

## State of Iowa UST Monitoring

### Contact Information

#### Iowa Department of Natural Resources

UST Section  
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The Iowa Department of Natural Resources,  
Environmental Protection Division, maintains  
a UST/LUST website at:  
<http://www.state.ia.us/dnr/organiza/wmad/lqbu-reau/ust/index.html>

The State of Iowa pools the UST parameters into one group for the purpose of certification. Iowa Administrative Code 567-135.16(455B) requires use of the following methodologies: Method OA-1, Method for Determination of Volatile Petroleum Hydrocarbons (Gasoline) revision 7/27/93 and Method OA-2 Method for Determination of Extractable Petroleum Products (And Related Low Volatility Organic Compounds) revision 7/27/93; EPA methods 525.2, 550, 550.1 for polynuclear aromatic hydrocarbons (PAHs) in drinking water; EPA methods 525.2, 550, 550.1, 610, 8100, 8270, 8310 for PAHs in water; EPA methods 8100, 8270, 8310 for PAHs in soil; and NIOSH 1501 for BTEX in soil gas.

Method OA-1 is a modification of EPA Method 8015 and is used to determine concentrations of volatile petroleum hydrocarbons and other individual components, including benzene, toluene, ethyl benzene, and xylenes, in water and soil/solids. Samples are analyzed using purge-and-trap sample concentration. Detection is achieved by GC/FID alone, by FID/PID in series, or by mass spectrometer (GC/MS). Identification and quantification are based on detector response to an external standard of commercial product.

Method OA-2 is a modification of EPA Method 8100, for determining diesel fuel, fuel oil, motor oil, kerosene, mineral spirits, or hydraulic fluid in a liquid or solid matrix. Laboratories use Method OA-2 to provide surrogate analysis of the PAHs based on default concentrations of the PAHs in certain petroleum-derived materials. This method covers the determination of low volatility petroleum products and organic compounds that are soluble in moderate to low polarity organic solvents. A capillary GC/FID method is used to quantify the compounds or mixtures of interest. GC/MS also may be used. Identification and quantification of various petroleum products is performed by comparing the chromatograms of samples and commercial products, preferably using computer data system overlay.



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## Gas Chromatography Columns & Accessories

For these items, see Restek's Chromatography Products Catalog:

- Syringes
- Autosampler Vials
- Guard Columns
- Ferrules, Septa



## Recommended Gas Chromatography Columns

Rtx®-5, 30m x 0.25mm

Film Thickness	temp. limits	Cat. #
0.25µm	-60 to 330/350°C	10223
0.50µm	-60 to 330/350°C	10238
1.00µm	-60 to 320/340°C	10253

## Integra-Guard™ Columns

Guard and analytical column in one continuous length.

\*Add the appropriate suffix number to analytical column catalog number.

ID	Length	Suffix #
0.25mm	5m	-124
	10m	-127

## Syringes

Standard Micro-Liter Syringes for Agilent 7673 and 7683 Autosamplers

Size	Needle Gauge	6-pk.
10µL	23s	20169
10µL	23s-26s	24600

## Autosampler Vials

Crimp Top Vial Snap Seal™ Style (12 x 32mm, 11mm Crimp)

Description*	1,000-pk.
2.0mL Clear Glass Vial w/White Graduated Marking Spot	24384
2.0mL Amber Glass Vial w/White Graduated Marking Spot	24386

\*Marking spots are available on request in blue, green, rust or yellow.

## Aluminum Crimp Seals w/Septa

Description	1,000-pk.
Silver Seal, 11mm, PTFE/Natural Rubber Septa	21175
Silver Seal, 11mm, PTFE/Silicone Septa*	24360

\*PTFE/Silicone/PTFE available on request.

## Thermolite® Septa

Size	temp. limits	25-pk.	50-pk.	100-pk.
11mm (7/16")	to 340°C	20363	20364	20365

## Replacement Inlet Seals

Stainless Steel Inlet Seal for Single-Column Installation\*

Size	2-pk.	10-pk.
0.8mm ID	21315	21316

\*Equivalent to Agilent Part# 18740-20880.

