

Volatile Organic Compounds in Waters

Agilent GC/MS Workflow Consumables Quick Reference Guide



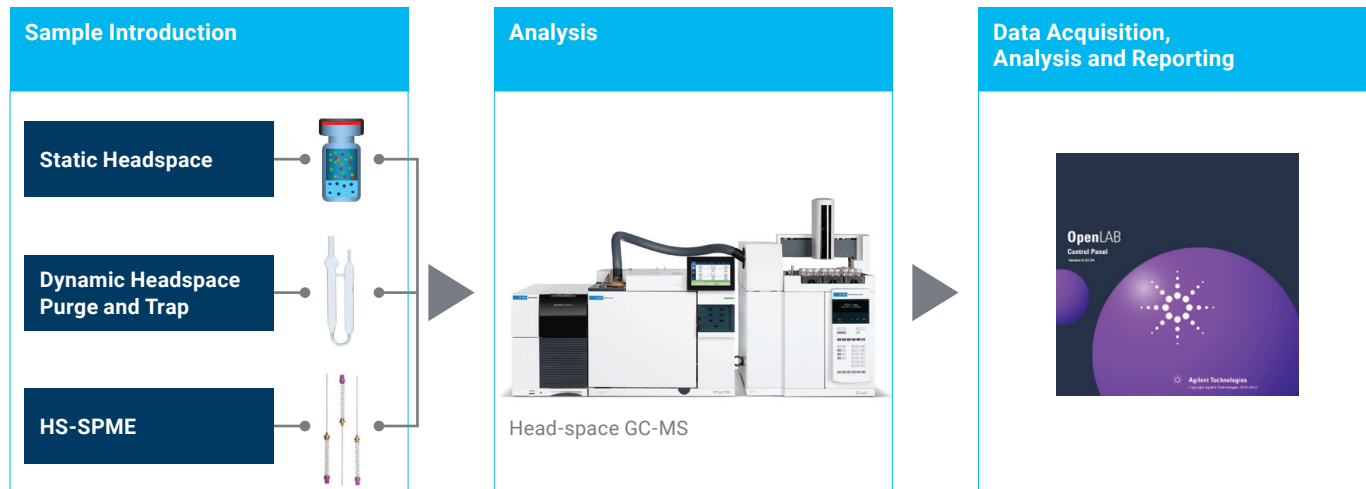
Your Complete Solution for Volatile Organic Compounds (VOC) in Water Analysis

Volatiles are monitored in drinking water supplies by environmental regulators as build-ups of toxic organics, nitrosamines and other disinfection by-products (DBPs) can cause widespread damage.

Regulatory agencies set threshold limits for volatile organic compounds based on threat, toxicity, and target matrix. Contaminants of concern include chemicals associated with the manufacture of paints, adhesives, petroleum products, pharmaceuticals, and refrigerants.

Agilent provides a complete range of products, spanning sample introduction to analysis and reporting, to labs using regulated methods for the analysis of VOCs in water.

This ordering guide provides guidance on products needed for this analysis. Clicking on the header 'MyList' will take you to an editable, prefilled shopping cart at the Agilent Online Store* so you can easily pick and choose the products you need.



Agilent 7697A Headspace Sampler – static headspace (HS) extraction is a direct approach. As the instrument itself heats the vial to shift diffusion of VOCs into sample headspace.

Regulatory Methods:
ISO 20595: 2018
HJ 810-2016

Teledyne/Tekmar Purge & Trap – widely used with GC/MS for extracting trace levels of VOCs

Regulatory Methods:
EPA Method 524.2, 624.1 and 8260C
ISO 15680: 2003
HJ 639-2012

HS-SPME – solid phase microextraction facilitates the extraction of volatile aromatic compounds in the absence of solvent.

Regulatory Methods:
ISO 17943:2016

ULTRA EPA Certified Reference Materials (CRMs) – calibration standards for EPA 500, EPA 600 and EPA 8000 series methods includes CofA and SDS

Agilent 8890-5977B and 7890-5977B Headspace GC/MS – accurate temperature control, precise injection system and enhanced Electronic Pneumatic Control (EPC) modules for the best retention times.

