

SPL-P100
For Gas Chromatography

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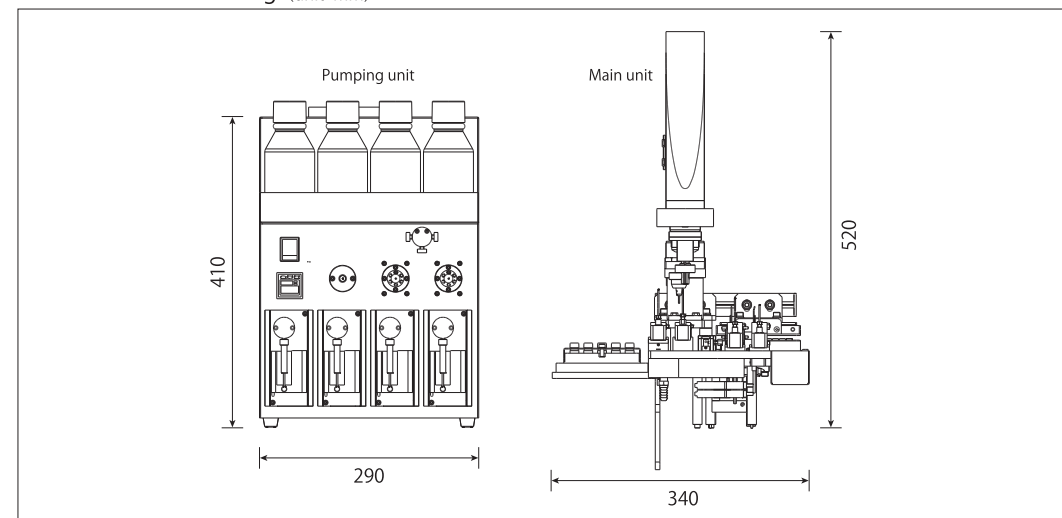
A
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S

Beyond your Imagination

Online SPE-GC system

SPL-P100
For Gas Chromatography

□ Dimensional drawing (unit:mm)



□ Product specification of SPL-P100

Size	Main unit	W340 mm	D560 mm	H520 mm (Height from the installing surface)
	Pumping unit	W290 mm	D570 mm	H410 mm
Power consumption	100 V (400 VA)			
PC for software	WindowsXP or later			
Maximum sample number	50			
Pumping method	Syringe			
Gas	Nitrogen or inert gas			
Installation environment	Temperaturer : 18~28 °C			
	Humidity : 40~70 %RH No condensation			
Others	Environment with dust, vibration, noise and corrosive gas should be avoided.			
	LVI-S250, large volume injection device, is neccessary			
	* If you have LVI-S200, it can be upgraded and used as large volume injection.			

Product specification, appearance, configuration, etc. are subject to change for improvement without notice. Company names and product names listed in the catalog are registered trademarks or trademarks of each company.

Please contact us or your distributor for inquiries about products.

2019.10.23

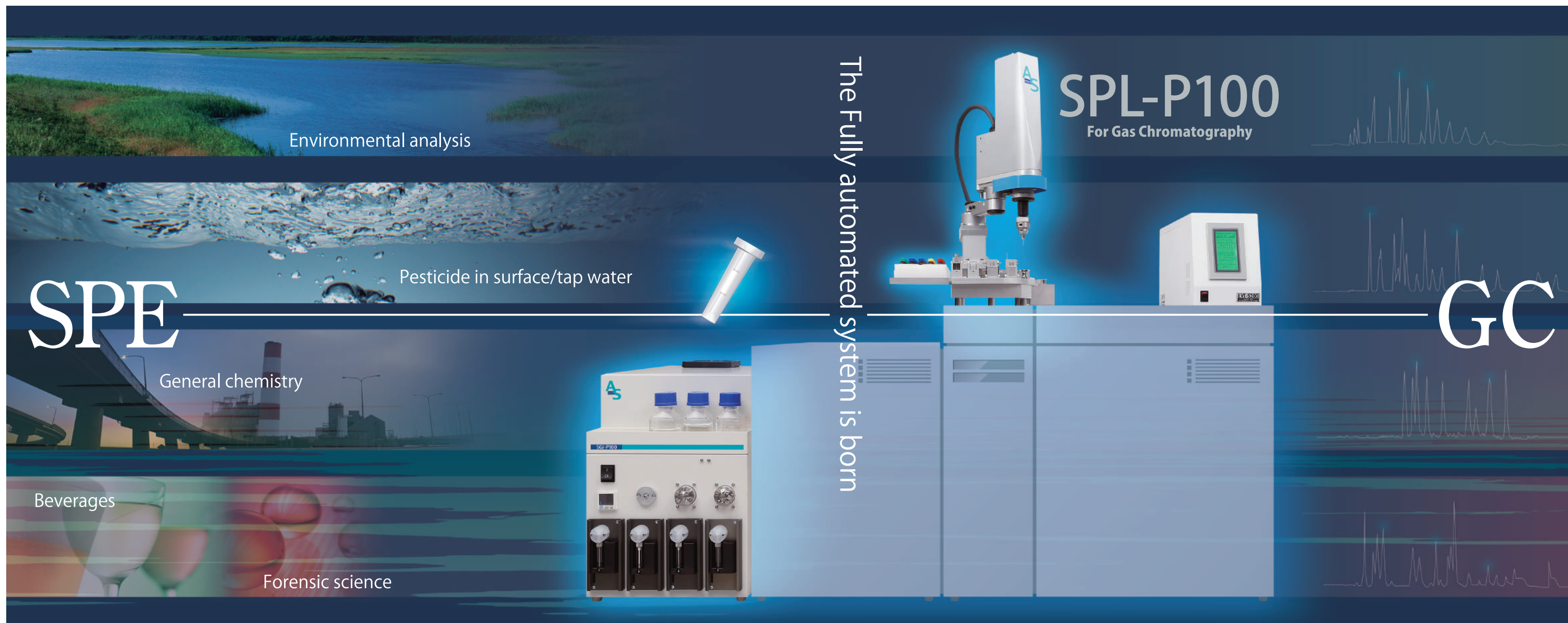
AiSTI SCIENCE Co., Ltd.

