylnaphthalene*	

50,000 ppm diesel #2 in methylene chloride, 1 mL/ampul
cat.# 31673 (ea.)

*Concentration differs from lot to lot. See online certificate of analysis for certified concentrations.

General, *cont.*

Gasoline Surrogate and Internal Standards

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

Compound	CAS #	Solvent	Conc.	cat.#
4-bromofluorobenzene	460-00-4	PTM	2,500	30067
4-bromofluorobenzene	460-00-4	PTM	10,000	30082
1-chlorooctane	111-85-3	PTM	10,000	30084
α,α,α-trifluorotoluene	98-08-8	PTM	2,500	30068
α,α,α-trifluorotoluene	98-08-8	PTM	10,000	30083
Recommended Internal Standard (PID) for EPA GRO Method				
1-chloro-4-fluorobenzene	352-33-0	PTM	2,500	30066

PTM = Purge-and-trap grade methanol

Diesel Surrogate and Internal Standards

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

Compound	CAS #	Solvent	Conc.	cat.#
1-chlorooctadecane	3386-33-2	D	10,000	31098
2-fluorobiphenyl	321-60-8	D	10,000	31096
o-terphenyl	84-15-1	D	10,000	31097
p-terphenyl	92-94-4	D	10,000	31095
Recommended Internal Standards				
5-α-androstane	438-22-2	D	2,000	31065
o-terphenyl	84-15-1	A	2,000	31066

A = acetone; D = methylene chloride

Diesel/Biodiesel Standard

Diesel:Biodiesel (80:20) Blend Standard

The biodiesel component is methyl soyate.

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31880 (ea.)

also available

ASTM Method D6584-10 and
EN14105 Biodiesel Standards

See **page 539.**

State-Specific Methods

Alaska

Alaska Department of Environmental Conservation (ADEC) regulations indicate which products and indicator compounds are to be tested for each petroleum range. The analyst must use the following Alaska Series Methods or appropriate SW-846 Method for the indicator compounds. The Alaska UST procedurals manual indicates which products are to be tested for each petroleum range.

AK101

Method for determination of aromatic and aliphatic hydrocarbons in gasoline range organics.

Retention Time Marker - Alaska (4 components)

n-hexane (C6)
n-decane (C10)
n-pentacosane (C25)
n-hexatriacontane (C36)

1,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31819 (ea.)

Alaska UST Method AK101AA (14 components)

benzene
ethylbenzene
1-ethyl-2-methylbenzene
1-ethyl-3-methylbenzene
1-ethyl-4-methylbenzene
isopropylbenzene
n-propylbenzene
toluene
1,2,3-trimethylbenzene
1,2,4-trimethylbenzene
1,3,5-trimethylbenzene
m-xylene
o-xylene
p-xylene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30461 (ea.)

Unleaded Gasoline Composite Standard

2,500 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30081 (ea.)

50,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30205 (ea.)

50,000 µg/mL in P&T methanol, 5 mL/ampul
cat.# 30206 (ea.)

1-Chloro-4-fluorobenzene Mix

2,500 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30066 (ea.)

4-Bromofluorobenzene Mix

2,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30026 (ea.)

α,α,α-Trifluorotoluene

2,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30048 (ea.)

2,500 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30068 (ea.)

10,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30083 (ea.)

State-Specific Methods, *cont.*

Alaska, *cont.*

AK102

Method for determination of aromatic and aliphatic hydrocarbons in diesel range organics.

DRO Mix (Tennessee/Mississippi) (16 components)

n-decane (C10)
n-undecane (C11)
n-dodecane (C12)
n-tridecane (C13)
n-tetradecane (C14)
n-pentadecane (C15)
n-hexadecane (C16)
n-heptadecane (C17)
n-octadecane (C18)
n-nonadecane (C19)
n-eicosane (C20)
n-heneicosane (C21)
n-docosane (C22)
n-tricosane (C23)
n-tetracosane (C24)
n-pentacosane (C25)

1,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31214 (ea.)

Kerosene Composite Standard

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31094 (ea.)

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31256 (ea.)

50,000 µg/mL in methylene chloride, 5 mL/ampul
cat.# 31257 (ea.)

Diesel Fuel #2 Composite Standard

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31093 (ea.)

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31258 (ea.)

