

Purge and Trap Concentrator

PT7000

Sample Preparation Technique for Water Testing



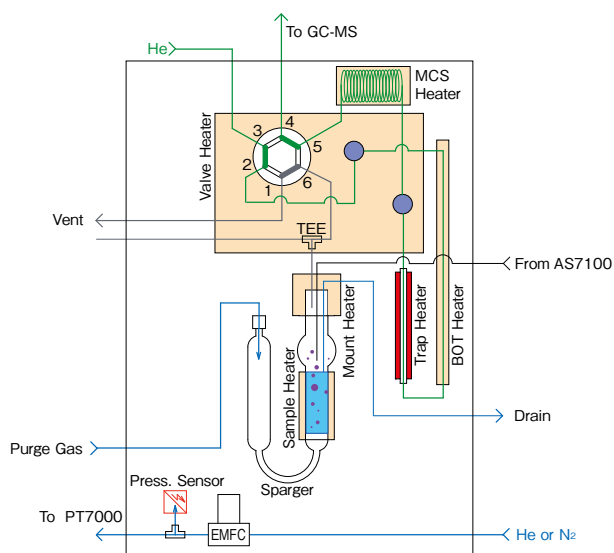
Precision meets Simplicity
Unlocking Accuracy with Ease



Dive into Reliable Underwater Volatile Organic Compound Analysis

About Purge and Trap

Volatile organic compounds are purged from water samples by an inert gas, then moved to a head space phase, captured and concentrated in a trap tube. After that, the components desorbed by rapidly heating the trap tube are introduced into an analysis column. Components can be efficiently recovered because they are forced into a headspace vapor phase by purging. Therefore, unlike static headspace sampling and SPME methods that cause their gas-liquid equilibrium changing by concentration of salt in the sample, dispersion of data due to matrix effects is less likely to occur, and a salting out operation is not required. The Purge and Trap method offers significant operational advantage.



System configuration

Valve oven

6 port valve and MCS unit etc. are installed here

Sparger

The sample sent from the autosampler is purged by using an inert gas

Status display

The status of the device is displayed by LEDs.

Trap

Components purged are trapped here, then are thermally desorbed and introduced into a GC-MS.

PT7000

Sample loop

Weighs samples accurately.

Vial tray

Capable of setting 56 vials for 40 mL or 80 vials for 13 mL.

Electric cooling unit

Standard function of cooling vials.

Condensation discharge function

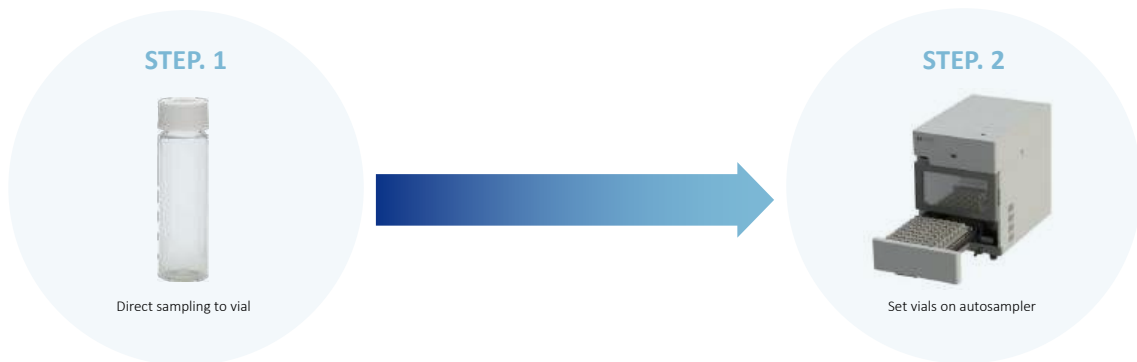
Discharging condensation efficiently even in a hot, humid environment.

AS7100
Vial autosampler

Advantages over other methods

Purge and Trap has a significant operational advantage of fully automated weighing water samples and adding internal standard. Automated process also makes high-precision results without human-error or discrepancy in operation.

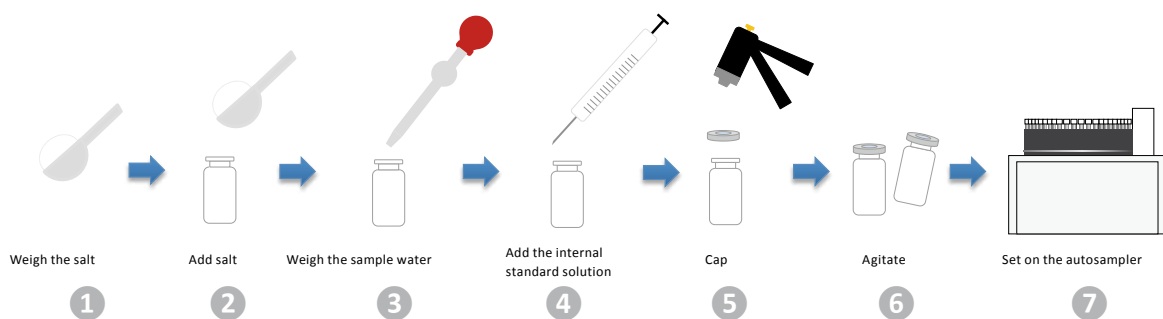
Purge and Trap | Two STEP method for simple analysis



Advantages

1. To sample water, just fill the dedicated vial and secure with a cap.
2. Just set the samples on the autosampler and the analysis is performed automatically.