【HEAD QUARTER】
#18-3, ARIMOTO, WAKAYAMA-CITY, WAKAYAMA, JAPAN
TEL.+81-(0)73-475-0033 FAX.+81-(0)73-497-5011

Mail to : as@aisti.co.jp
www.aisti.co.jp

日本/和歌山





SPL-P100

For Gas Chromatography
AUTOMATION

By installing solid extraction device onto GC/MS,
fully automated online treatment has become possible.

The full automation system has made all steps
until GC/MS analysis possible by simply setting the sample.

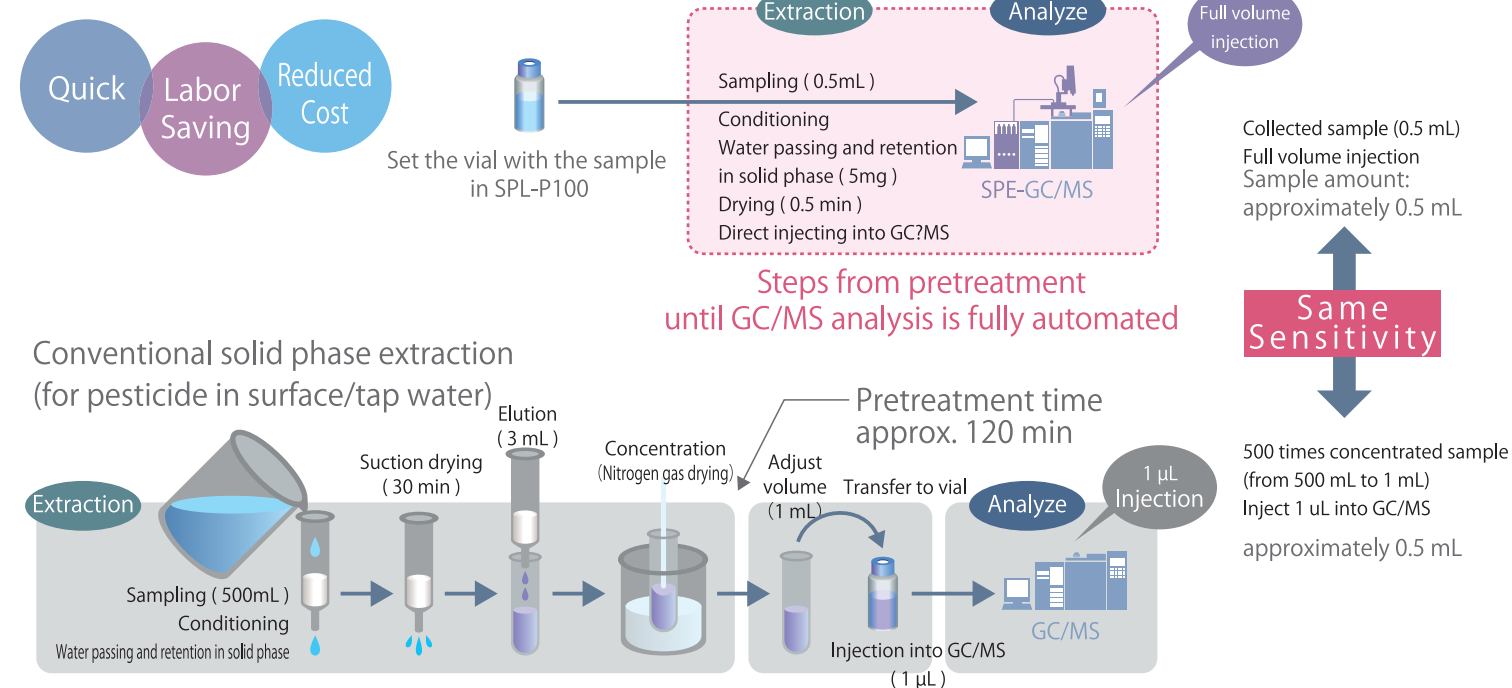
- ☐ Fully automation process is just 5 minutes.
- ☐ Steps for SPE conditioning→sample loading→nitrogen gas drying→injection into GC is completely automated.
- ☐ High-throughput system is achieved by performing treatment of the next sample during analysis.
- ☐ Only you have to set the vial, set the SPE, and start the GC/MS sequence

Flash-SPE cartridge enables full volume injection



This solid phase cartridge is specially designed for online SPE-GC. The amount of cartridge filler is only 2 to 5 mg, which is very small amount, and using this compact cartridge with the large volume injection port LVI-S250, the entire sample can be injected.


Scale down of solid phase extraction process
Drastically shortened pretreatment time



Explanation

Functions and characteristics of hardware

Fully automated from conditioning the solid phase, purification, drying and elution until GC/MS injection
Syringe pumps are dedicated to each solvent, which prevents mixing of different solvents.