Agilent J&W Ultra Inert GC Columns – exceptionally low bleed and consistently high inertness

Ultra Inert Liners – very low surface activity and highly reproducible sample vaporization – with or without deactivated glass wool

Ultra Inert Gold-plated inlet Seals – gold plated ultra inert surface producing leak free seal with minimal analyte adsorption

Ultimetal Plus Flexible Metal Ferrules – ultra inert surface minimizes analyte adsorption

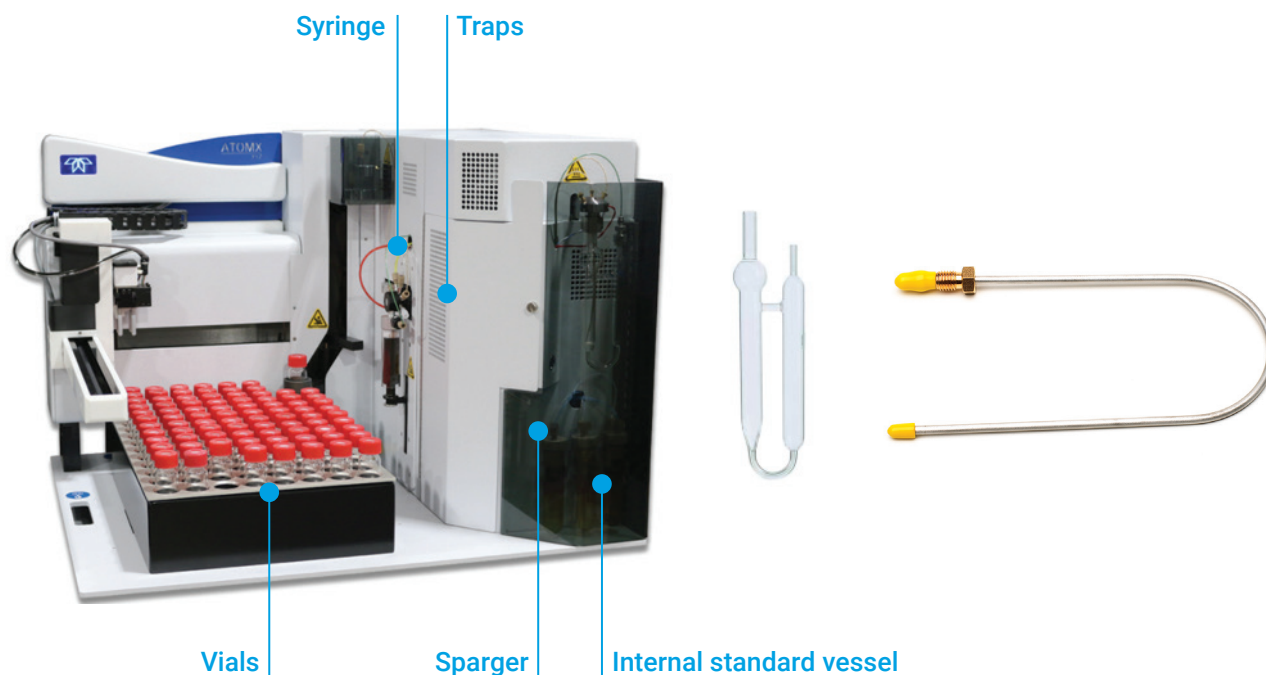
Inert MS Source – ensures sensitivity at mass spectrometer

Gas Clean Purifier – removes oxygen, moisture, hydrocarbons ensuring sensitivity

Agilent OpenLAB Software – enables capture, analysis and sharing of water quality data

**When using the Agilent Online Store, you will be asked to enter your email address for account verification. If you don't have a registered Agilent account, you will need to register (www.agilent.com/en/promotions/onlinestore-videos) for one. The "My List" feature is valid only in regions that are e-commerce enabled. All items can also be ordered through your regular sales and distributor channels.*

Sample Introduction



Supplies for Teledyne/Tekmar purge and trap concentrators

[View MyList of Purge and Trap supplies, as listed in the table below](#)