## Inlet Liners

For Agilent GCs

Description	ID /OD & Length (mm)	ea.	5-pk.
Uniliner®*	4.0 ID, 6.3 OD x 78.5	20335	20336
Drilled Uniliner®	4.0 ID, 6.3 OD x 78.5	21054	21055
1mm Split**	1.0 ID, 6.3 OD x 78.5	20972	20973

\*Restek design improves performance over the original Agilent Liner.

\*\*Use this liner for increased sensitivity.

## Low Volume Injector for Agilent GCs

Description	kit.
Low-Volume Injector for Agilent Split/Splitless GC Inlets	21692

# OA-1, Revision 7/27/93

## Calibration Mixtures/Composite Standards

### Retention Time Marker

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

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

Each	5-pk.	10-pk.
30483	30483-510	—
	<b>w/data pack</b>	
30483-500	30483-520	30583

### Unleaded Gasoline Composite Standard

2,500µg/mL in P&T methanol, 1mL/ampul

Each	5-pk.	10-pk.
30081	30081-510	—
	<b>w/data pack</b>	
30081-500	30081-520	30181

50,000µg/mL in P&T methanol, 1mL/ampul

Each	5-pk.	10-pk.
30205	30205-510	—
	<b>w/data pack</b>	
30205-500	30205-520	30305

50,000µg/mL in P&T methanol, 5mL/ampul

Each	5-pk.	10-pk.
30206	30206-510	—
	<b>w/data pack</b>	
30206-500	30206-520	30306

### Certified BTEX in Unleaded Gas Composite Standard

benzene\*                      methyl *tert*-butyl ether\*                      *m*-xylene\*  
ethylbenzene\*                      naphthalene\*                      *o*-xylene\*  
isopropyl benzene\*                      toluene\*                      *p*-xylene\*

5,500ppm gasoline in P&T methanol, 1mL/ampul

Each	5-pk.	10-pk.
30237	30237-510	—
	<b>w/data pack</b>	
30237-500	30237-520	30337

\*Concentration varies lot to lot. See Certificate of Analysis for certified concentrations. See <http://www.restekcorp.com> for current certificate of analysis.

### Certified Aromatics in Gasoline (16 components)

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\*                      *o*-xylene\*  
naphthalene\*                      *p*-xylene\*

5,500ppm gasoline in P&T methanol, 1mL/ampul

Each	5-pk.	10-pk.
30485	30485-510	—
	<b>w/data pack</b>	
30485-500	30485-520	30585

\*Concentration varies lot to lot. See Certificate of Analysis for certified concentrations. See <http://www.restekcorp.com> for current certificate of analysis.

### PVOC Mix (California) (7 components)

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

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

Each	5-pk.	10-pk.
30231	30231-510	—
	<b>w/data pack</b>	
30231-500	30231-520	30331

## BTEX Standard

benzene  
ethylbenzene

toluene  
*m*-xylene

*o*-xylene  
*p*-xylene

200µg/mL each in P&T methanol, 1mL/ampul

Each	5-pk.	10-pk.
30051	30051-510	—
	<b>w/data pack</b>	
30051-500	30051-520	30151

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

Each	5-pk.	10-pk.
30213	30213-510	—
	<b>w/data pack</b>	
30213-500	30213-520	30313

2,000µg/mL each in P&T methanol, except *m*-xylene and *p*-xylene at 1,000µg/mL, 1mL/ampul

Each	5-pk.	10-pk.
30488	30488-510	—
	<b>w/data pack</b>	
30488-500	30488-520	30588

## Internal Standard Mixtures

### 4-Bromofluorobenzene Mix

2,500µg/mL in P&T methanol, 1mL/ampul

Each	5-pk.	10-pk.
30067	30067-510	—
	<b>w/data pack</b>	
30067-500	30067-520	30167

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

Each	5-pk.	10-pk.
30082	30082-510	—
	<b>w/data pack</b>	
30082-500	30082-520	30182

### α,α,α-Trifluorotoluene Mix

2,000µg/mL in P&T methanol, 1mL/ampul

Each	5-pk.	10-pk.
30048	30048-510	—
	<b>w/data pack</b>	
30048-500	30048-520	30148