 Quick and stable purification

The revolution of pretreatment
2 hours to 5 minutes



(Representative figure of) Installed system on GC/MS



Space for solvent bottles



Syringe pump and valve



Pumping unit

☐ Pump with syringe

The syringe pumps are dedicated to each solvent, which enables efficient pumping.

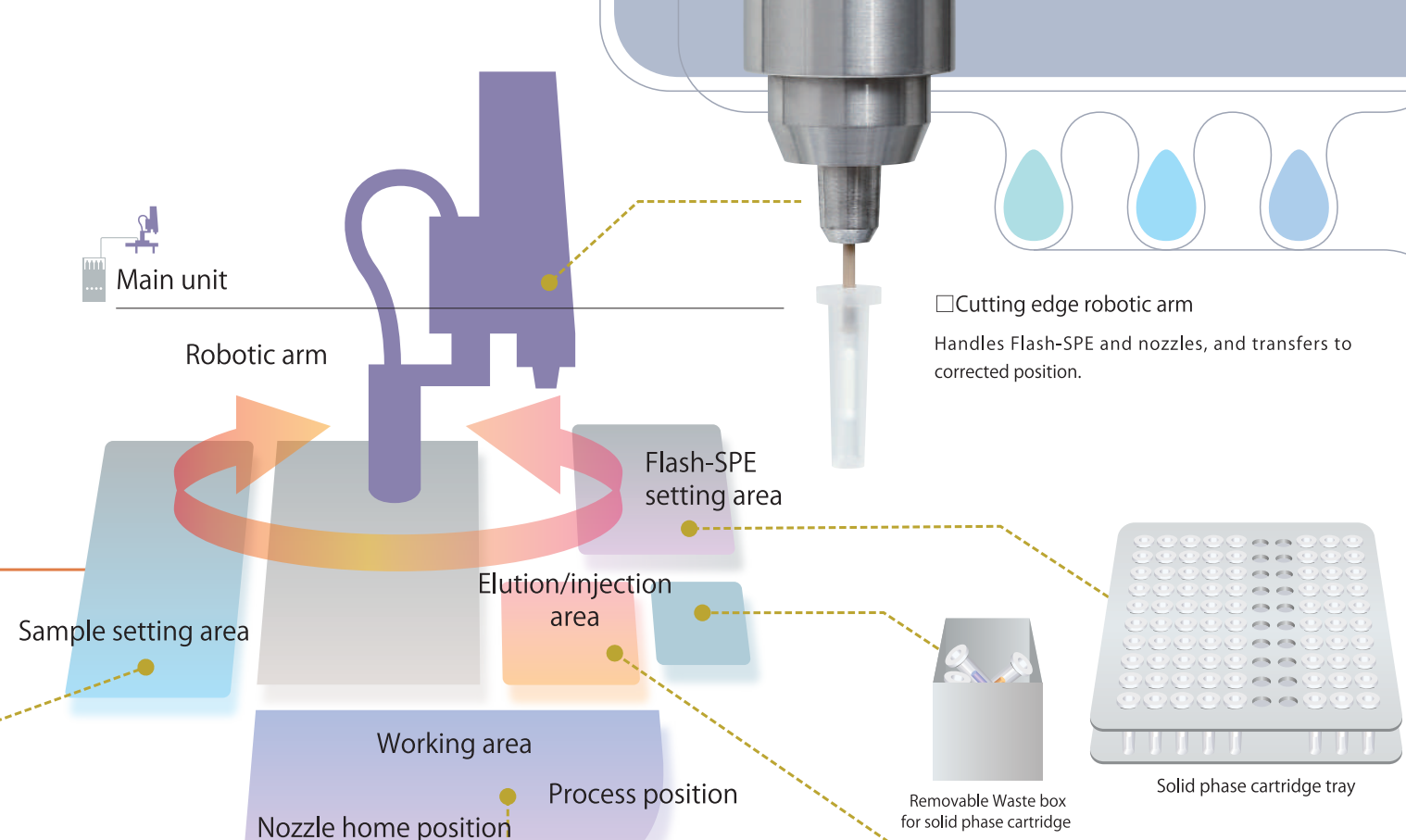
☐ Beep sound

Beep will notify when treatment is finished or when there is an error.

☐ Easy maintenance

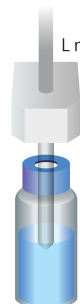
Syringe can be easy to replace with accessory. Depending on the method condition, the valves can be switched.

Online SPE-GC

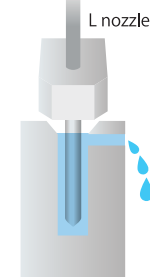


Collect sample

L nozzle



Wash nozzle



Condition



Load sample



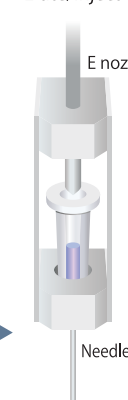
Wash



Dry

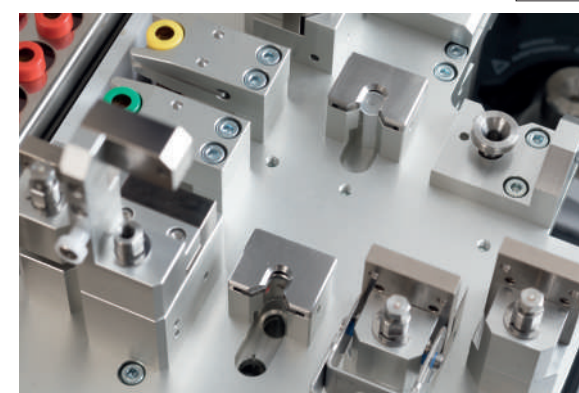


Elute/inject



Flash-SPE

● Target Analyte ▲ Contaminants



Nozzle and process position

☐ Specific nozzle dedicated for each step

There are nozzles dedicated to each step (conditioning, sample loading, washing, nitrogen ventilation and elution) for sending specific solvent smoothly.



