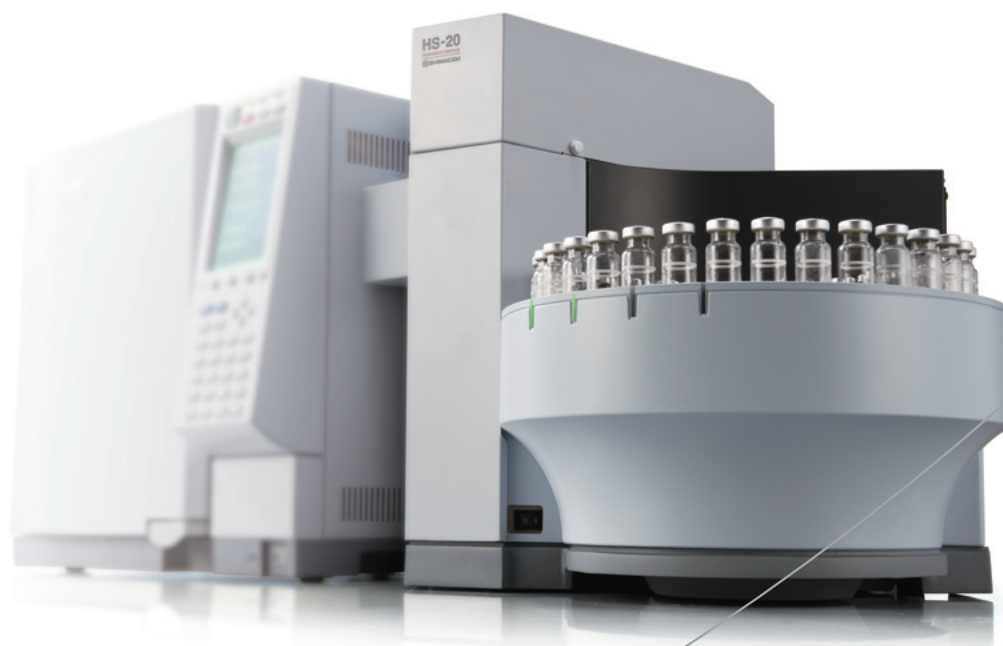


Headspace Samplers

HS-20 Series



HS-20 Series of Headspace Samplers

A Revolutionary System Aimed at Performance and Ease of Use

The HS-20 Series is the optimal solution for volatile component analysis.

Its superior performance and user-friendly design support all types of analyses, from research to quality control.



1 Excellent Performance

- High reproducibility
- Low carryover
- High-temperature compatibility

High reproducibility and low carryover ensure reliable quantitation. In addition, an oven with a maximum temperature of 300 °C enables analysis of high-boiling compounds.

2 User-Friendly Design

- User-friendly sample tray
- Easy maintenance

Easily place samples in the tray with the user-friendly design. Also, the needle, sample loop, trap, and other consumables can easily be replaced from the top of the instrument.

3 Excellent Expandability

- Electronic cooling trap (trap model)
- Barcode reader option

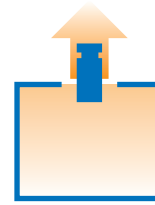
With the trap model, concentrating the headspace gas enables the analysis of ultra-trace components, such as gases released from parts and materials.

The optional barcode reader enables samples to be controlled via a chromatography data system.

Excellent Performance

High Reproducibility

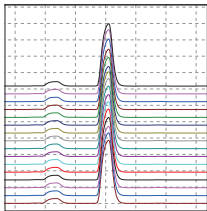
The HS-20 Series achieves high reproducibility through both high-accuracy flow rate control via the pneumatic flow controller (Advanced Flow Control: AFC™ system) and a mechanism that allows sample vial to enter the oven from the bottom. Consequently, this system minimizes heat loss, and maintains high thermal stability during overlap analyses.



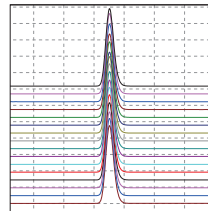
Typical HS Sampler
Internal heat easily escapes during vial transfer, temporarily reducing the oven temperature.