Description	Agilent Partnumber		
Headspace Syringe with side port, 27 mL	5190-2234		
Vial kit 40 mL Pre-cleaned vials, caps & septa 72/pk	5183-4741		
Traps			
Vocarb 3000 (#K)	5188-8820		
Type #9	5188-8816		
Trap, Tenax (#1A), U-shape	5188-1447		
Vessel, 15 mL, amber, for internal standards, for Atomx Automated or Aquatek 100 ALS VOC Sample Prep System			
15 mL	5190-2233		
Spargers*	5 mL all systems	25 mL all systems	
Frit	5182-0852	5182-0851	
Fritless	5182-0850	5182-0849	
Needle	5182-0848	5182-0847	
Sparger kits*	5 mL Lumin/Stratum	25 mL Lumin/Stratum	kits, 25 mL Atomx (XYZ)
Frit	5182-0846	5182-0845	5190-2232
Fritless		5182-0796	5190-2231

* Sparger glassware is interchangeable between all Tekmar P&T concentrators. Sparger kits come with drain line, nuts, and ferrules. Atomx and Atomx XYZ sparger kits are interchangeable. Stratum and Lumin sparger kits are interchangeable.

[Additional Supplies for Teledyne/Tekmar Purge and Trap Concentrators](#)

Headspace syringes for CTC/CombiPAL

[View MyList of headspace syringes, as listed in the table below](#)

PTFE-tip Plunger, HD-type, 23/56/side Hole	Agilent Partnumber
1 mL	G6500-80107
2.5 mL	G6500-80109
5 mL	G6500-80111



Headspace Syringe

Headspace vials

[View MyList of headspace vials, as listed in the table below](#)

Headspace Vials	Volume (mL)	Agilent Partnumber
Clear, crimp, flat bottom	10	5182-0838
Clear, crimp, flat bottom	20	5182-0837
Amber, crimp, flat bottom	10	5167-0227
Amber, crimp, flat bottom	20	5067-0226
Cap, PTFE/silicone	20	5183-4477
Magnetic cap, blue PTFE/silicone	20	5188-2759



Clear crimp flat bottom vials

Supplies for HS-SPME

[View MyList of HS-SPME supplies, as listed in the table below](#)

SPME Fibers	Agilent Partnumber	
SPME Fiber DVB/C-WR/PDMS 80/10-P1, dark gray, 3/pk	5191-5874	
SPME Fiber Carbon WR-95/PDMS/10-P3, dark blue, 3/pk	5191-5875	
SPME Arrows	Arrow Coating	Agilent Partnumber
DVB/Carbon WR/PDMS Arrow, 3 pk	1.1 mm	5191-5861
DVB/Carbon WR/PDMS Arrow	1.5 mm	5191-5864
Carbon WR/PDMS Arrow	1.1 mm	5191-5859
Carbon WR/PDMS Arrow	1.5 mm	5191-5863
SPME Accessories	Agilent Partnumber	
Manual Injection Kit for SPME fiber and SPME Arrow	5191-5877	
Merlin Microseal SPME replacement Microseal, for Varian/Bruker 1079 GCs, 23-gauge (only compatible with SPME fibers)	392609902	



PAL Arrows

Agilent EPA specific reference materials (RMs) and certified reference materials (CRMs)*

Complete your workflow solution with Agilent ISO 17024 and Guide 34 manufactured standards. Agilent supplies reference materials (RM) and certified reference materials (CRM) with certificate of analysis (CoA) and Safety Data Sheet (SDS) for:

US EPA 524.2

- Calibration standards
- Internal/surrogate standards
- GC/MS calibration standards

US EPA 8260B/C

- Calibration check standards
- Calibration standards
- Internal/surrogate standards
- GC/MS calibration standards

US EPA 624.1

- Calibration standards
- Internal/surrogate standards
- GC/MS calibration standards