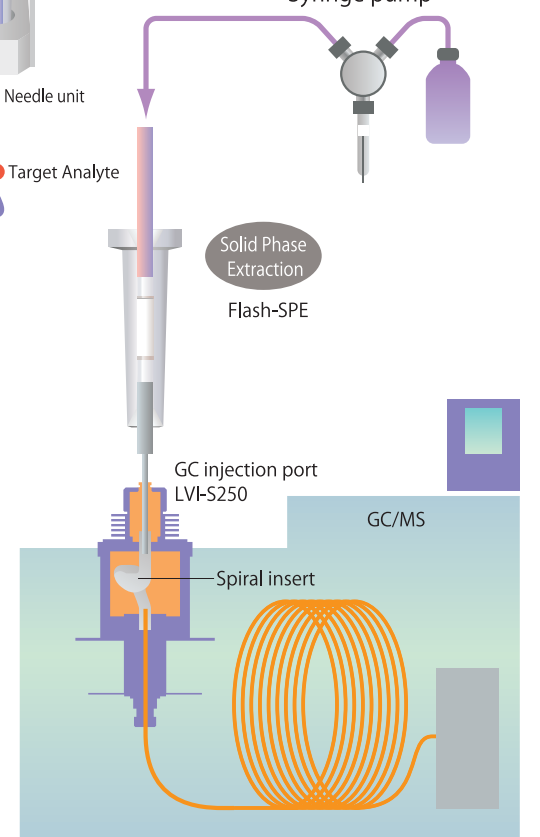
Injection into GC simultaneously with elution

 Attachment to needle

☐ Simultaneously elute and inject into GC

Since Flash-SPE and needle can be attached, elution and injection can occur simultaneously. LVI-S250, large volume injector device for GC with installed spiral insert, can inject full volume at the order of 10uL.

Syringe pump



Evaluation result Perormance

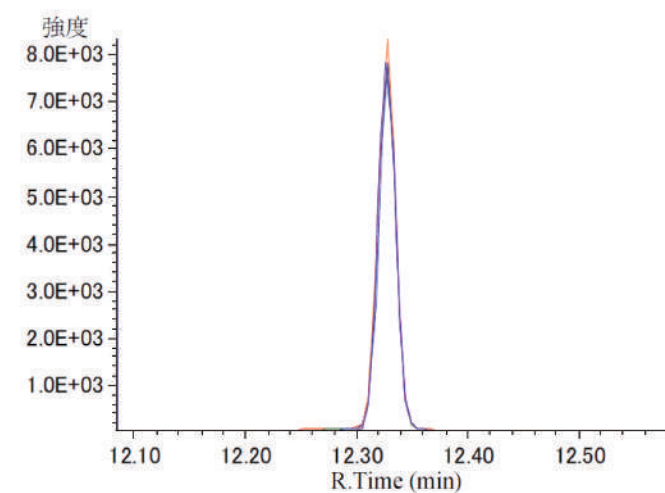
Evaluating the performance of SPL-P100 (Spike and recovery test, repeatability, calibration curve)

25 μ L of Diazinon-d10 standard solution (20 ppb) was directly injected into GC/MS (injection amount: 500 pg).

For spike and recovery test, diazinon-d10 was diluted to 1 ppb with ultrapure water. 0.5 mL was collected by SGI-P100, and the full volume was injected into GC/MS (injection amount: 500 pg).

$$\text{Recover rate} = \frac{\text{Peak area of spiked sample}}{\text{Peak area of standard sample}} \times 100 (\%) = 94 \%$$

Overlapped ion chromatogram (n=5)



Test condition
Test water: Ultrapure water
Spiked standard: Diazinon-d10
Spiked concentration: 1 ppb (in test water)
Replication: n=5

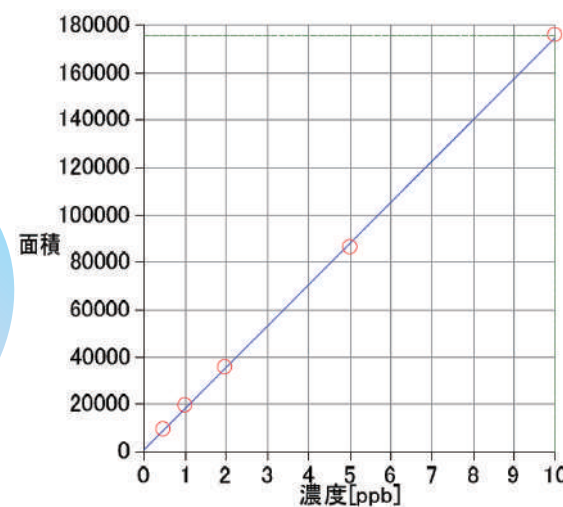
SPE-GC system condition
Collected amount : 0.5 mL
Solid phase : Flash-SPE C18-5 mg
Solid phase conditioning : Acetone/Hexane→Acetone→Water
Drying time after loading test water : 30sec.
Elution solvent : Acetone/Hexane 40 μ L