50,000 µg/mL in methylene chloride, 5 mL/ampul
cat.# 31259 (ea.)

***o*-Terphenyl**

2,000 µg/mL in acetone, 1 mL/ampul
cat.# 31066 (ea.)

10,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31097 (ea.)

5-α-Androstane

2,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31065 (ea.)

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AK103

Method for determination of aromatic and aliphatic hydrocarbons in residual range organics.

Residual Range Calibration Standard (RCS) (2 components)

SAE30 motor oil:SAE40 motor oil (1:1)

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31817 (ea.)

Residual Range Calibration Verification Standard (CVS) (2 components)

SAE30 motor oil:SAE40 motor oil (1:1)

25,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31818 (ea.)

Motor Oil Composite Standard

Prepared from an equal-volume blend of 5W30, 10W30, 10W40, and 20W50 motor oils. After blending, a precisely weighed amount of the composite is added to a volumetric flask to produce the standard.

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31464 (ea.)

Fuel Oil #6 Standard

This fuel, sometimes called bunker C or residual, is a black viscous oil. Applications in which it may be used require the ability to preheat the fuel prior to pumping and burning.

5,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31218 (ea.)

50,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31248 (ea.)

50,000 µg/mL in methylene chloride, 5 mL/ampul
cat.# 31249 (ea.)

***n*-Triacontane-d62**

500 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31816 (ea.)

Surrogate Standard Mixture (3 components)

squalane
o-terphenyl
tetrahydronaphthol

1,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31638 (ea.)

State-Specific Methods, *cont.*

Arizona

Extraction Retention Time Standard (4 components)

n-hexane (C6)
n-decane (C10)
n-docosane (C22)
n-dotriacontane (C32)

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31830 (ea.)

DRO/GRO Calibration Standard (2 components)

10W30 motor oil:diesel fuel #2 (1:1 blend)

25,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31831 (ea.)

DRO/GRO Range Calibration Standard (12 components)

n-decane (C10)
n-dodecane (C12)
n-tetradecane (C14)
n-hexadecane (C16)
n-octadecane (C18)
n-eicosane (C20)
n-docosane (C22)
n-tetracosane (C24)
n-hexacosane (C26)
n-octacosane (C28)
n-triacontane (C30)
n-dotriacontane (C32)

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31832 (ea.)

o-Terphenyl

2,000 µg/mL in acetone, 1 mL/ampul
cat.# 31066 (ea.)

10,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31097 (ea.)

Los Angeles County, CA Well Investigation Program (WIP)*

*For monitoring samples suspected of gasoline contamination, Los Angeles County requires laboratories to calibrate and report these compounds.

CA WIP VOA Standard (11 components)

benzene
chlorobenzene
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
ethylbenzene
methyl *tert*-butyl ether (MTBE)
toluene
m-xylene
o-xylene
p-xylene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30236 (ea.)

California

PVOC Mix (California) (7 components)

benzene
ethylbenzene
methyl *tert*-butyl ether (MTBE)
toluene
m-xylene
o-xylene
p-xylene

1,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30231 (ea.)

California Oxygenates Mix (5 components)

diisopropyl ether (DIPE)	2,000 µg/mL	*tert*-butyl alcohol	10,000
ethyl-*tert*-butyl ether (ETBE)	2,000	methyl *tert*-butyl ether (MTBE)	2,000
tert-amyl methyl ether (TAME)	2,000		

In P&T methanol, 1 mL/ampul
cat.# 30465 (ea.)

Methanol

10,000 µg/mL in DI water, 1 mL/ampul
cat.# 30467 (ea.)

15 mg/mL in dimethyl sulfoxide, 1 mL/ampul
cat.# 36401 (ea.)

Ethanol

10,000 µg/mL in DI water, 1 mL/ampul
cat.# 30466 (ea.)

2,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30288 (ea.)

Glycols Standard (2 components)

ethylene glycol
propylene glycol

50,000 µg/mL each in DI water, 1 mL/ampul
cat.# 30471 (ea.)

Connecticut

Connecticut ETPH Calibration Mixture (15 components)

n-nonane (C9)
n-decane (C10)
n-dodecane (C12)
n-tetradecane (C14)
n-hexadecane (C16)
n-octadecane (C18)
n-eicosane (C20)
n-docosane (C22)
n-tetracosane (C24)
n-hexacosane (C26)
n-octacosane (C28)
n-triacontane (C30)
n-dotriacontane (C32)
n-tetratriacontane (C34)
n-hexatriacontane (C36)

1,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31614 (ea.)