HS-20
Conveyance from the bottom makes it difficult for heat to escape from inside, improving oven temperature stability. (Patent pending)



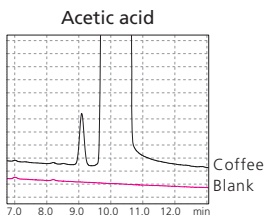
Methanol 50 ppm
reproducibility (n = 20)
1.5 %



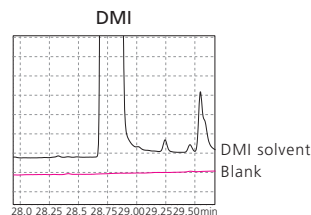
n-Butanol 50 ppm
reproducibility (n = 20)
1.5 %

Low Carryover

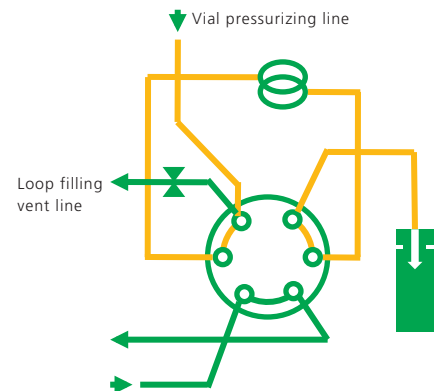
Keeping the sample line inert and as short as possible results in extremely low carryover. No residue is left, even with acetic acid and other polar compounds, enabling highly reliable analysis. (Patent pending)



Residual acetic acid in coffee
< 0.0001 %



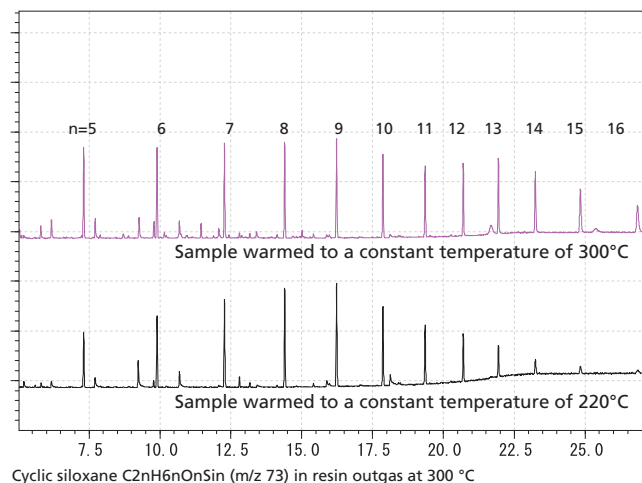
Residual DMI solvent
< 0.0001 %



High-Temperature Compatibility

With an oven configurable up to 300 °C and a simple, inert sample line, the HS-20 Series allows the analysis of high-boiling compounds.

Cyclic siloxane is a raw silicone material, trace quantities of which remain in oils, liquid rubber, and other products. Because cyclic siloxane is volatile, it could potentially cause problems with contacts in electronic parts, so controlling its concentration is very important. The HS-20 Series makes it possible to measure everything from cyclic siloxane to phthalate esters under the same conditions.



Cyclic siloxane C₂H₆nOnSin (m/z 73) in resin outgas at 300 °C

User-Friendly Design

User-Friendly Sample Tray



The HS-20 sample tray is 20 cm higher than the desk, enabling it to be seen at all times. This makes sample placement easy.

In addition, 10 mL and 20 mL vials can be placed and analyzed simultaneously without the need for special attachments.

Furthermore, the optional barcode reader allows samples to be controlled using barcodes.



Analysis of blood and other samples in the forensic field requires a system that not only offers excellent performance, but also eliminates operational errors.

With its user-friendly design, the HS-20 Series prevents mistakes, while the barcode reader records logs to dramatically improve traceability.