Analysis
Injection port: Large volume injector for GC

$$\text{Repeatability RSD} = 3 \%$$

Calibration curve

Calibration curve: linear
Area(Ratio)=17454.070227 * Q+802.026486
Correlation coefficient=0.9998767

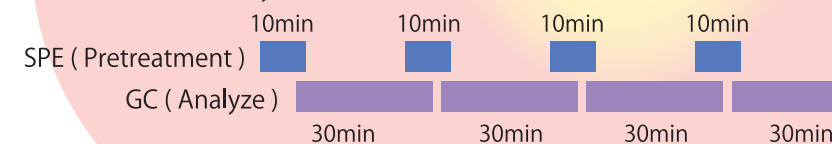


Test condition
Test water : Ultrapure water
Spiked standard : Diazinon-d10
Spiked concentration : 0.5, 1, 2, 5, 10 ppb

$$\text{Linearity Correlation Coefficient} = 0.99987$$

Analysis cycle time

By overlapping pretreatment and GC analysis, the instrument operates efficiently.



Highly efficient operation
with SPE-GC system

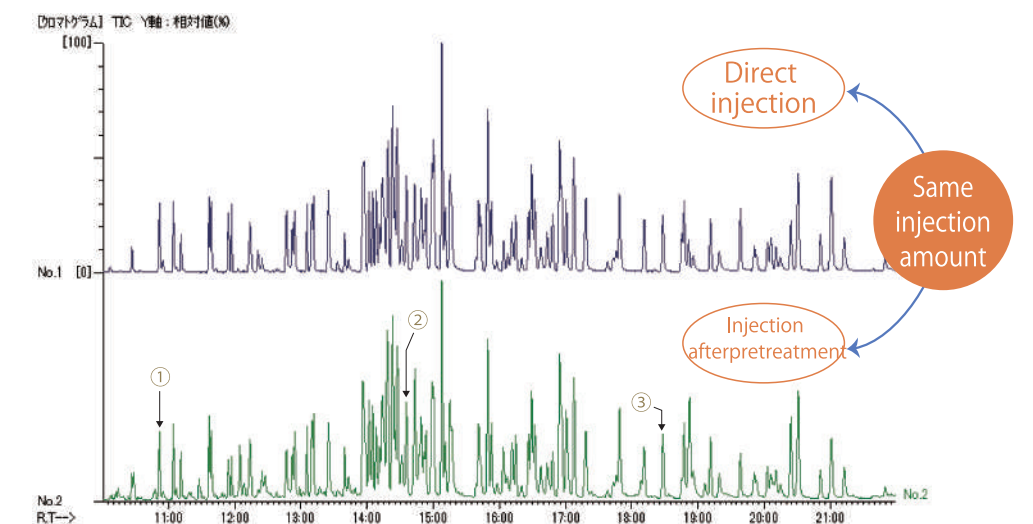
Online SPE-GC

SPE-GC drive to faster analysis

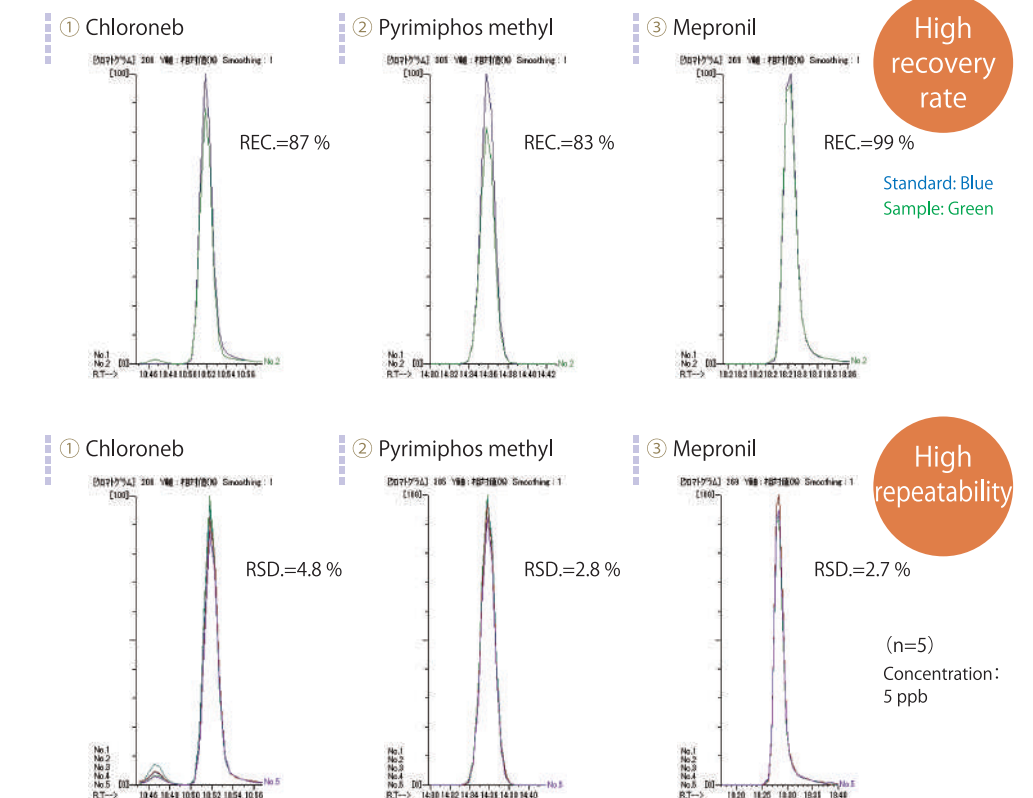
Verification comparison

Simultaneous analysis of pesticide in water

SCAN Total ion chromatogram (pesticides : 116components)