2,500µg/mL in P&T methanol, 1mL/ampul

Each	5-pk.	10-pk.
30068	30068-510	—
	<b>w/data pack</b>	
30068-500	30068-520	30168

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

Each	5-pk.	10-pk.
30083	30083-510	—
	<b>w/data pack</b>	
30083-500	30083-520	30183

## Chlorobenzene Mix

2,000µg/mL in P&T methanol, 1mL/ampul

Each	5-pk.	10-pk.
30261	30261-510	—
	<b>w/data pack</b>	
30261-500	30261-520	30361

## Surrogate Mixtures

### Surrogate Standard

1,4-bromofluorobenzene

α,α,α-trifluorotoluene

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

Each	5-pk.	10-pk.
30484	30484-510	—
	<b>w/data pack</b>	
30484-500	30484-520	30584

# OA-2, Revision 7/27/93

## Calibration Mixtures/Composite Standards

### Retention Time Marker Standard

*n*-decane (C10)

*n*-hexatriacontane (C36)

*n*-pentacosane (C25)

1,000µg/mL each in hexane, 1mL/ampul

Each	5-pk.	10-pk.
31637	31637-510	—
	<b>w/data pack</b>	
31637-500	31637-520	31737

### Diesel Fuel #2 Composite Standard

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

Each	5-pk.	10-pk.
31093	31093-510	—
	<b>w/data pack</b>	
31093-500	31093-520	31193

50,000µg/mL in methylene chloride, 1mL/ampul

Each	5-pk.	10-pk.
31258	31258-510	—
	<b>w/data pack</b>	
31258-500	31258-520	31358

50,000µg/mL in methylene chloride, 5mL/ampul

Each	5-pk.	10-pk.
31259	31259-510	—
	<b>w/data pack</b>	
31259-500	31259-520	31359

### Motor Oil Composite Standard

This composite solution is prepared from an equal volume blend of the following types of motor oil: 5W30, 10W30, 10W40, and 20W50.

50,000µg/mL in methylene chloride, 1mL/ampul

Each	5-pk.	10-pk.
31464	31464-510	—
	<b>w/data pack</b>	
31464-500	31464-520	31564

### Used Motor Oil Composite Standard

This composite solution is prepared from an equal volume blend from five gasoline powered vehicles.

50,000µg/mL in methylene chloride, 1mL/ampul

Each	5-pk.	10-pk.
31465	31465-510	—
	<b>w/data pack</b>	
31465-500	31465-520	31565

### Kerosene Fuel Composite Standard

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

Each	5-pk.	10-pk.
31094	31094-510	—
	<b>w/data pack</b>	
31094-500	31094-520	31194

50,000µg/mL in methylene chloride, 1mL/ampul

Each	5-pk.	10-pk.
31256	31256-510	—
	<b>w/data pack</b>	
31256-500	31256-520	31356

50,000µg/mL in methylene chloride, 5mL/ampul

Each	5-pk.	10-pk.
31257	31257-510	—
	<b>w/data pack</b>	
31257-500	31257-520	31357

## Fuel Oil #6 Standard

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

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

Each	5-pk.	10-pk.
31218	31218-510	—
<b>w/data pack</b>		
31218-500	31218-520	31318

50,000µg/mL in methylene chloride, 1mL/ampul

Each	5-pk.	10-pk.
31248	31248-510	—
<b>w/data pack</b>		
31248-500	31248-520	31348

50,000µg/mL in methylene chloride, 5mL/ampul

Each	5-pk.	10-pk.
31249	31249-510	—
<b>w/data pack</b>		
31249-500	31249-520	31349

## 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.

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

Each	5-pk.	10-pk.
31216	31216-510	—
<b>w/data pack</b>		
31216-500	31216-520	31316

50,000µg/mL in methylene chloride, 1mL/ampul

Each	5-pk.	10-pk.
31244	31244-510	—
<b>w/data pack</b>		
31244-500	31244-520	31344