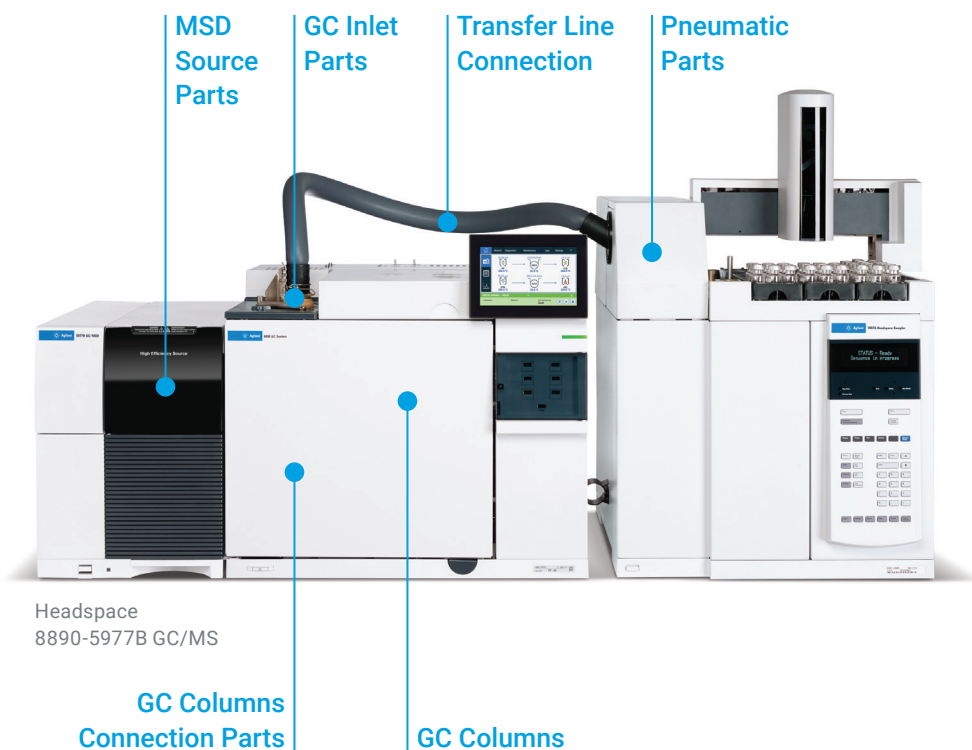
- Matrix spike solution
- Performance check standard



*Not available in all countries. Please contact your local sales representative for availability.

More information at: www.agilent.com/chem/standards

Analysis



J&W GC columns

[View MyList of GC Columns, as listed in the table below](#)

DB-624 UI column

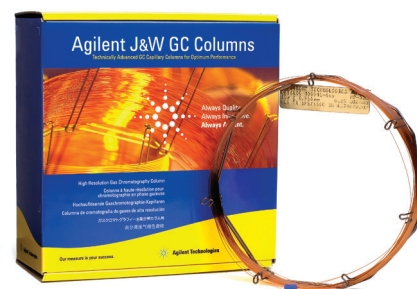
The DB-624 is the global reference standard for VOC analysis. It is often the column of choice when relying on copying existing VOC methodology. Excellent peak shapes and high levels of inertness are the forte of the DB-624UI. It is the column of choice for all VOC methods and for upgrading applications for improved ease of quantification and lower detection limits. For higher productivity and throughput, the 0.18 mm version provides a fast and comprehensive VOC analysis in less than 15 minutes. (Ideally combined with 6 mm MS drawout plate).

Dimensions	Agilent Partnumber
20 m x 0.18 mm x 1.0 µm	121-1324UI
30 m x 0.25 mm x 1.4 µm	122-1334UI
60 m x 0.25 mm x 1.4 µm	122-1364UI

DB-VRX column

Excellent for GC/MS but especially targeted for non-MS VOC methods. For VOC applications that contain the 6 early eluting "gases", the DB-VRX offers a unique separation that avoids sub-ambient initial oven temperatures.

Dimensions	Agilent Partnumber
20 m x 0.18 mm x 1.0 µm	121-1524
30 m x 0.25 mm x 1.4 µm	122-1534
60 m x 0.25 mm x 1.4 µm	122-1564



Agilent J&W GC Columns

Agilent GC/MS Supplies

[View MyList of GC/MS supplies, as listed in the table below](#)