Overlapped extracted-ion chromatogram obtained by developed method



Application examples

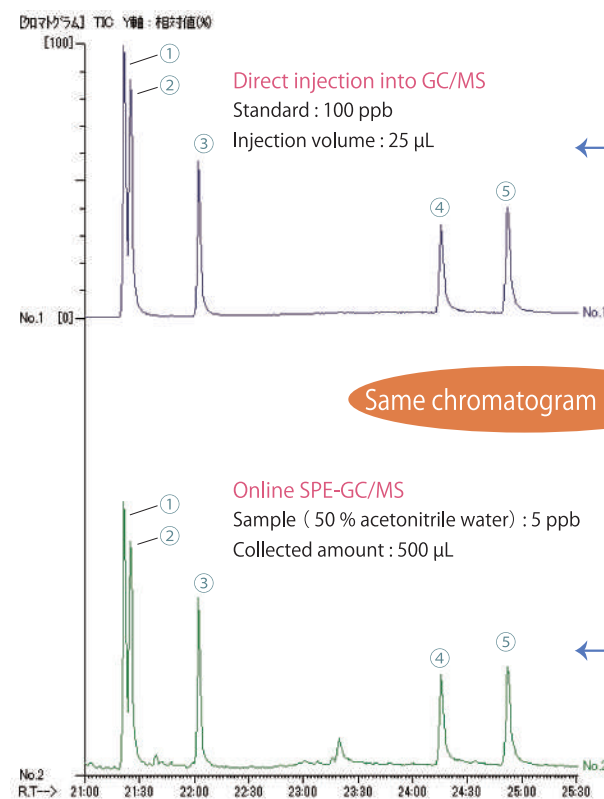
Software

Function and characteristic of software

Convenient with diverse functions

Analysis of polycyclic aromatic compounds in water

□SCAN total ion chromatogram

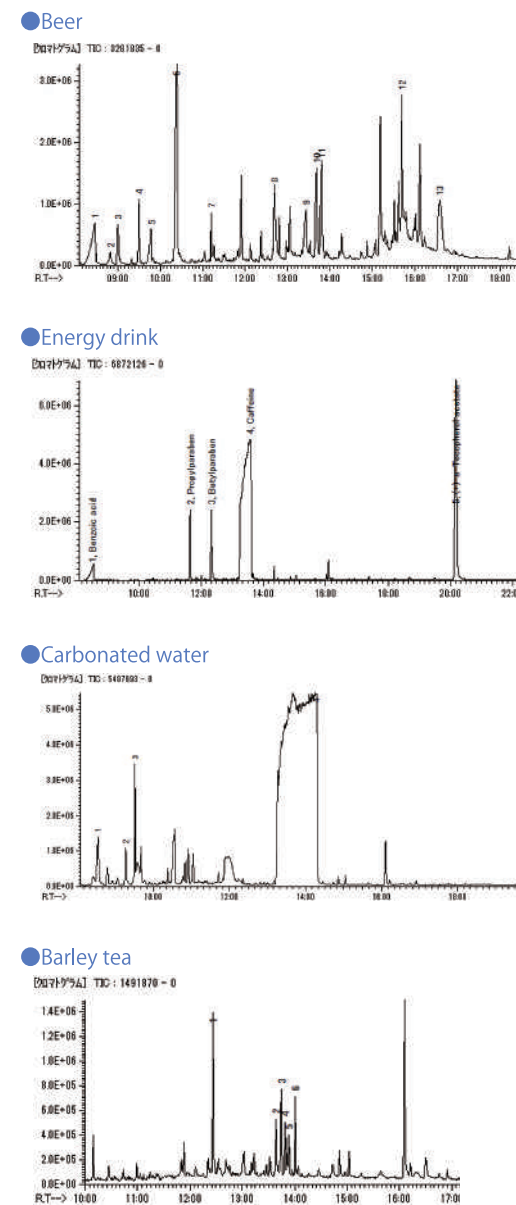


Same chromatogram pattern

- ① Benzo[b]fluoranthene
- ② Benzo[k]fluoranthene
- ③ Benzo[a]pyrene
- ④ Benzo[ghi]perylene
- ⑤ Indeno[1,2,3-cd]pyrene

Analysis of various beverages

□SCAN total ion chromatogram



User friendly software

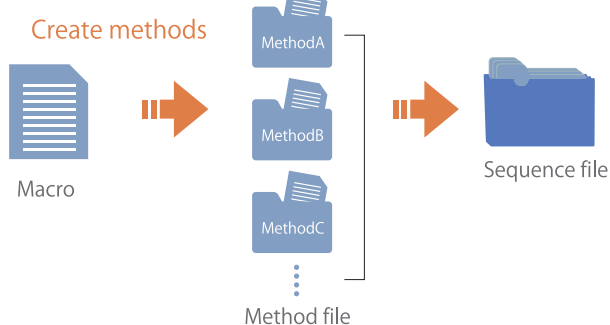
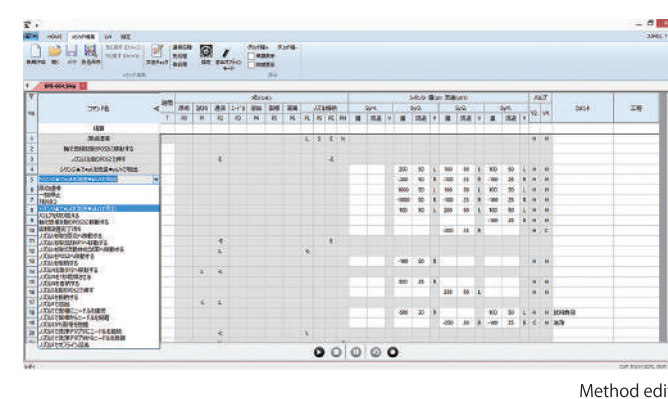
Menu bar Make method and sequence and set conditions