Head space (HS) /Head space trap (HS-Trap) /Solid phase micro extraction (SPME)



Disadvantage

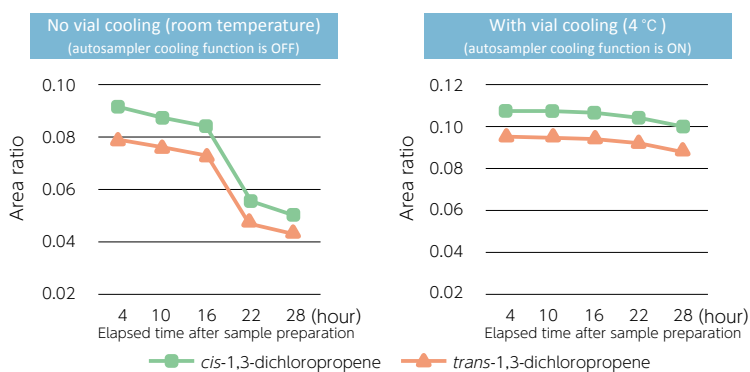
- A significant amount of preparation is required for all water samples, and it is a labor-intensive.
- Weighing water samples and adding internal standard are performed manually, which may result in errors.

Features

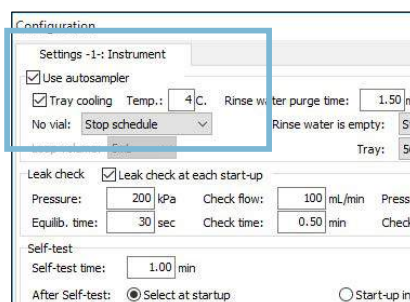
Autosampler with various functions

Built-in thermoelectric cooling Function

Thermoelectric vial cooling is included in a compact form factor. It is also possible to accurately analyze hydrolysable compound, by cooling the sample water.

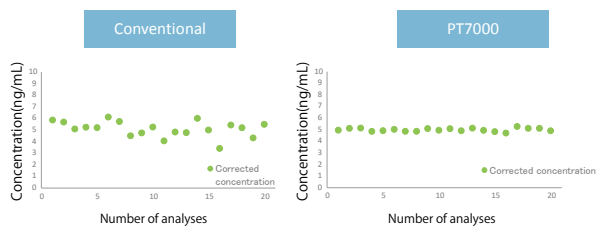


Comparison of the area ratio of 0.5 µg/L for a parallel test (0.1, 0.2, 0.5, 1, 2, 5 and 10 µg/L, 5 repeat measurements) (measured by PT-GC/MS)



Automatic Addition Function for Internal Standard Solution

An automatic addition function is included which has high accuracy. Enabling accurate automatic addition of an internal standard 1,4-Dioxane-*d*₈, complete with full automation of analysis.



Note) Image of concentration corrected by auto-added 1,4-Dioxane-*d*₈ in Analysis of 1,4-Dioxane

Vial tray safe loading mechanism

Needles and vials are located internally for safety. In addition, it is possible to add and remove vials at any time even during analysis. During the movement of the needle there is a safety interlock mechanism that prevents the tray from being pulled out.



Condensation discharging mechanism

It is fitted with a condensation discharging mechanism especially useful for humid climates similar to Japan.

Two types of vials may be used

You can load max. 56 vials, 40 mL, in the drawer tray. Also you can load max. 80 vials, 13 mL, with the optional tray.



40 mL vial



13 mL vial

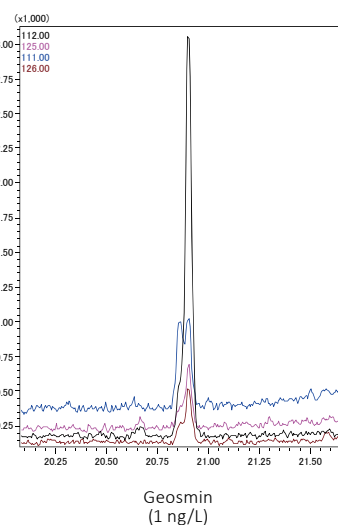
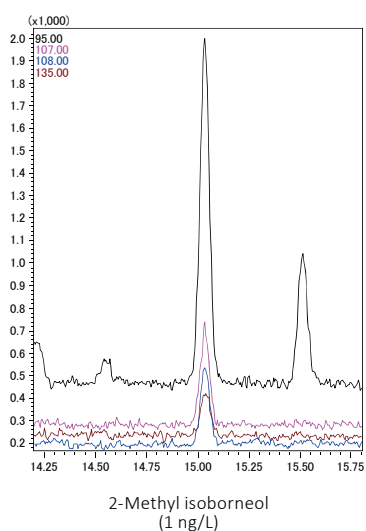
Automatic analysis function of a water blank

When analyzing a water blank, it can be automatically collected from the rinse bottle into the sparger. It is not necessary to set a vial (The blank for the calibration curve is set for the vial)

Ultra High Sensitivity

We have achieved the highest sensitivity in the world by making lines inert thoroughly and optimization of methods. This provides exceptional performance for the analysis of musty smell in water that is difficult to be analyzed with a high-sensitivity. Naturally you don't need any burdensome operations such as salting-out or cryo-focus.

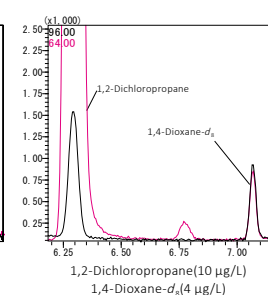
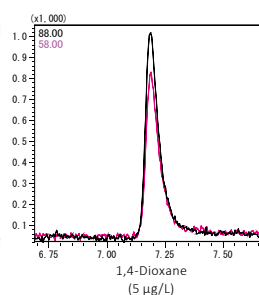
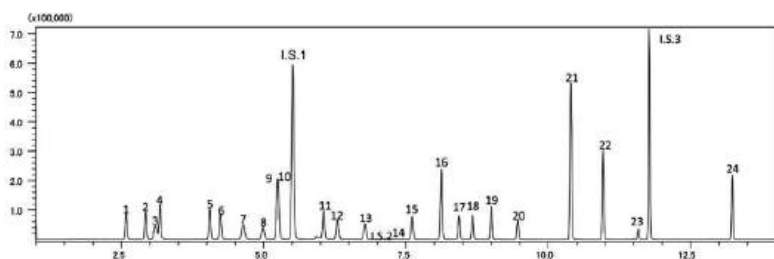
It is possible to obtain high S/N ratio in simultaneous analysis of Volatile organic compounds.



