

# Analyze a Full 82-Component EPA List Using Just Three Ampuls

## With New EPA 524.3 Certified Reference Materials!



In support of the U.S. Safe Drinking Water Act (SDWA), Restek has formulated 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! 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.

- Full 82-component EPA 524.3 list using as few as three ampuls—reduce prep time and chances for error or contamination.  
*(See Figure 1 on page 2!)*
- 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.



**Simplify your analyses and start saving with our new EPA 524.3 reference standards.**

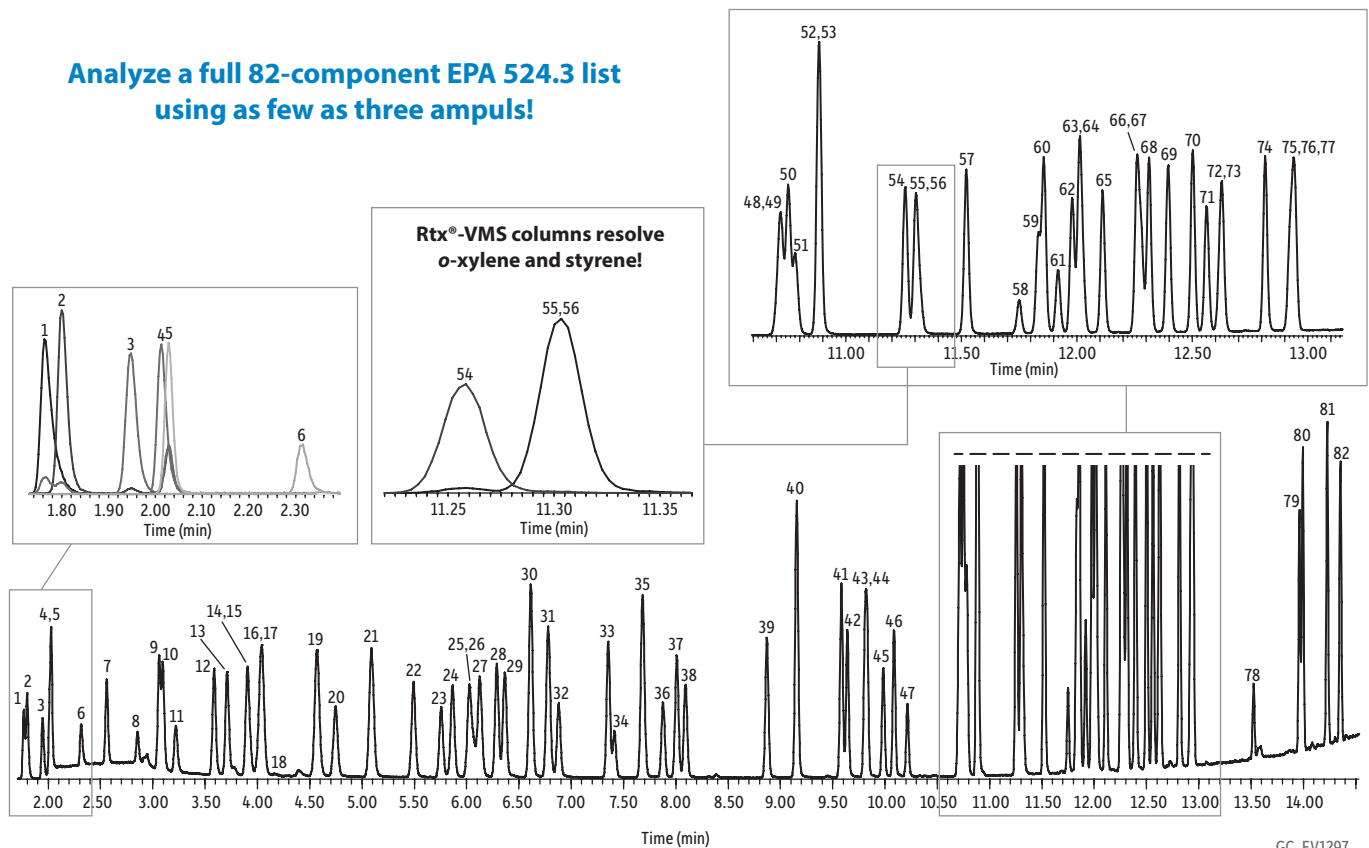
Visit [www.restek.com/524.3-standards](http://www.restek.com/524.3-standards) today!