Monitor Real-time check of operation condition

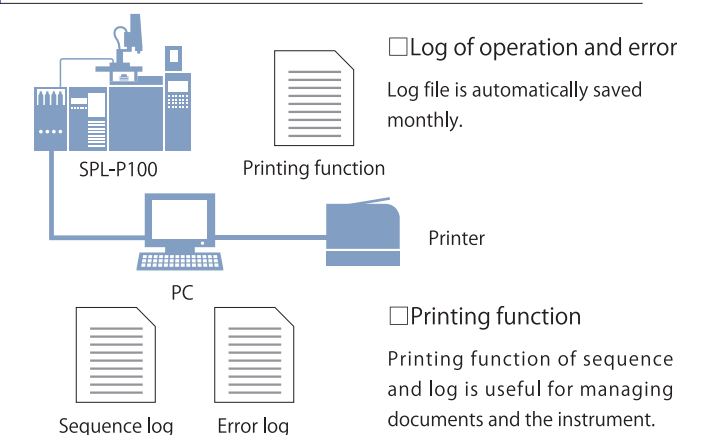
Select method with one click

Schedule Directly enter the analysis schedule (Possible to save as sequence file)
Put check mark next to samples for analysis and press start

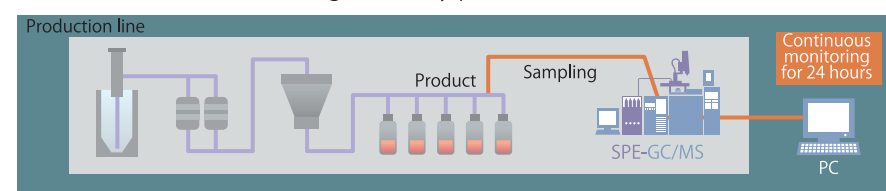
Possible to create own methods



Operation condition can be recorded



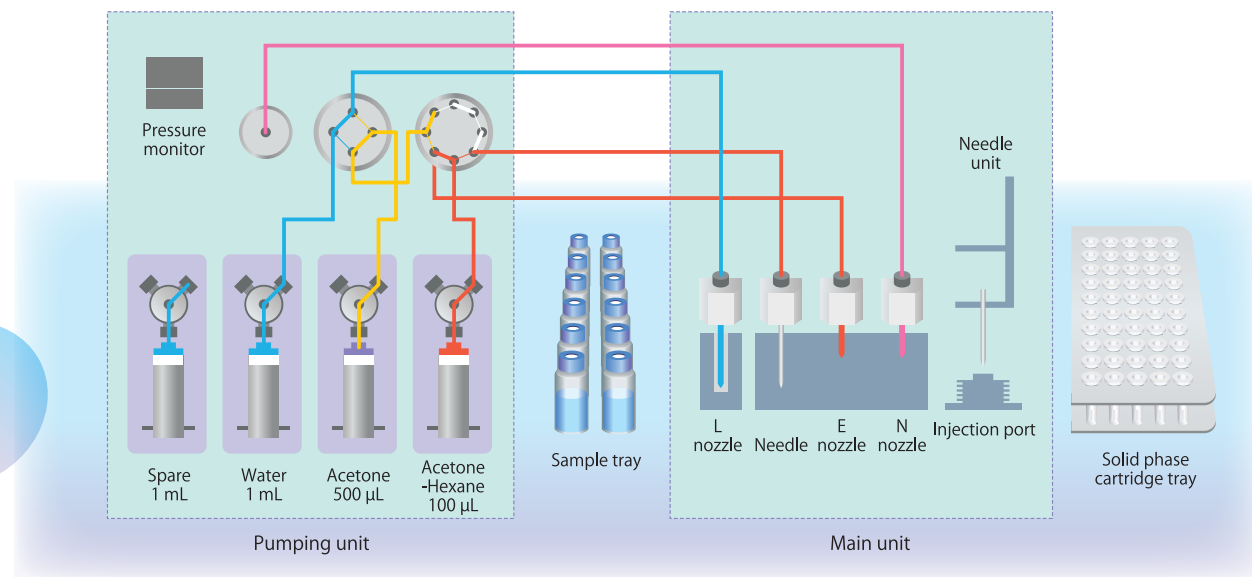
□24 hours online monitoring of factory production line



SPE-GC/MS is effective for quality control of products in factory production line, or checking safety of waste water.