NEW! Compound Index for Reference Standards

See **pages 730–736.**

State-Specific Methods, *cont.*

Florida

Florida TRPH Standard (17 components)

n-octane (C8)
n-decane (C10)
n-dodecane (C12)
n-tetradecane (C14)
n-hexadecane (C16)
n-octadecane (C18)
n-eicosane (C20)
n-docosane (C22)
n-tetracosane (C24)
n-hexacosane (C26)
n-octacosane (C28)
n-triacontane (C30)
n-dotriacontane (C32)
n-tetratriacontane (C34)
n-hexatriacontane (C36)
n-octatriacontane (C38)
n-tetracontane (C40)

500 µg/mL each in hexane, 1 mL/ampul
cat.# 31266 (ea.)

2,000 µg/mL each in carbon disulfide, 1 mL/ampul*
cat.# 31878 (ea.)

*Ground transportation shipments only.

Florida TRPH Surrogate Mix

n-nonatriacontane (C39)

3,000 µg/mL in carbon disulfide, 1 mL/ampul*
cat.# 31456 (ea.)

3,000 µg/mL in carbon disulfide, 10 mL/ampul*
cat.# 31877 (ea.)

*Ground transportation shipments only.

Massachusetts

MA VPH Standard With Surrogate Rev. 1.1 (July 2004) (16 components)

benzene
n-butylcyclohexane
n-decane (C10)
2,5-dibromotoluene (SS)
ethylbenzene
2-methylpentane
methyl *tert*-butyl ether (MTBE)
naphthalene
n-nonane (C9)
n-pentane (C5)
toluene
1,2,4-trimethylbenzene
2,2,4-trimethylpentane (isooctane)
m-xylene
o-xylene
p-xylene

10,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30604 (ea.)

MA VPH Matrix Spike Mix With Surrogate Rev. 1.1 (July 2004) (16 components)

benzene
n-butylcyclohexane
n-decane (C10)
2,5-dibromotoluene (SS)
ethylbenzene
2-methylpentane
methyl *tert*-butyl ether (MTBE)
naphthalene
n-nonane (C9)
n-pentane (C5)
toluene
1,2,4-trimethylbenzene
2,2,4-trimethylpentane (isooctane)
m-xylene
o-xylene
p-xylene

50 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30605 (ea.)

Massachusetts, *cont.*

MA Volatile Petroleum Hydrocarbon (VPH) Standard (13 components)

n-pentane (C5)	1,000 µg/mL	naphthalene	1,000
n-nonane (C9)	1,000	toluene	1,500
benzene	500	1,2,4-trimethylbenzene	1,000
ethylbenzene	500	*m*-xylene	1,000
isooctane	1,500	*o*-xylene	1,000
2-methylpentane	1,500	*p*-xylene	1,000
methyl *tert*-butyl ether (MTBE)	1,500		

In P&T methanol, 1 mL/ampul
cat.# 30434 (ea.)

MA VPH Standard With Surrogate (14 components)

n-pentane (C5)	1,000 µg/mL	methyl *tert*-butyl ether (MTBE)	1,500
n-nonane (C9)	1,000	naphthalene	1,000
benzene	500	toluene	1,500
2,5-dibromotoluene (SS)	1,000	1,2,4-trimethylbenzene	1,000
ethylbenzene	500	*m*-xylene	1,000
isooctane	1,500	*o*-xylene	1,000
2-methylpentane	1,500	*p*-xylene	1,000

In P&T methanol, 1 mL/ampul
cat.# 30452 (ea.)

MA VPH Matrix Spike Mix With Surrogate (14 components)

n-pentane (C5)
n-nonane (C9)
benzene
2,5-dibromotoluene (SS)
ethylbenzene
isooctane
2-methylpentane
methyl *tert*-butyl ether (MTBE)
naphthalene
toluene
1,2,4-trimethylbenzene
m-xylene
o-xylene
p-xylene

2,500 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30454 (ea.)

MA VPH Surrogate Standard

2,5-dibromotoluene

1,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30435 (ea.)

10,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30453 (ea.)

Save time with prepacked sample prep cartridges!