High Resolution Separation

The combination of GC Column (InertCap AQUATIC : 25 % Diphenyl 75 % Dimethylpolysiloxane) with high separation performance allows analysis of Volatile organic compounds. 1,2-Dichloropropane and 1,4-Dioxane- d_8 that have the same mass number and are usually difficult to completely separate, can be completely resolved.

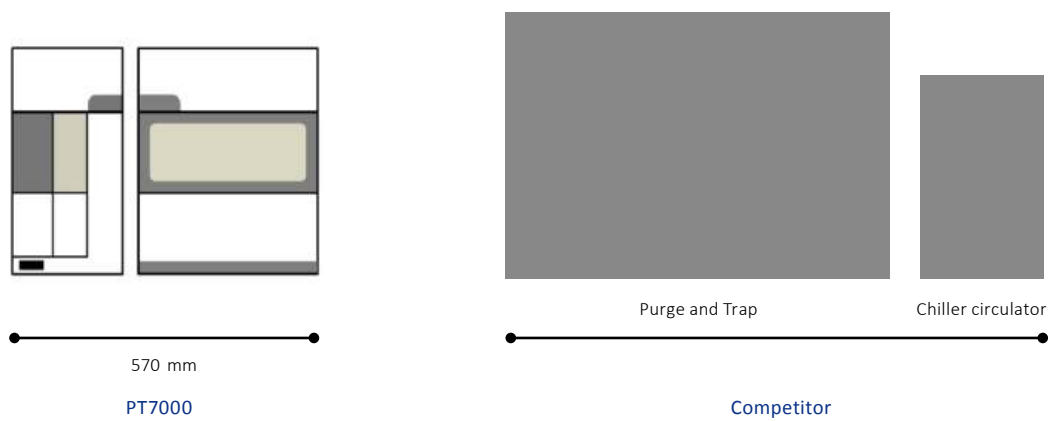
TIC chromatogram



Features

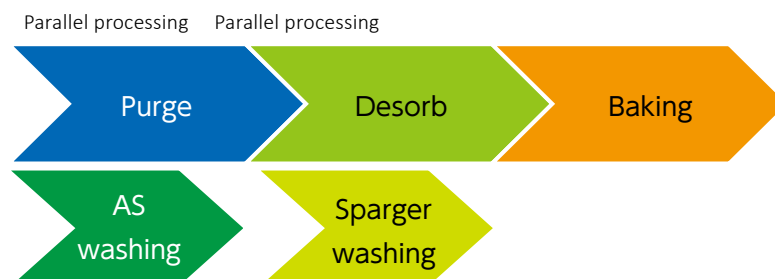
Compact Design

Both the Purge and Trap device and the autosampler are compact and space-saving designed, because a cooling water circulator is not required.



Parallel Processing

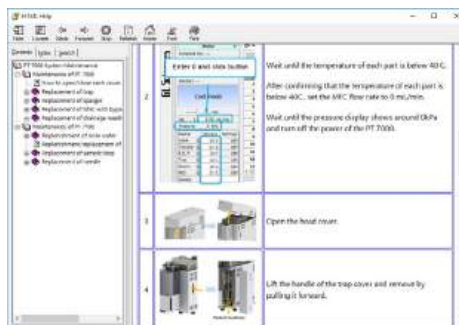
Because a pressure method is used without the requirement of a syringe drive for water sampling or cleaning of the lines, rapid processing is achieved without unnecessary operations. In addition, the operation of the autosampler and PT main instrument are overlapped to reduce the waiting time for cleaning and to accelerate the analysis cycle.



Streamlined Maintenance: Keeping Your Analysis Flowing Smoothly.

Fully Featured Help Function

A Help function is included that provides information about the procedures for replenishment of rinse water, parts replacement; such as sparger and the autosampler needle.



Easily Replace the Rinse Water

The rinse water can be refilled easily using a dedicated bottle with a special finger tight connector.



Detachable with one touch/single operation.
No need to stop the gas.

Effortless Maintenance and Installation Features for Trap Tube

Accessible from the front panel (No tool required). The trap tube can be easily exchanged with a wrench. A flexible heater is used, allowing for simple installation and removal.



Experience Effortless Navigation with Our User-Friendly Software

PT Link is simple, easy-to-use software that anyone can operate; it can be set-up from a single screen and without any requirement for complex configuration.

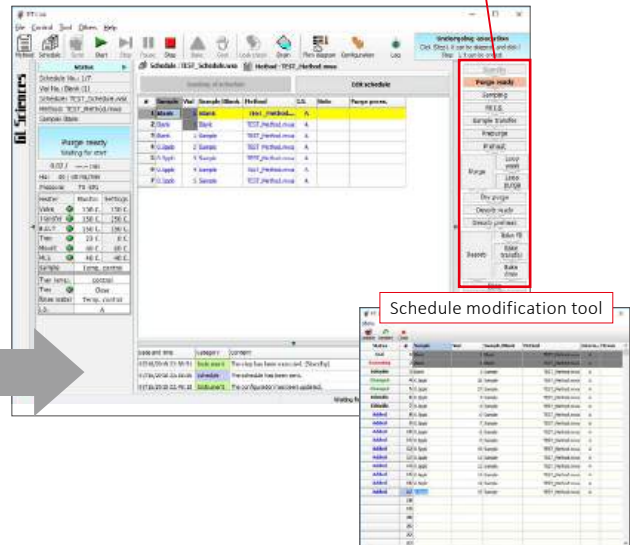
In addition, a rich QA/QC log function supports reliable and accurate operation. Note functions, real-time channel diagram display, scheduling, and vial-specific tools are also included for the highest operability.