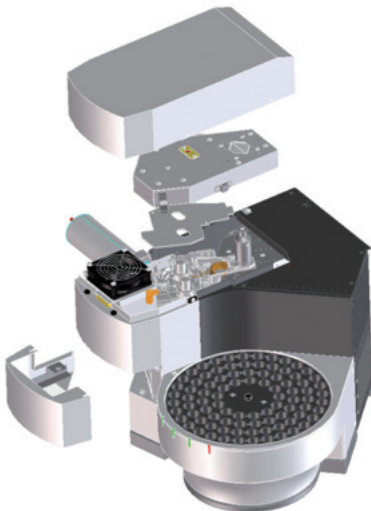


Visit	Barcode	Result	Method File	Injection Time
37	ABCD013833	Normal end	HS20\Method\BCRtest.htm	2/24/2012 5:25:01 PM
38	ABCD010139	Normal end	HS20\Method\DCRtest.htm	2/24/2012 5:26:50 PM
39	ABCD013833	Normal end	HS20\Method\BCRtest.htm	2/24/2012 5:28:43 PM
40	ABCD010139	Normal end	HS20\Method\BCRtest.htm	2/24/2012 5:30:37 PM
41	ABCD013833	Normal end	HS20\Method\BCRtest.htm	2/24/2012 5:32:27 PM
42	ABCD010139	Normal end	HS20\Method\DCRtest.htm	2/24/2012 5:34:16 PM
43	ABCD013833	Normal end	HS20\Method\BCRtest.htm	2/24/2012 5:36:06 PM
44	ABCD010139	Normal end	HS20\Method\BCRtest.htm	2/24/2012 5:37:56 PM

Quantitative Results Browser

The instrument can be controlled by the CFR 21 Part 11-compliant LabSolutions chromatography data system, ensuring traceability of analysis conditions and operations. In addition, an automatic shutdown function operates after analysis is completed, saving electricity and carrier gas. (LabSolutions LC/GC only. Not supported by GCMS software.)

Easy Maintenance



The HS-20 Series has been designed to enable sample loop and needle replacement and other maintenance work to be performed easily from the top of the instrument.

Even if sample lines become contaminated by high-concentration samples, the piping alone can now be replaced.

Also, the capillary column joints are shared with the GC sample injection unit, enabling easy column replacement.

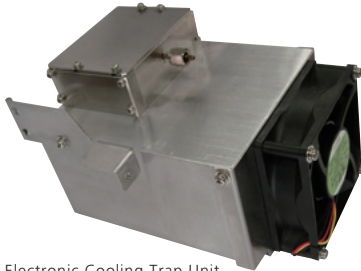
This superior design minimizes downtime during maintenance and improves laboratory productivity.

Excellent Expandability

Sample Concentration

The HS-20 trap model is equipped with an electronic cooling trap that concentrates the headspace gas, enabling high-sensitivity analysis. By using hydrophobic Tenax, the trap enables the analysis of low-boiling compounds by concentrating them to high-boiling compounds in samples containing moisture.

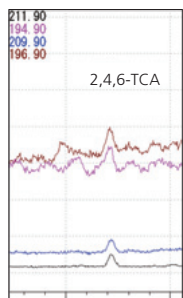
Method files make it easy to switch between trap and conventional modes, in which a sample loop is used. The two modes can be combined even in continuous analysis via batch processing.



Electronic Cooling Trap Unit

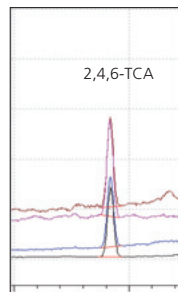
Start Vial #	End Vial #	Analysis Mode	Method File Path	Comment
1	10	Regular Analysis	HS20\Method\FVOC LoopMode001.hsm	
2	11	Regular Analysis	HS20\Method\FVOC TrapMode001.hsm	
3	21	Regular Analysis	HS20\Method\FVOC LoopMode001.hsm	
4	31	Regular Analysis	HS20\Method\FVOC TrapMode001.hsm	

Switching Between Loop Mode and Trap Mode Using Batch Editor

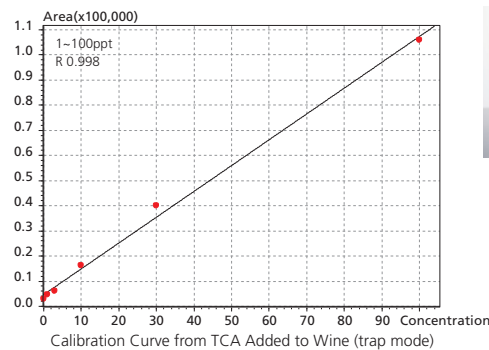


1ppt TCA in Wine (Loop mode)

Area x 4
S/N x 10



1ppt TCA in Wine (Trap mode)