EPH Fractionation Tubes

See **page 376.**

State-Specific Methods, *cont.*

Massachusetts, *cont.*

Massachusetts APH Mix (26 components)

benzene
1,3-butadiene
butylcyclohexane
cyclohexane
n-decane
2,3-dimethylheptane
2,3-dimethylpentane
n-dodecane
ethylbenzene
n-heptane
n-hexane
isopentane
isopropylbenzene
p-isopropyltoluene
methyl *tert*-butyl ether
1-methyl-3-ethylbenzene
naphthalene
n-nonane
n-octane
toluene
1,2,3-trimethylbenzene
1,3,5-trimethylbenzene
n-undecane
o-xylene
m/*p*-xylene (combined)

cylinder design

Spectra (Linde)
104 L Cylinders:
Aluminum construction
Size: 8 x 24 cm
Volume/Pressure:
104 liters of gas @ 1,800 psi
CGA-180 outlet fitting.
Weight: 1.5 lb/0.7 kg

Scotty (Air Liquide)
110 L Cylinders:
Aluminum construction
Size: 8.3 x 29.5 cm
Volume/Pressure:
110 liters of gas @ 1,800 psi
CGA-180 outlet fitting.
Weight: 2.2 lb/1 kg
U.S. DOT Specs: 3AL2216

1 ppm in nitrogen, 104 liters @ 1,800 psi
cat.# 34540 (ea.)

100 ppb in nitrogen, 110 liters @ 1,500psi
cat.# 26366 (ea.)

NEW!

100 ppb in nitrogen, 110 liters @ 1,500 psig (Pi-marked cylinder)
cat.# 34540-PI (ea.)

No data pack available.

Gas standards are subject to hazardous materials shipping fees by most freight carriers. All calibration gas standards are nonreturnable due to DOT hazardous shipping requirements.

MA EPH Aromatic Hydrocarbon Standard

(17 components)

acenaphthene
acenaphthylene
anthracene
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(k)fluoranthene
benzo(ghi)perylene
chrysene
dibenzo(a,h)anthracene
fluoranthene
fluorene
indeno(1,2,3-cd)pyrene
2-methylnaphthalene
naphthalene
phenanthrene
pyrene

1,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31458 (ea.)

MA EPH Aliphatic Hydrocarbon Standard

(14 components)

n-nonane (C9)
n-decane (C10)
n-dodecane (C12)
n-tetradecane (C14)
n-hexadecane (C16)
n-octadecane (C18)
n-nonadecane (C19)
n-eicosane (C20)
n-docosane (C22)
n-tetracosane (C24)
n-hexacosane (C26)
n-octacosane (C28)
n-triacontane (C30)
n-hexatriacontane (C36)

1,000 µg/mL each in hexane, 1 mL/ampul
cat.# 31459 (ea.)

MA EPH Matrix Spike Mix (10 components)

n-nonane (C9)
n-tetradecane (C14)
n-nonadecane (C19)
n-eicosane (C20)
n-octacosane (C28)
acenaphthene
anthracene
chrysene
naphthalene
pyrene

250 µg/mL each in acetone, 1 mL/ampul
cat.# 31460 (ea.)

5-α-Androstane

2,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31065 (ea.)

MA EPH Surrogate Spike Mix (2 components)

1-chlorooctadecane
o-terphenyl

4,000 µg/mL each in acetone, 1 mL/ampul
cat.# 31479 (ea.)

1-Chlorooctadecane

10,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31098 (ea.)

Naphthalene-d8

2,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31043 (ea.)

MA Fractionation Surrogate Spike Mix (2 components)

2-bromonaphthalene
2-fluorobiphenyl

4,000 µg/mL each in hexane, 1 mL/ampul
cat.# 31480 (ea.)

MA Fractionation Check Mix (31 components)

PAHs:
acenaphthene
acenaphthylene
anthracene
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(k)fluoranthene
benzo(ghi)perylene
chrysene
dibenzo(a,h)anthracene
fluoranthene
fluorene
indeno(1,2,3-cd)pyrene
2-methylnaphthalene
naphthalene
phenanthrene
pyrene

Hydrocarbons:
n-nonane (C9)
n-decane (C10)
n-dodecane (C12)
n-tetradecane (C14)
n-hexadecane (C16)
n-octadecane (C18)
n-nonadecane (C19)
n-eicosane (C20)
n-docosane (C22)
n-tetracosane (C24)
n-hexacosane (C26)
n-octacosane (C28)
n-triacontane (C30)
n-hexatriacontane (C36)

25 µg/mL each in hexane, 1 mL/ampul
cat.# 31481 (ea.)