**Figure 1: 5 ppb Volatiles in Drinking Water on Rtx®-VMS by EPA 524.3**

**Peaks**

- |   |   |                               |                                 |
|---|---|-------------------------------|---------------------------------|
| 1. Dichlorodifluoromethane                | 22. <i>cis</i> -1,2-Dichloroethene        | 43. 1,1,2-Trichloroethane     | 64. 1,2,3-Trichloropropane      |
| 2. Chlorodifluoromethane                  | 23. Bromochloromethane                    | 44. Ethyl methacrylate        | 65. 4-Chlorotoluene             |
| 3. Chloromethane                          | 24. Chloroform                            | 45. Dibromochloromethane      | 66. <i>tert</i> -Butylbenzene   |
| 4. Vinyl chloride                         | 25. Carbon tetrachloride                  | 46. 1,3-Dichloropropane       | 67. Pentachloroethane           |
| 5. 1,3-Butadiene                          | 26. Tetrahydrofuran                       | 47. 1,2-Dibromoethane         | 68. 1,2,4-Trimethylbenzene      |
| 6. Bromomethane                           | 27. 1,1,1-Trichloroethane                 | 48. Chlorobenzene-d5          | 69. <i>sec</i> -Butylbenzene    |
| 7. Trichlorofluoromethane                 | 28. 1,1-Dichloropropene                   | 49. Chlorobenzene             | 70. 4-Isopropyltoluene          |
| 8. Diethyl ether                          | 29. 1-Chlorobutane                        | 50. Ethylbenzene              | 71. 1,3-Dichlorobenzene         |
| 9. 1,1-Dichloroethene                     | 30. Benzene                               | 51. 1,1,1,2-Tetrachloroethane | 72. 1,4-Dichlorobenzene-D4      |
| 10. Carbon disulfide                      | 31. <i>tert</i> -Amyl methyl ether (TAME) | 52. <i>m</i> -Xylene          | 73. 1,4-Dichlorobenzene         |
| 11. Methyl iodide                         | 32. 1,2-Dichloroethane                    | 53. <i>p</i> -Xylene          | 74. <i>n</i> -Butylbenzene      |
| 12. Allyl chloride                        | 33. Trichloroethene                       | 54. <i>o</i> -Xylene          | 75. Hexachloroethane            |
| 13. Methylene chloride                    | 34. 1,4-Difluorobenzene                   | 55. Styrene                   | 76. 1,2-Dichlorobenzene-D4 (SS) |
| 14. <i>trans</i> -1,2-Dichloroethene      | 35. <i>tert</i> -Amyl ethyl ether (TAE)   | 56. Bromoform                 | 77. 1,2-Dichlorobenzene         |
| 15. Methyl acetate                        | 36. Dibromomethane                        | 57. Isopropylbenzene          | 78. 1,2-Dibromo-3-chloropropane |
| 16. MTBE-d3 (SS)                          | 37. 1,2-Dichloropropane                   | 58. 4-Bromofluorobenzene (SS) | 79. Hexachlorobutadiene         |
| 17. MTBE                                  | 38. Bromodichloromethane                  | 59. Bromobenzene              | 80. 1,2,4-Trichlorobenzene      |
| 18. <i>tert</i> -Butyl alcohol (TBA)      | 39. <i>cis</i> -1,3-Dichloropropene       | 60. <i>n</i> -Propylbenzene   | 81. Naphthalene                 |
| 19. Diisopropyl ether (DIPE)              | 40. Toluene                               | 61. 1,1,2,2-Tetrachloroethane | 82. 1,2,3-Trichlorobenzene      |
| 20. 1,1-Dichloroethane                    | 41. Tetrachloroethene                     | 62. 2-Chlorotoluene           |                                 |
| 21. <i>tert</i> -Butyl ethyl ether (ETBE) | 42. <i>trans</i> -1,3-Dichloropropene     | 63. 1,3,5-Trimethylbenzene    |                                 |