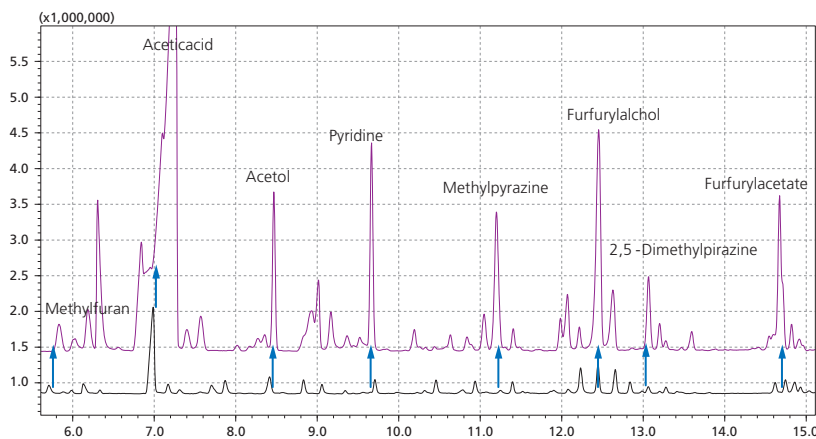


Calibration Curve from TCA Added to Wine (trap mode)



High-Sensitivity Analysis of Fragrance Components in Coffee

In combination with a GCMS, the high-sensitivity electronic cooling trap enables qualitative and quantitative analyses of fragrance components at trace levels undetectable with a conventional headspace sampler.



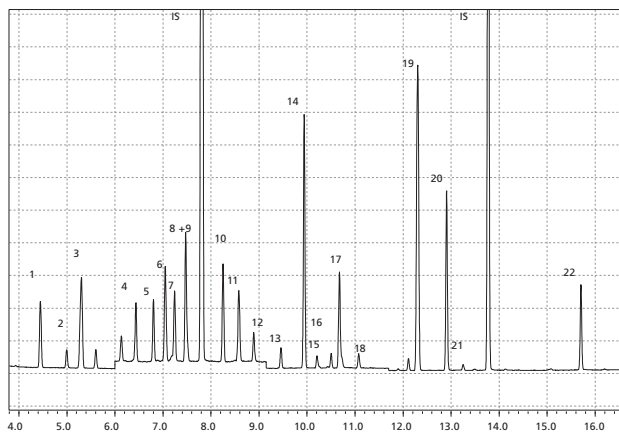
Peak areas are improved 5 to 50 times.



HS-20Trap + GCMS-QP2010 Ultra

Batch Analysis of VOCs in Wastewater

With its high thermal stability and inert sample line, the HS-20 Series can measure VOCs in wastewater with high reproducibility. Carryover is minimal, so the sample tray, which is capable of holding 90 samples, can be effectively utilized.

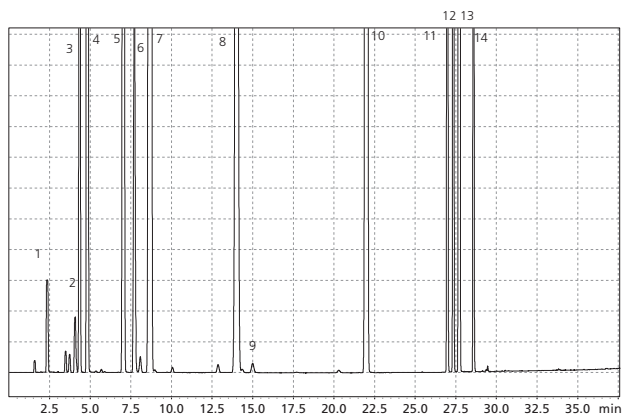


VOC 0.1 ppb reproducibility RSD% (n = 5)

1. 1,1-Dichloroethene	1.8	12 Bromochloroethane	2.0
2 Dichloromethane	3.0	13 cis-1,3-Dichloropropane	1.8
3 trans-1,2-Dichloroethene	1.4	14 Toluene	1.4
4 cis-1,2-Dichloroethene	2.8	15 trans-1,3-Dichloropropane	1.8
5 Chloroform	2.3	16 1,1,2-Trichloroethane	2.9
6 1,1,1-Trichloroethane	1.7	17 Tetrachloroethene	0.8
7 Carbon tetrachloride	2.2	18 Dibromochloromethane	2.1
8 1,2-Dichloroethane	2.7	19 m+p-Xylene	1.7
9 Benzene	0.7	20 o-Xylene	1.4
10 Trichloroethene	1.2	21 Bromoform	2.3
11 1,2-Dichloropropane	3.1	22 1,4-Dichlorobenzene	1.2