State-Specific Methods, *cont.*

Michigan

Michigan GRO Mix (14 components)

benzene
1,2-dibromoethane
1,2-dichloroethane
ethylbenzene
isopropylbenzene
2-methylnaphthalene
methyl *tert*-butyl-ether (MTBE)
naphthalene
toluene
1,2,4-trimethylbenzene
1,3,5-trimethylbenzene
m-xylene
o-xylene
p-xylene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30468 (ea.)

Mississippi

DRO Mix (Tennessee/Mississippi) (16 components)

n-decane (C10)
n-undecane (C11)
n-dodecane (C12)
n-tridecane (C13)
n-tetradecane (C14)
n-pentadecane (C15)
n-hexadecane (C16)
n-heptadecane (C17)
n-octadecane (C18)
n-nonadecane (C19)
n-eicosane (C20)
n-heneicosane (C21)
n-docosane (C22)
n-tricosane (C23)
n-tetracosane (C24)
n-pentacosane (C25)

1,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31214 (ea.)

Gasoline Component Standard (10 components)

benzene	500 µg/mL	1,2,4-trimethylbenzene	1,000
ethylbenzene	500	2,2,4-trimethylpentane	1,500
heptane	500	*m*-xylene	1,000
2-methylpentane	1,500	*o*-xylene	1,000
toluene	1,500	*p*-xylene	1,000

10,000 µg/mL total in P&T methanol, 1 mL/ampul
cat.# 30486 (ea.)

New Jersey

NJDEP EPH 10/08 Rev. 2 Aliphatics Calibration Standard (20 components)

n-nonane (C9)
n-decane (C10)
n-dodecane (C12)
n-tetradecane (C14)
n-hexadecane (C16)
n-octadecane (C18)
n-eicosane (C20)
n-heneicosane (C21)
n-docosane (C22)
n-tetracosane (C24)
n-hexacosane (C26)
n-octacosane (C28)
n-triacontane (C30)
n-dotriacontane (C32)
n-tetratriacontane (C34)
n-hexatriacontane (C36)
n-octatriacontane (C38)
n-tetracontane (C40)
2-methylnaphthalene
naphthalene

2,000 µg/mL each in hexane:carbon disulfide (80:20), 1 mL/ampul
cat.# 30540 (ea.)

New Jersey, *cont.*

NJDEP EPH 10/08 Rev. 2 Aromatics Calibration Standard (18 components)

acenaphthene
acenaphthylene
anthracene
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(ghi)perylene
benzo(k)fluoranthene
chrysene
dibenzo(a,h)anthracene
fluoranthene
fluorene
indeno(1,2,3-cd)pyrene
2-methylnaphthalene
naphthalene
phenanthrene
pyrene
1,2,3-trimethylbenzene

2,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 30541 (ea.)

NJDEP EPH 10/08 Rev. 2 Aliphatics Matrix Spike Mix (18 components)

n-nonane (C9)
n-decane (C10)
n-dodecane (C12)
n-tetradecane (C14)
n-hexadecane (C16)
n-octadecane (C18)
n-eicosane (C20)
n-heneicosane (C21)
n-docosane (C22)
n-tetracosane (C24)
n-hexacosane (C26)
n-octacosane (C28)
n-triacontane (C30)
n-dotriacontane (C32)
n-tetratriacontane (C34)
n-hexatriacontane (C36)
n-octatriacontane (C38)
n-tetracontane (C40)

200 µg/mL each in pentane, 5 mL/ampul
cat.# 30542 (ea.)

NJDEP EPH 10/08 Rev. 2 Aromatics Matrix Spike Mix (18 components)

acenaphthene
acenaphthylene
anthracene
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(ghi)perylene
benzo(k)fluoranthene
chrysene
dibenzo(a,h)anthracene
fluoranthene
fluorene
indeno(1,2,3-cd)pyrene
2-methylnaphthalene
naphthalene
phenanthrene
pyrene
1,2,3-trimethylbenzene

200 µg/mL each in acetone:toluene (50:50), 5 mL/ampul
cat.# 30543 (ea.)