GC Column Connection Parts		Agilent Partnumber
Column nut, collared, self-tightening, inlet/detector		G3440-81011
Column nut, collared, self-tightening, MSD		G3440-81013
Graphite Vespel ferrules		5181-3323
GC Inlet	Column ID	Agilent Partnumber
<ul style="list-style-type: none"> Sample introduction: HS/P&T Ultra Inert, splitless, straight, 1 mm id Small ID for fast transfer of volatile components; minimal band broadening; better sensitivity 	0.18 mm, 0.25 mm	5190-4047
<ul style="list-style-type: none"> Sample introduction: HS/P&T Ultra Inert, splitless, straight, 2 mm id Also part of G3969A Transfer Line Interface kit for 7697A 	0.25 mm	5190-6168
<ul style="list-style-type: none"> Sample introduction: HS-SPME Ultra Inert, splitless, straight, 0.75 mm id, for SPME, fibers only Inlet liner, Ultra Inert, splitless, straight, 2 mm id 	0.18 mm, 0.25 mm	5190-4048 5190-6168
GC Inlet Parts	Pack Quantity	Agilent Partnumber
BTO inlet septa, 11mm	50/pk	5183-4757
BTO inlet septa, 11mm	100/pk	5183-4757-100
BTO inlet septa, 11mm	400/pk	5190-3157
Ultra Inert gold seal with washer	1/pk	5190-6144
Ultra Inert gold seal with washer	10/pk	5190-6145
Ultra Inert gold seal with washer	50/pk	5190-6149
MSD Source Parts	Agilent Partnumber	
Filament, inert	G7005-60061	
Draw-out plates 6 mm, inert	G2589-20045	
Draw-out plates 9 mm (recommended)	G3440-20022	
Pneumatics Parts	Agilent Partnumber	
1 mL sample loop, inert	G4556-80106	
Sample probe, deactivated, for Agilent 7697A headspace sampler	G4556-63825	
Transfer Line Connection	Agilent Partnumber	
5 m x 0.32 mm ID fused silica	160-2325-5	
Ferrule, Polyimide-Graphite	0100-2595	
Fitting, internal reducer	0100-2594	



Column nut, collared, inlet



Ultra Inert Inlet Liners



BTO inlet septa



Gold seal

Gas clean system

[View MyList of Gas Clean Filters, as listed in the table below](#)

Gas Clean System	Agilent Partnumber
Gas Clean kit for 8890 and 8860; includes carrier gas filter, 1/8-inch connection unit with mounting bracket and Gas Clean sensor	CP179880
Gas Clean Carrier Gas Kit for 7890	CP17988
Gas Clean carrier gas purifier replacement cartridge	CP17973



Gas Clean Filter System

Rapid Trace-level VOC Analysis using Purge and Trap

An Agilent Case Study in optimizing your analysis and lab productivity

A VOC in water analysis was performed using US EPA methods 524.2 and 8260C and a setup configured with:

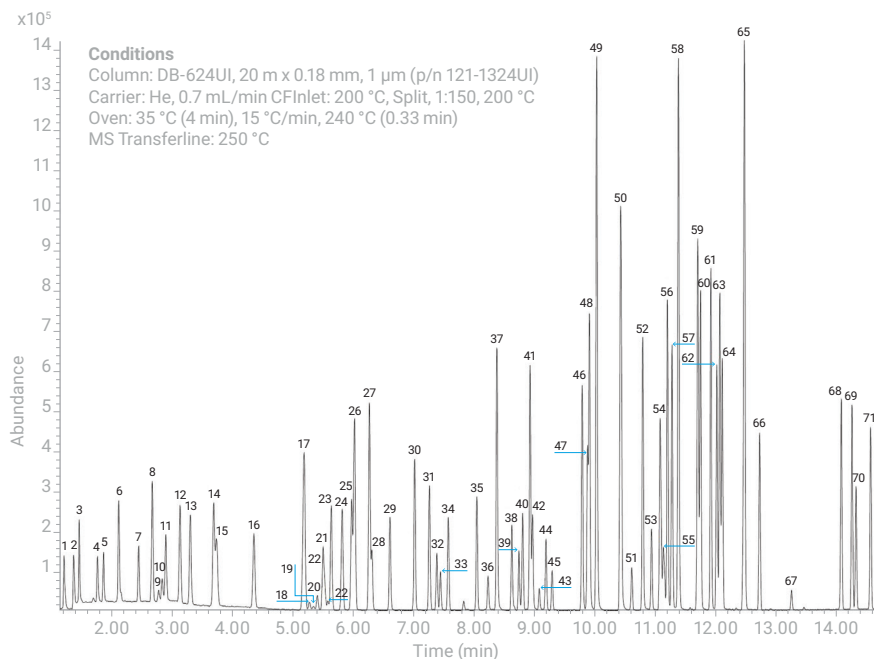
- 6mm Drawout plate (Inert) for Agilent 5973 and 5975 MSD Inert EI Ion Source – G2589-20045
- DB-624 UI Column (20 m x 0.18 mm, 1.0 um film) – 121-1324UI
- Straight-through 1.0 mm UI liner – 5190-4047

Speed: Analysis of 71 compounds was reduced to 15 minutes with the use of the 0.18 mm DB-624 UI column.