Online SPE-GC

Flow diagram pipe, syringe pump, nozzle



Solid phase cartridge for online SPE-GC

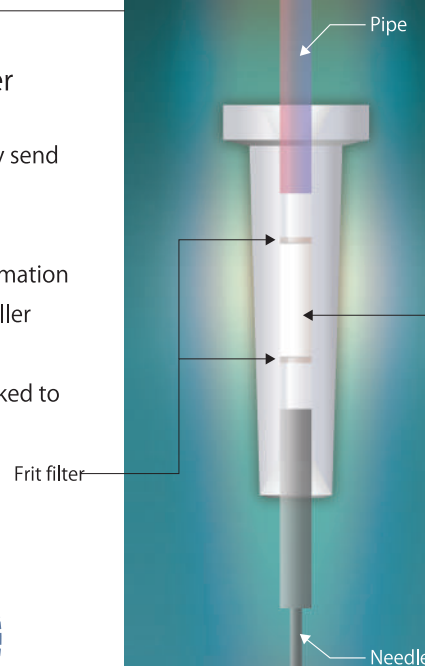
Merit of Flash-SPE

Efficient analysis with less cartridge filler

- The straight shape can effectively send sample and solvent
- Fast air blow drying (30 sec.)
- Simple shape optimized for automation
- Minimized amount of cartridge filler with only 2 to 5 mg
- Both sides of cartridge can be linked to pipe or needle



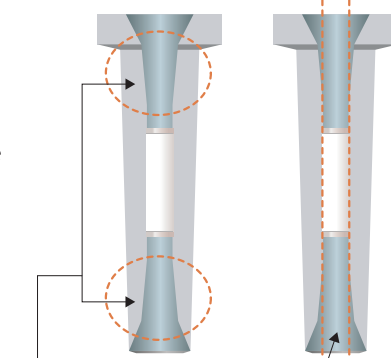
Flash-SPE For Online SPE-GC



Characteristic of Flash-SPE

Attachment function

Connect to Pipe or Needle



Both sides of the cartridge is press fit to pipe or needle.

The straight attachment can effectively send solvent and dry. This results in efficient pretreatment.

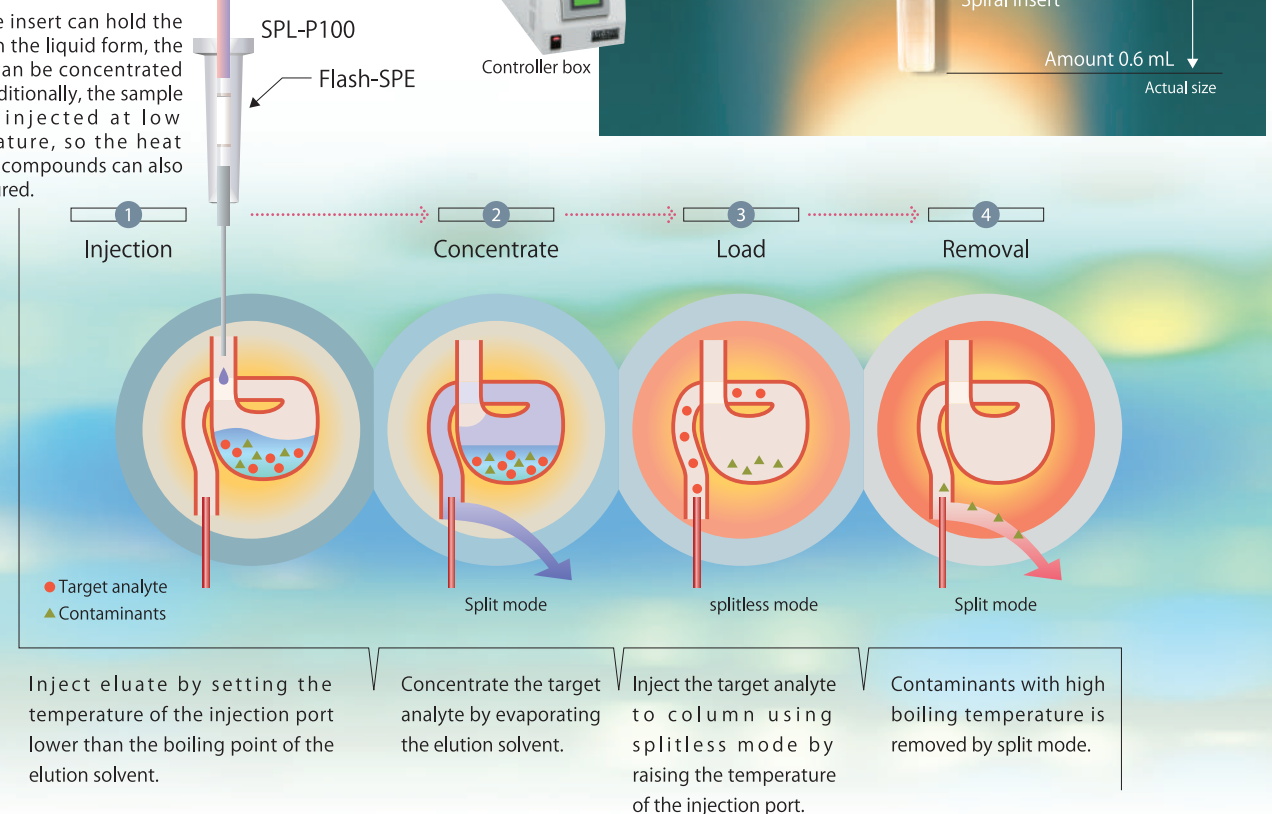
Elution and injection
into GC

Large volume injector device for GC (with spiral insert)

The unique shaped insert enables
200µL injection.

- Improvement in sensitivity has made it possible to analyze trace amount of target analyte with high sensitivity
- Minimized the amount of sample and shortened pretreatment (by skipping concentrating step)
- Derivatization within the insert
- Can be used for large volume injection and other methods of injection

Since the insert can hold the sample in the liquid form, the sample can be concentrated easily. Additionally, the sample can be injected at low temperature, so the heat sensitive compounds can also be measured.



Derivatization injection method