Upgraded schedule setting, which is much easier to use

The convenient scheduling feature makes it easy to enter/edit information, using auto-copy and auto-vial-numbering (increment, copy) functions. In addition, it is possible to schedule the execution up to 560 lines, and these can be added to without interrupting the operation.

※Unlimited number of methods.

You can monitor the complete operating process of the PT7000 at a glance.



Vial Selection tool

Automatically enter a vial number and method with simple click operation.

It is easy to set replicates for a vial number.



Simple operation method screen

The method can set-up in one screen, no need to switch tabs.

Various memo functions

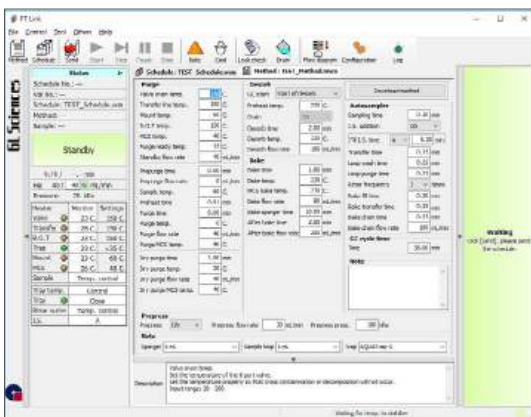
In addition to the conventional memo, a dedicated memo function, "Sparger size", "Sample loop" and "Trap Tube" are included. Additional information can be freely recorded when you create a method.

Customization of the Operation Screen

The status display and process screen can be customized, such as On/Off, position and color scheme.

Printing function

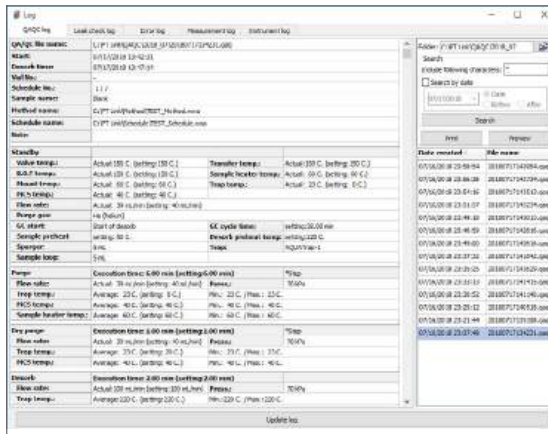
Useful methods for creating reports and schedule printing function have been added.



Comprehensive log function

An information rich QA/QC log ensures complete confidence in your analysis results. In addition, the leak check log has a detailed record of the start time and pressure record of the leak check, making it easier to manage the status.

QA/QC log screen



Other log functions

- Leak check log
- Error log
- Measurement log
- Instrument log

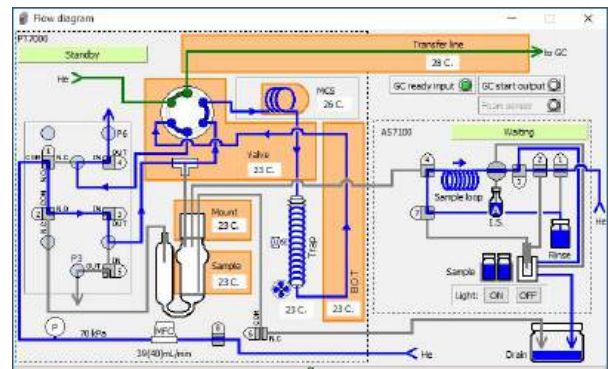
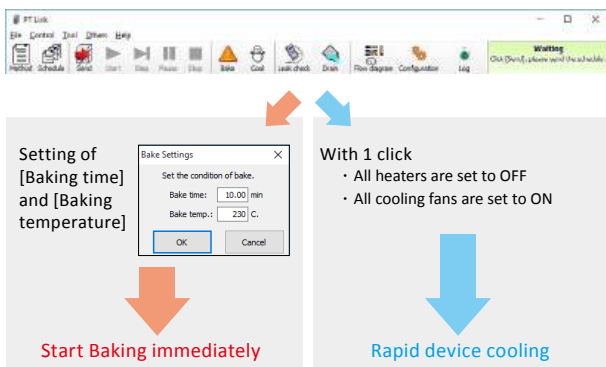
Direct mode

Each mode may be executed without including baking or cooling methods. Leak check and discharge can be done with just one click. It is not necessary to put another method into the schedule to run it.

Real time flow path diagram

The flow path diagram is synchronized in real time with the progress of the process right up to completion of the analysis.