NJDEP EPH 10/08 Rev. 2 Aliphatics Fractionation Check Mix (18 components)

n-nonane (C9)
n-decane (C10)
n-dodecane (C12)
n-tetradecane (C14)
n-hexadecane (C16)
n-octadecane (C18)
n-eicosane (C20)
n-heneicosane (C21)
n-docosane (C22)
n-tetracosane (C24)
n-hexacosane (C26)
n-octacosane (C28)
n-triacontane (C30)
n-dotriacontane (C32)
n-tetratriacontane (C34)
n-hexatriacontane (C36)
n-octatriacontane (C38)
n-tetracontane (C40)

400 µg/mL each in hexane, 5 mL/ampul
cat.# 30544 (ea.)

State-Specific Methods, *cont.*

New Jersey, *cont.*

NJDEP EPH 10/08 Rev. 2 Aromatics Fractionation Check Mix (16 components)

acenaphthene
acenaphthylene
anthracene
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(ghi)perylene
benzo(k)fluoranthene
chrysene
dibenzo(a,h)anthracene
fluoranthene
fluorene
indeno(1,2,3-cd)pyrene
phenanthrene
pyrene
1,2,3-trimethylbenzene

400 µg/mL each in hexane:toluene (50:50), 5 mL/ampul
cat.# 30545 (ea.)

Northwest U.S. Regional Method (Oregon & Washington)

Also see Washington, page 567.

Glycols Standard (2 components)

ethylene glycol
propylene glycol

50,000 µg/mL each in DI water, 1 mL/ampul
cat.# 30471 (ea.)

NW TPH-Dx Surrogate Mix Standards

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

Compound	CAS #	Solvent	Conc.	cat.#
2-fluorobiphenyl	321-60-8	D	10,000	31096
o-terphenyl	84-15-1	D	10,000	31097
p-terphenyl	92-94-4	D	10,000	31095
pentacosane (C25)	629-99-2	D	10,000	31487

D = methylene choride

Pennsylvania

PA DEP UST Standard (11 components)

benzene
1,2-dibromoethane
1,2-dichloroethane
ethylbenzene
isopropyl benzene
methyl *tert*-butyl ether (MTBE)
naphthalene
toluene
m-xylene
o-xylene
p-xylene

2,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 30433 (ea.)

Tennessee/Mississippi

DRO Mix (Tennessee/Mississippi) (16 components)

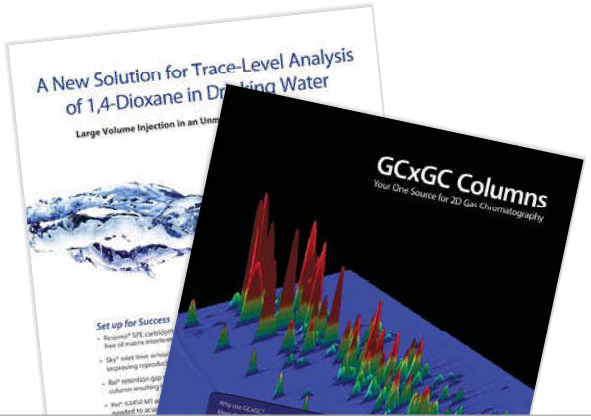
n-decane (C10)
n-undecane (C11)
n-dodecane (C12)
n-tridecane (C13)
n-tetradecane (C14)
n-pentadecane (C15)
n-hexadecane (C16)
n-heptadecane (C17)
n-octadecane (C18)
n-nonadecane (C19)
n-eicosane (C20)
n-heneicosane (C21)
n-docosane (C22)
n-tricosane (C23)
n-tetracosane (C24)
n-pentacosane (C25)

1,000 µg/mL each in methylene chloride, 1 mL/ampul
cat.# 31214 (ea.)

Gasoline Component Standard (10 components)

benzene	500 µg/mL	1,2,4-trimethylbenzene	1,000
ethylbenzene	500	2,2,4-trimethylpentane	1,500
heptane	500	*m*-xylene	1,000
2-methylpentane	1,500	*o*-xylene	1,000
toluene	1,500	*p*-xylene	1,000

10,000 µg/mL total in P&T methanol, 1 mL/ampul
cat.# 30486 (ea.)