## 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.

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

Each	5-pk.	10-pk.
31217	31217-510	—
<b>w/data pack</b>		
31217-500	31217-520	31317

50,000µg/mL in methylene chloride, 1mL/ampul

Each	5-pk.	10-pk.
31246	31246-510	—
<b>w/data pack</b>		
31246-500	31246-520	31346

## WA EPH Aromatic Hydrocarbon Standard (18 components)

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

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

Each	5-pk.	10-pk.
31469	31469-510	—
<b>w/data pack</b>		
31469-500	31469-520	31569

## Certified PAHs in Diesel (7 components)

Certified PAHs	Typical Certified Conc. (ppm)
acenaphthene	20*
acenaphthylene	14*
fluorene	32*
1-methylnaphthalene	269*
2-methylnaphthalene	180*
naphthalene	90*
phenanthrene	47*

50,000ppm diesel #2 in methylene chloride, typical PAH concentrations listed above, 1mL/ampul

Each	5-pk.	10-pk.
31673	31673-510	—
<b>w/data pack</b>		
31673-500	31673-520	31773

\*Concentration varies lot to lot. See Certificate of Analysis for certified concentrations. See <http://www.restekcorp.com> for current certificate of analysis.

## Mineral Spirits Standard: Unweathered

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

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

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

Each	5-pk.	10-pk.
31225	31225-510	—
<b>w/data pack</b>		
31225-500	31225-520	31325

50,000µg/mL in methylene chloride, 1mL/ampul

Each	5-pk.	10-pk.
31260	31260-510	—
<b>w/data pack</b>		
31260-500	31260-520	31360

50,000µg/mL in methylene chloride, 5mL/ampul

Each	5-pk.	10-pk.
31261	31261-510	—
<b>w/data pack</b>		
31261-500	31261-520	31361

## Internal Standard Mixtures

### 5-α-androstane

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

Each	5-pk.	10-pk.
31065	31065-510	—
<b>w/data pack</b>		
31065-500	31065-520	31165

## Surrogate Mixtures

### o-Terphenyl Standard

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

Each	5-pk.	10-pk.
31097	31097-510	—
<b>w/data pack</b>		
31097-500	31097-520	31197



## Custom Reference Material Request Form

**FAX#:** (814) 355-2895  
**email:** standards@restekcorp.com

You also can complete this form online at <http://www.restekcorp.com/stdreq.htm>

**Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Company/Location:** \_\_\_\_\_

**Phone #:** \_\_\_\_\_ **FAX #:** \_\_\_\_\_

**E-mail:** \_\_\_\_\_

### Take these eight steps to create the right solution:

1. Mixture Description: \_\_\_\_\_
2. Solvent: \_\_\_\_\_ **3. No. of components:** \_\_\_\_\_
4. Volume (select): 1mL, 2mL, 5mL, 10mL, or other mL: \_\_\_\_\_
5. Quantity: No. of units \_\_\_\_\_

### 6. Select testing and documentation that best meets your requirements:

- Gravimetric Documentation: Lot Sheet with balance printout attached.
- Qualitative Documentation: Certificate of Composition, Chromatogram, and Gravimetric Documentation.
- Quantitative Documentation: Certificate of Analysis and Data Pack.

7. Compound(s): (list or attach sheet)		Concentration:	8. Concentration Units
1.			<input type="radio"/> mg/mL <input type="radio"/> µg/mL <input type="radio"/> ng/mL <input type="radio"/> vol./vol.% <input type="radio"/> wt./wt.% <input type="radio"/> other _____
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			

ALL mixtures are produced in accordance with our ISO 9001:2000 registration. Analytical balances are calibrated daily at seven mass levels using NIST-traceable weights. ALL raw materials used are a minimum of 97% pure unless otherwise specified.

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# Can't locate the exact mixture you need?

## With **thousands** of compounds in our inventory, we can make any mixture to your specifications.

*To order, use the convenient custom  
reference material request form inside, or*

visit us online at  
[www.restekcorp.com](http://www.restekcorp.com) 

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For more information,  
Call 800-356-1688 or 814-353-1300 or  
Contact Your Local Restek Representative

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**Literature Cat.# 59504**