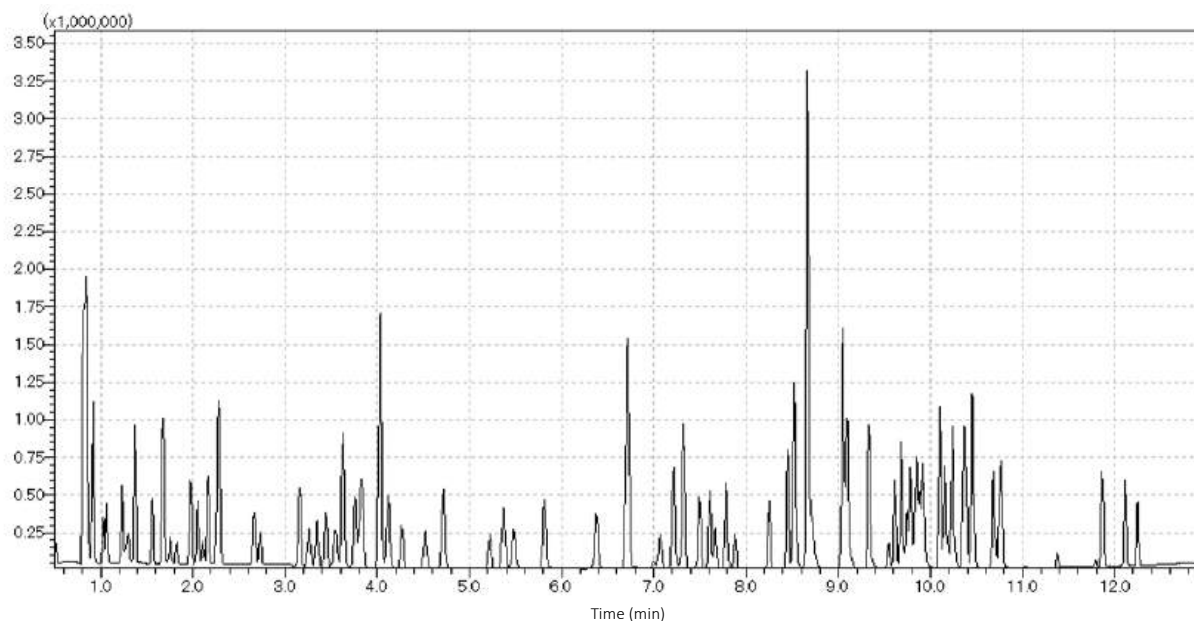
It is easy to monitor the internal function, and if an error occurs, it is possible to quickly identify the location of the problem.



Applications

Volatile organic compound

TIC Chromatogram



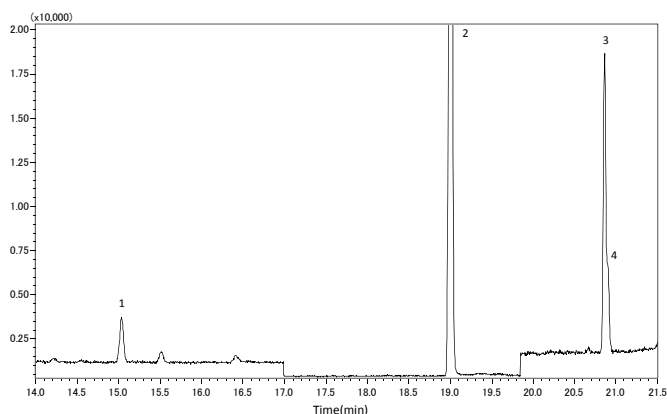
Sample size	5 mL	Desorb Preheat	250 °C
Purge time	11 min	Desorb Temp.	250 °C
Purge Flow	40 mL/min	Desorb time	2 min
Purge Temp.	Ambient	Bake Temp.	260 °C
Dry Purge time	1 min	Bake time	8 min
Dry Purge Flow	40 mL/min	Cool tray Temp.	4 °C

GC-MS	GCMS-QP2020 NX(Shimadzu)
Column	TC-VMS 0.25 mmI.D. x 30 m, df= 1.40 µm
Oven Temp.	40 °C (hold 2.5 min)-7 °C /min-70 °C -25 °C /min-240 °C (1 min)
Carrier gas	He,180 kPa
Split ratio	1:40
Scan range	35-300 amu