Analyze a full 82-component EPA 524.3 list using as few as three ampuls!



GC\_EV1297

**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:** Restek Premium 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.

# For EPA 524.3 analysis, Restek recommends...

## EPA 524.3 Reference Standards

### 524.3 VOA MegaMix (69 components)

allyl chloride (3-chloropropene)	<i>trans</i> -1,3-dichloropropene
<i>tert</i> -amyl ethyl ether (TAE)	diethyl ether (ethyl ether)
<i>tert</i> -amyl methyl ether (TAME)	diisopropyl ether (DIPE)
benzene	ethylbenzene
bromobenzene	ethyl- <i>tert</i> -butyl ether (ETBE)
bromochloromethane	ethyl methacrylate
bromodichloromethane	hexachlorobutadiene
bromoform	hexachloroethane
<i>tert</i> -butanol (TBA)	iodomethane (methyl iodide)
<i>n</i> -butylbenzene	isopropylbenzene (cumene)
<i>sec</i> -butylbenzene	4-isopropyltoluene ( <i>p</i> -cymene)
<i>tert</i> -butylbenzene	methyl acetate
carbon disulfide	methyl- <i>tert</i> -butyl ether (MTBE)
carbon tetrachloride	methylene chloride (dichloromethane)
chlorobenzene	naphthalene
chloroform	pentachloroethane
1-chlorobutane (butyl chloride)	<i>n</i> -propylbenzene
2-chlorotoluene	styrene
4-chlorotoluene	tetrachloroethane
dibromochloromethane	1,1,1,2-tetrachloroethane
1,2-dibromo-3-chloropropane	1,1,1,2-tetrachloroethane
dibromomethane	tetrahydrofuran
1,2-dibromoethane (EDB)	toluene
1,2-dichlorobenzene	1,2,3-trichlorobenzene
1,3-dichlorobenzene	1,2,4-trichlorobenzene
1,4-dichlorobenzene	1,1,1-trichloroethane
1,1-dichloroethane	1,1,2-trichloroethane
1,2-dichloroethane	trichloroethane
1,1-dichloroethane	1,2,3-trichloropropane
<i>cis</i> -1,2-dichloroethane	1,2,4-trimethylbenzene
<i>trans</i> -1,2-dichloroethane	1,3,5-trimethylbenzene
1,2-dichloropropane	<i>m</i> -xylene
1,3-dichloropropane	<i>o</i> -xylene
1,1-dichloropropene	<i>p</i> -xylene
<i>cis</i> -1,3-dichloropropene	

2,000 µg/mL each in P&T methanol, 1 mL/ampul  
cat.# 30013 (ea.)

### 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.)

### 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.)

### 524.3 Surrogate Standard (3 components)

1-bromo-4-fluorobenzene (BFB)
methyl-d3- <i>tert</i> -butyl ether
1,2-dichlorobenzene-d4

2,000 µg/mL each in P&T methanol, 1 mL/ampul  
cat.# 30016 (ea.)

### 524.3 Internal Standard/Surrogate Mix (6 components)

1-bromo-4-fluorobenzene (BFB)
methyl-d3- <i>tert</i> -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.)

**Rtx®-VMS Columns** (fused silica)  
(proprietary Crossbond® phase)

- Application-specific columns for volatile organic pollutants by GC-MS.
- Stable to 260 °C.
- No known equivalent phases.