Sensitivity: Limits of detection for high performance P&T GC/MSD systems are typically in the low ppt range. For some compounds, levels of detection approaching part-per-quadrillion (ppq) are feasible.

Resolution: The Inert flow path, made up of Ultra Inert column, Ultra Inert Liner and Inert EI Ion source, provided stability, robustness and excellent resolution of peaks.

Full details of the study are available in [Agilent publication 5991-0029EN](#)



- | | | | |
|---|--|---|---|
| 1. Dichlorodifluoromethane | 20. Methyl acrylate | 37. Toluene | 56. n-Propylbenzene |
| 2. Chloromethane | 21. Bromochloromethane, Methacrylonitrile | 38. trans-1,3-Dichloropropene | 57. 2-Chlorotoluene |
| 3. Vinyl chloride | 22. THF | 39. Ethyl methacrylate | 58. 1,3,5-Trimethylbenzene, 4-Chlorotoluene |
| 4. Bromomethane | 23. Chloroform | 40. 1,1,2-Trichloroethane | 59. tert-Butylbenzene |
| 5. Chloroethane | 24. 1,1,1-Trichloroethane | 41. Tetrachloroethene | 60. 1,2,4-Trimethylbenzene |
| 6. Trichlorofluoromethane | 25. 1-Chlorobutane | 42. 1,3-Dichloropropane | 61. sec-Butylbenzene |
| 7. Diethyl Ether | 26. Carbon tetrachloride, 1,1-Dichloro-1-propene | 43. 2-Hexanone | 62. 1,3-Dichlorobenzene |
| 8. 1,1-Dichloroethene | 27. Benzene | 44. Dibromochloromethane | 63. p-Isoproyltoluene |
| 9. Acetone | 28. 1,2-Dichloroethane | 45. 1,2-Dibromoethane | 64. 1,4-Dichlorobenzene |
| 10. Iodomethane | 29. Fluorobenzene | 46. Chlorobenzene | 65. 1,2-Dichlorobenzene-d4, 1,2-Dichlorobenzene, n-Butylbenzene |
| 11. Carbon disulfide | 30. Trichloroethene | 47. 1,1,1,2-Tetrachloroethane | 66. Hexachloroethane |
| 12. Allyl chloride | 31. 1,2-Dichloropropane | 48. Ethylbenzene | 67. 1,2-Dibromo-3-chloropropane (DBCP) |
| 13. Methylene chloride | 32. Dibromomethane | 49. m+p-Xylene | 68. 1,2,4-Trichlorobenzene |
| 14. Acrylonitrile, trans-1,2-dichloroethene | 33. Methyl methacrylate | 50. o-Xylene, Styrene | 69. Hexachlorobutadiene |
| 15. Methyl tert-butyl ether (MTBE) | 34. Bromodichloromethane | 51. Bromoform | 70. Naphthalene |
| 16. 1,1-Dichloroethane | 35. cis-1,3-Dichloropropene | 52. Isopropylbenzene | 71. 1,2,3-Trichlorobenzene |
| 17. 2,2-Dichloropropane, cis-1,2-Dichloroethene | 36. 1,1-Dichloropropanone, 2-Nitropropane, 4-methyl-2-pentanone (MIBK) | 53. Bromofluorobenzene | |
| 18. 2-Butanone (MEK) | | 54. Bromobenzene, 1,1,2,2-Tetrachloroethane | |
| 19. Propionitrile | | 55. 1,2,3-Trichloropropane, trans-1,4-Dichloro-2-butene | |

CrossLab is an Agilent capability that integrates services, consumables and lab-wide resource management to help laboratories improve efficiency, optimize operations, increase instrument uptime, develop user skill and more.

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