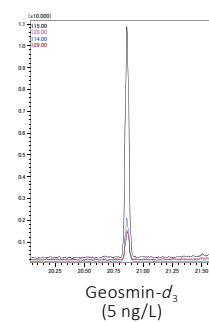
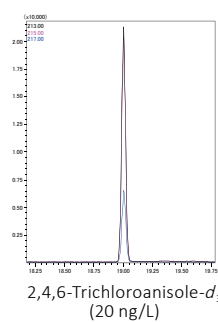
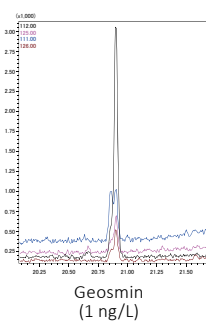
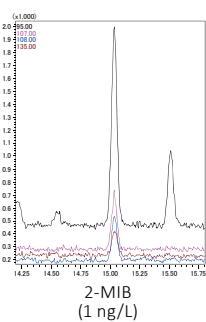
- | | | | |
|----------------------------------------|-------------------------------------|----------------------------------------|-------------------------------------------------------|
| 1. Dichlorodifluoromethane | 23. Tetrahydrofuran | 45. <i>trans</i> -1,3-Dichloropropene | 67. 1,3,5-Trimethylbenzene |
| 2. Chloromethane | 24. 2-Butanone | 46. 4-Methyl-2-pentanone | 68. <i>trans</i> -1,4-Dichloro-2-butene |
| 3. Vinyl chloride | 25. 1,1,1-Trichloroethane | 47. 1,1,2-Trichloroethane | 69. 4-Chlorotoluene |
| 4. Bromomethane | 26. Methyl acrylate | 48. Ethyl methacrylate | 70. <i>tert</i> -Butylbenzene |
| 5. Chloroethane | 27. 1,1-Dichloropropene | 49. Dibromochloromethane | 71. Pentachloroethane |
| 6. Trichlorofluoromethane | 28. 1-Chlorobutane | 50. 1,3-Dichloropropane | 72. 1,2,4-Trimethylbenzene |
| 7. Ethyl ether | 29. Benzene | 51. 1,2-Dibromoethane | 73. <i>sec</i> -Butylbenzene |
| 8. 1,1-Dichloroethylene | 30. Propionitrile | 52. 2-Hexanone | 74. <i>p</i> -Isopropyltoluene |
| 9. Carbon disulfide | 31. Methacrylonitrile | 53. Chlorobenzene | 75. <i>m</i> -Dichlorobenzene |
| 10. Iodomethane | 32. 1,2-Dichloroethane | 54. Ethylbenzene | 76. <i>p</i> -Dichloroethane |
| 11. Allyl chloride | 33. Fluorobenzene(I.S.) | 55. 1,1,1,2-Tetrachloroethane | 77. <i>n</i> -Butylbenzene |
| 12. Dichloromethane | 34. Trichloroethene | 56. <i>m,p</i> -Xylene | 78. Hexachlorethane |
| 13. Acetone | 35. Dibromomethane | 57. <i>o</i> -Xylene | 79. 1,2-Dichlorobenzene- <i>d</i> ₄ (I.S.) |
| 14. <i>trans</i> -1,2-Dichloroethylene | 36. 1,2-Dichloropropane | 58. Bromoform | 80. 1,2-Dichlorobenzene |
| 15. MTBE | 37. Bromodichloromethane | 59. Styrene | 81. 1,2-Dibromo-3-Chloropropane |
| 16. 1,1-Dichloroethane | 38. Methyl methacrylate | 60. Isopropylbenzene | 82. Nitrobenzene |
| 17. Acrylonitrile | 39. <i>cis</i> -1,3-Dichloropropene | 61. <i>p</i> -Bromofluorobenzene(I.S.) | 83. Hexachlorobutadiene |
| 18. <i>cis</i> -1,2-Dichloroethylene | 40. Toluene | 62. Bromobenzene | 84. 1,2,4-Trichlorobenzene |
| 19. 2,2-Dichloropropane | 41. Chloroacetone | 63. <i>n</i> -Propylbenzene | 85. Naphthalene |
| 20. Bromochloromethane | 42. 2-Nitropropane | 64. 1,1,1,2-Tetrachloroethane | 86. 1,2,3-Trichlorobenzene |
| 21. Chloroform | 43. 1,1-Dichloropropanone | 65. 2-Chlorotoluene | |
| 22. Tetrachloromethane | 44. Tetrachloroethylene | 66. 1,2,3-Trichloropropane | |

Geosmin, 2-Methylisoborneol

TIC Chromatogram

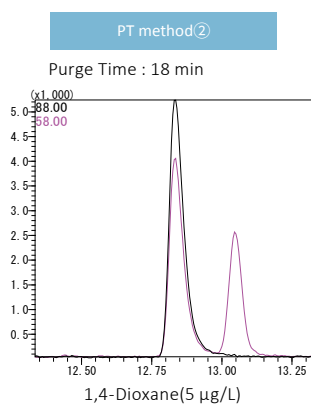
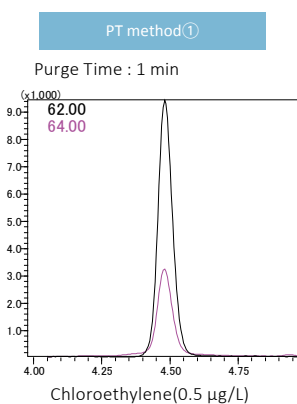


System	PT-GC-MS	
Trap	AQUA TRAP 1 (Tenax TA + Tenax GR)	
Column	InertCap SMS/Sil (0.25 mm I.D. × 30 m df = 0.50 μm)	
Col.Temp.	60 °C (1 min hold) – 4 °C/min – 120 – 10 °C/min – 170 °C – 20 °C/min – 220 °C (5 min hold)	
Carrier Gas	He 120 kPa	
Detection	MS SIM	
Sample Size	20 mL	
Sample	1. 2-MIB	1 ng/L
	2. 2,4,6-Trichloroanisole- <i>d</i> ₃	20 ng/L
	3. Geosmin- <i>d</i> ₃	5 ng/L
	4. Geosmin	1 ng/L



Chloroethylene and 1,4-Dioxane

SIM Chromatogram

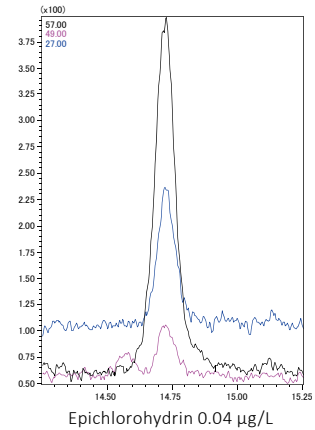
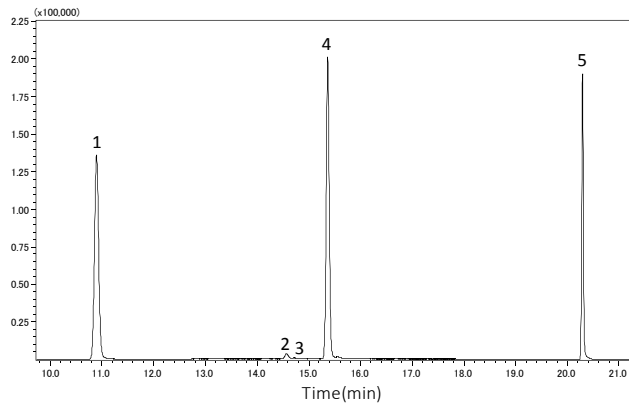