Description	temp. limits	qty.	cat.#
30 m, 0.25 mm ID, 1.40 µm	-40 to 240/260 °C	ea.	19915

## Restek Premium 1.0 mm ID Straight Inlet Liner

for Agilent GCs equipped with split/splitless inlets



ID x OD x Length	qty.	cat.#
Straight, Restek Premium Technology, Borosilicate Glass		
1.0 mm x 6.3 mm x 78.5 mm	ea.	23333.1
1.0 mm x 6.3 mm x 78.5 mm	5-pk.	23333.5
1.0 mm x 6.3 mm x 78.5 mm	25-pk.	23333.25

## Manual Microliter Syringes

- Economical.
- Removable needles; replacement needles available at [www.restek.com](http://www.restek.com)
- Each syringe plunger and barrel assembly is manufactured as one working unit; components are not interchangeable or individually replaceable.

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat.#	qty.	Restek cat.#
5 µL	R	26	50 mm	2	5R**	001050	ea.	24701
10 µL	R	26	50 mm	2	10R**	002050	ea.	24703
25 µL	R	25	50 mm	2	25R	003050	ea.	24705
100 µL	R	25	50 mm	2	100R	005050	ea.	24709
250 µL	R	25	50 mm	2	250R	006050	ea.	24711

\*\*With plunger protection.

## PTFE Tip, Gas-Tight Syringes

- Suitable for gases or liquids, for maximum inertness.
- High accuracy of dispensed volumes.
- Interchangeable barrels, plungers, and tips extend performance and increase cost-effectiveness.

Volume	Needle Term.	Needle Gauge	SGE Model	SGE cat.#	qty.	Restek cat.#
5 mL	LL	*	5MDR-LL-GT	008760	ea.	24757
50 mL	LL	*	50MR-LL-GT	009660	ea.	24761

\*Syringes are equipped with a luer-lock fitting instead of a needle; if needed, needles sold separately at [www.restek.com](http://www.restek.com)

## Mininert® Precision Sampling Valves for Vials

Mininert® valves are very convenient for repetitive sampling and limit content exposure to the silicon septum.

Description	Type	Thread Size	qty.	cat.#
Mininert Precision Sampling Valves	Screw-Thread	13 mm/425	12-pk.	24900
Replacement Septa			50-pk.	24906



## 4.0 mL WISP 48 Screw-Thread Step Vials (15 x 45 mm, 13/425) (vials only)

Description	Volume	Material	100-pk.	1,000-pk.
WISP 48 Step Vial w/White Graduated Marking Spot	4.0 mL	Amber	24656	24657

## Pre-cleaned Volatile Organic Analyte (VOA) Sampling Vials

- Container, liner, and closure cleaned, assembled, and lot traceable.
- Open top caps.
- PTFE faced 0.125" silicone septa.

Description	Volume	Color	Material	Screw-Thread Size	qty.	cat.#
Pre-cleaned VOA Vials	40 mL	Clear	Glass	24 mm/400	72-pk.	21796
Pre-cleaned VOA Vials	40 mL	Amber	Glass	24 mm/400	72-pk.	21797
Replacement Septa, 24 mm x 0.125"			PTFE-lined silicone		100-pk.	24694



## Treated Welded/Drawn 304 Grade Stainless Steel Tubing

Our most popular grade of tubing. Recommended for:

- chromatography applications.
- gas delivery systems.
- lower pressures.
- inert applications.

Maximum temperature of 450 °C in an inert atmosphere.

Siltek®/Sulfinert® Treated (Coiled)

OD	ID	cat.#
<sup>1</sup> / <sub>16</sub> " (1.59 mm)	0.040" (1.02 mm)	22505

Price-per-foot by length. Minimum order is 5 ft. Price breaks are available at 25 ft., 200 ft., and 400 ft.

**Contact your Restek representative and order yours today!**

Visit [www.restek.com/Contact-Us](http://www.restek.com/Contact-Us) to find a distributor or representative.

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