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State-Specific Methods, *cont.*

Texas

Texas TNRCC Method 1006

TNRCC 1006 Retention Time Marker Mix (9 components)

n-hexane (C6)
n-heptane (C7)
n-octane (C8)
n-decane (C10)
n-dodecane (C12)
n-hexadecane (C16)
n-heneicosane (C21)
n-octacosane (C28)
n-pentatriacontane (C35)

200 µg/mL in pentane, 1 mL/ampul
cat.# 31814 (ea.)

Texas TNRCC Method 1005

TNRCC 1005 Retention Time Markers Mix
(4 components)

n-hexane (C6)
n-dodecane (C12)
n-octacosane (C28)
n-pentatriacontane (C35)

200 µg/mL each in pentane, 1 mL/ampul
cat.# 31698 (ea.)

TX TPH Locator Mix (3 components)

n-hexane (C6)
n-decane (C10)
n-octacosane (C28)

200 µg/mL each in pentane, 1 mL/ampul
cat.# 31482 (ea.)

TX TPH Calibration Mix (2 components)

diesel fuel #2 composite
unleaded gasoline composite

10,000 µg/mL each in pentane, 1 mL/ampul
cat.# 31483 (ea.)

TX TPH Matrix Spike Mix (2 components)

diesel fuel #2 composite
unleaded gasoline composite

10,000 µg/mL each in P&T methanol, 1 mL/ampul
cat.# 31484 (ea.)

Texas TNRCC Method 1005, *cont.*

Alternate Boiling Point/Carbon Number Distribution Marker Stock Standard (9 components)

n-hexane (C6)
n-octane (C8)
n-decane (C10)
n-dodecane (C12)
n-hexadecane (C16)
n-heneicosane (C21)
n-octacosane (C28)
n-pentatriacontane (C35)
n-hexatriacontane (C36)

200 µg/mL each in pentane, 1 mL/ampul
cat.# 31639 (ea.)

α,α,α-Trifluorotoluene

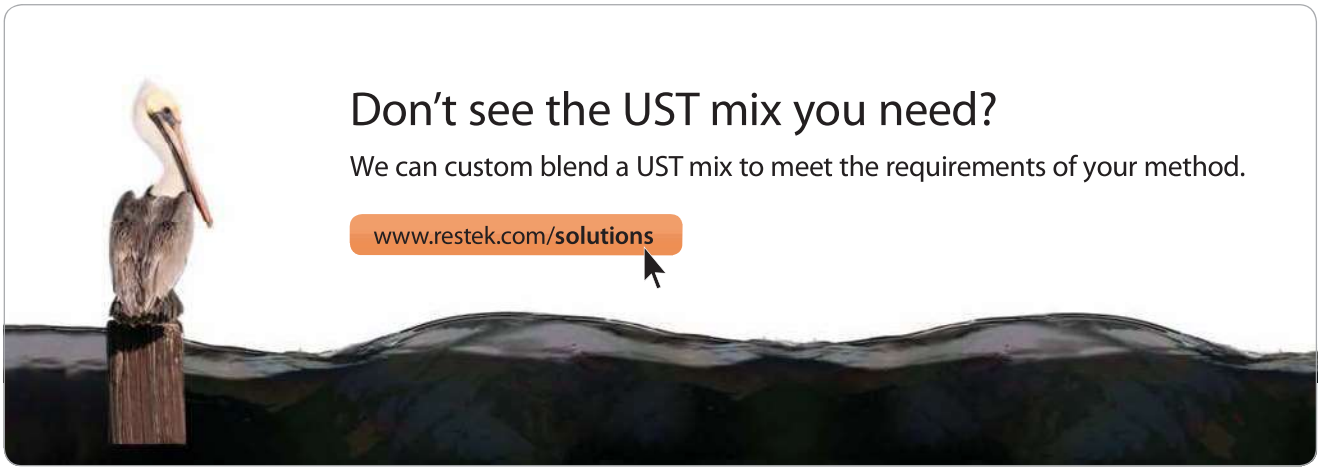
2,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30048 (ea.)

2,500 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30068 (ea.)

10,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30083 (ea.)

1-Chlorooctane

10,000 µg/mL in P&T methanol, 1 mL/ampul
cat.# 30084 (ea.)

1-Chlorooctadecane

10,000 µg/mL in methylene chloride, 1 mL/ampul
cat.# 31098 (ea.)