System	PT-GC-MS	
Trap	AQUA TRAP 1 (Tenax TA + Tenax GR)	
Column	InertCap AQUATIC (0.25 mm I.D. × 60 m df = 1.00 μm)	
Col.Temp.	40 °C (1 min hold) – 5 °C/min – 100 °C – 10 °C/min – 200 °C (10 min hold)	
Carrier Gas	He 180 kPa	
Detection	MS SIM	
Sample Size	5 mL	

Applications

Epichlorohydrin

TIC Chromatogram

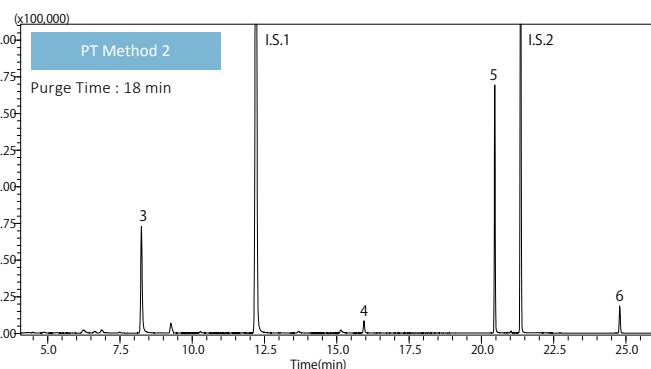
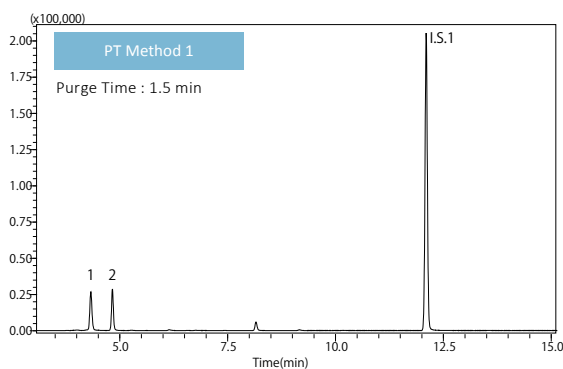


System PT-GC-MS
 Trap AQUA TRAP 1 (Tenax TA + Tenax GR)
 Column InertCap AQUATIC
 (0.25 mm I.D. × 60 m df = 1.00 µm)
 Col.Temp. 40 °C (1 min hold) – 3 °C/min – 80 °C – 20 °C/min – 200 °C (10 min hold)
 Detection MS SIM
 Sample Size 5 mL

Sample 1. Fluorobenzene	5 µg/L
2. Epichlorohydrin- <i>d</i> ₅	0.5 µg/L
3. Epichlorohydrin	0.04 µg/L
4. Toluene- <i>d</i> ₈	0.5 µg/L
5. <i>p</i> -Bromofluorobenzene	5 µg/L

Extractables and Leachables in water supply

TIC Chromatogram

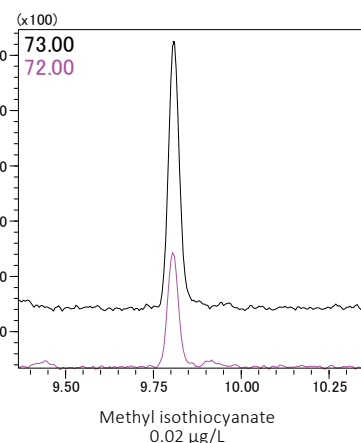
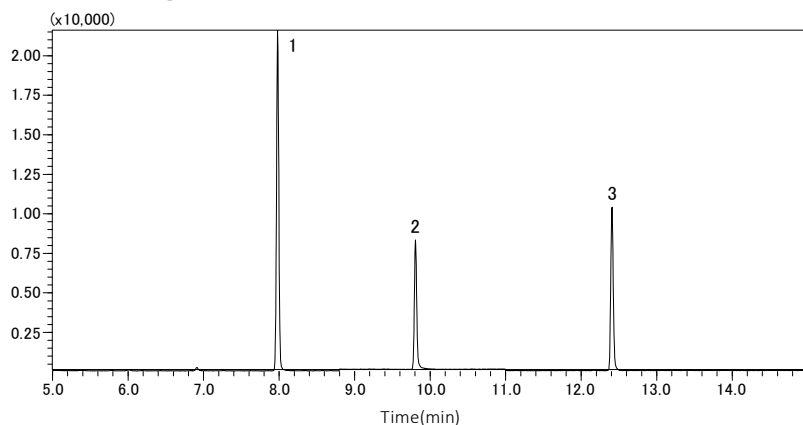


System PT-GC-MS
 Trap AQUA TRAP 1 (Tenax TA + Tenax GR)
 Column InertCap AQUATIC
 (0.25 mm I.D. × 60 m df = 1.00 µm)
 Col.Temp. 40 °C (1 min hold) – 3 °C/min – 80 °C – 20 °C/min – 200 °C
 (10 min hold)
 Carrier Gas He 180 kPa
 Detection MS SIM
 Sample Size 5 mL

Sample 1.	1,3-Butadiene	1 µg/L
2.	1,2-Butadiene	1 µg/L
3.	Vinyl acetate	1 µg/L
4.	Epichlorohydrin	1 µg/L
5.	Stylene	1 µg/L
6.	<i>N,N</i> -Dimethylaniline	1 µg/L
I.S.1.	Fluorobenzene	5 µg/L
I.S.2.	<i>p</i> -Bromofluorobenzene	5 µg/L

Methyl isothiocyanate

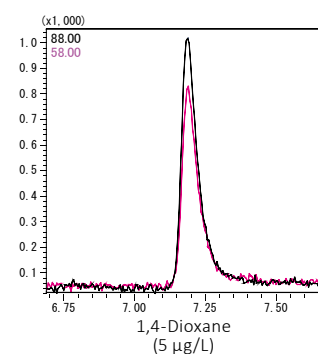
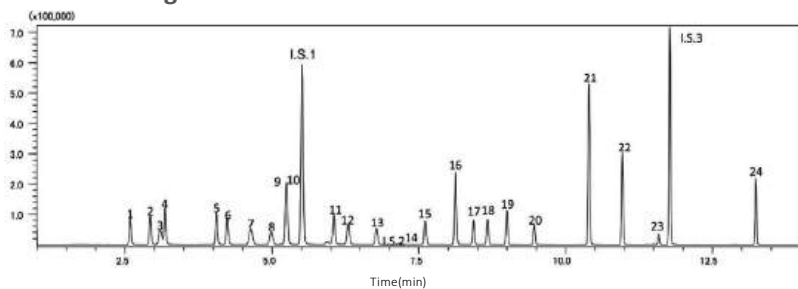
TIC Chromatogram



System	PT-GC-MS	Sample	1. Fluorobenzene	0.08 µg/L
Trap	AQUA TRAP 1 (Tenax TA + Tenax GR)		2. MITC	0.2 µg/L
Column	InertCap AQUATIC (0.25 mm I.D. × 60 m df = 1.00 µm)		3. <i>p</i> -Bromofluorobenzene	0.08 µg/L
Col.Temp.	40 °C (1 min) – 15 °C/min – 200 °C (10 min)			
Carrier Gas	He 180 kPa			
Detection	MS SIM			
Sample Size	5 mL			

Volatile organic compound

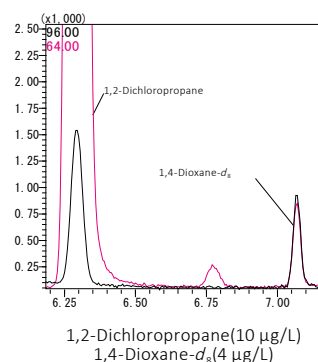
TIC Chromatogram



Sample	1. 1,1-Dichloroethylene	10. Benzene	19. Tetrachloroethylene
	2. Dichloromethane	11. Trichloroethylene	20. Dibromochloromethane
	3. MTBE	12. 1,2-Dichloropropane	21. <i>m,p</i> -Xylene
	4. <i>trans</i> -1,2-Dichloroethylene	13. Bromodichloromethane	22. <i>o</i> -Xylene
	5. <i>cis</i> -1,2-Dichloroethylene	14. 1,4-Dioxane	23. Bromoform
	6. Chloroform	15. <i>cis</i> -1,3-Dichloropropene	24. 1,4-Dichlorobenzene
	7. 1,1,1-Trichloroethane	16. Toluene	I.S.1 Fluorobenzene(5 µg/L)
	8. Carbon tetrachloride	17. <i>trans</i> -1,3-Dichloropropene	I.S.2 1,4-Dioxane- <i>d</i> ₈ (4 µg/L)
	9. 1,2-Dichloroethane	18. 1,1,2-Trichloroethane	I.S.3 <i>p</i> -Bromofluorobenzene(5 µg/L)

VOCs (1 µg/L each)
1,4-Dioxane (10 µg/L)

System	PT-GC-MS
Trap	AQUA TRAP 1 (Tenax TA + Tenax GR)
Column	InertCap AQUATIC (0.25 mm I.D. × 30 m df = 1.00 µm)
Col.Temp.	40 °C (1 min hold) – 5 °C/min – 70 °C – 15 °C/min – 200 °C (5 min hold)
Carrier Gas	He 100 kPa
Detection	MS SIM
Sample Size	5 mL



About Quality

InertCap high separation GC Column

GL Sciences ensures optimal performance of Purge and Trap-GC-MS by imposing strict quality control standards not only on the PT7000 main unit but also on its crucial component, the trap tube. From manufacturing in our ISO 9001-certified Japanese facility to inspection, we maintain consistency to deliver high performance.



Specification

PT7000 Purge and Trap Concentrator

Sparger	Glass with frit 5 mL, 25 mL
Trap	Glass lining stainless steel, 1/8" O.D. x12" L, ambient +5 °C ~ 350 °C
GC injection	Split
Auto switching valve	2 position 6 port, ambient +5 °C ~ 300 °C
Log	QA/QC, Leak check, Error, Measurement, Instrument
Gas supply	He or N ₂ , 99.999 % pure, 0.4 ~ 0.6 MPa
Sample heater setting range	20 ~ 100 °C
Mount heater setting range	20 ~ 100 °C
Power requirements	AC220 V ± 10 %, 50/60 Hz, 1000 VA
Software	PT Link, English/Japanese
Operating system	Windows 10 Pro 32 bit/64 bit, Windows 11 Pro, English/Japanese
Dimensions	220(W) × 500(D) × 480(H) mm *Protruding parts not included
Weight	max.18 kg
Certifications	CE, KC, RCM
Compliance	WEEE, RoHS

AS7100 Vial autosampler

Sample vial	56 positions (40 mL vial), 80 positions (13 mL vial, Option)
Sample roop volume	5 mL, 20 mL
I.S. injection	2 bottles, 2 µL
Gas supply	He or N ₂ , 99.999 % pure, 0.4 ~ 0.6 Mpa
Cooling system	Electric cooling system, Setting range 3 ~ 15 °C, 1 °C step
Cleaning	Heated blank water
Power requirements	AC220 V ± 10 %, 50/60 Hz, 500 VA
Dimensions	340(W) × 500(D) × 480(H) mm *Protruding parts not included
Weight	35 kg
Certifications	CE, KC, RCM
Compliance	WEEE, RoHS

Condition

Temperatures	18 ~ 27 °C
Humidity levels	30 ~ 70 % *

* : There is no condensation.

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