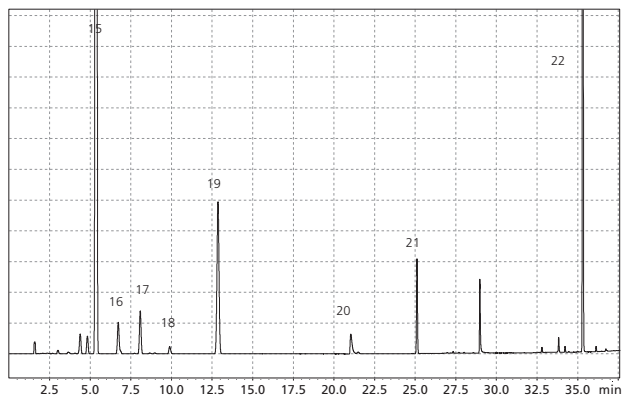
Aqueous Solution of USP467 Class 2A/2B Pharmaceutical Residual Solvents

In combination with a robust GC detector, the system can be used for quality control requiring high quantitative accuracy. Traceability is guaranteed by the all-sample leak check function and the digitized log function.



Reproducibility of USP467 Class 2A/2B Procedure A (Aqueous Solution)

Compound	RSD% (n=20)
2 Acetonitrile	1.1
3 Dichloromethane	1.7
4 trans-1,2-Dichloroethene	2.3
5 cis-1,2-Dichloroethene	1.9
6 THF	0.6
10 Toluene	2.5
11 Chlorobenzene	2.5
18 1,2-Dimethoxyethane	3.1
20 Pyridine	2.6



HS-20 + GC-2010 Plus

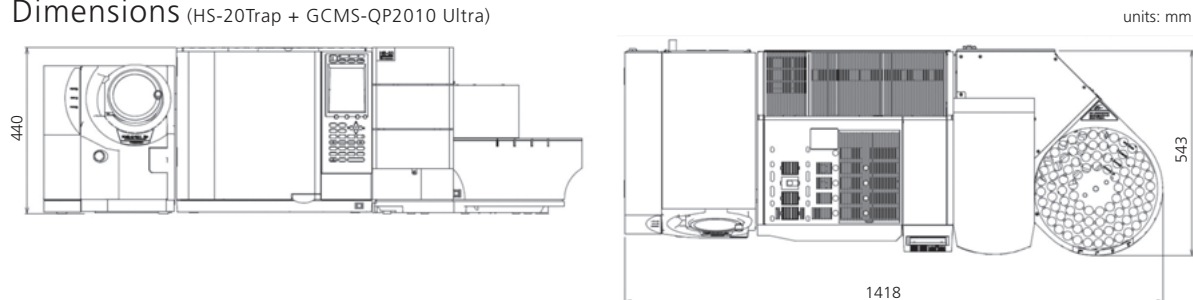
Specifications and Installation Conditions

Model	HS-20	HS-20Trap	HS-20LT
Transfer line	Short (350 °C)	Short (350 °C)	Long (200 °C)
Trap	No	Yes	No



Sample Injection Method	Sulfinert sample loop 1 mL (standard); 0.2 mL, 3 mL (optional) or trap (HS-20Trap)
Number of Vials	90
Vials	Outer dia. 22.5 mm x 79 mm (20 mL); outer dia. 22.5 mm x 46 mm (10 mL); can be combined
Vial Mixing	5 stages max.
Leak Check	All-vial automatic check
Optional Barcode Reader	Optional, can read 6 types of barcodes
Vial Warming Temperature	Room temperature + 10 to 300 °C (Settings are 0 to 300 °C, in 1 °C units, with an accuracy of ± 0.1 °C)
Sample Line Temperature	Room temperature + 10 to 220 °C or 150 to 300 °C (set in 1 °C units, accuracy of ± 0.5 °C) Long transfer line model (HS-20LT): Room temperature + 10 to 220 °C
Transfer Line Temperature	Room temperature + 10 to 350 °C (set in 1 °C units, accuracy of ± 0.5 °C) Long transfer line model (HS-20LT): Room temperature + 10 to 200 °C
Trap	Inner dia. 2 mm x 100 mm, Sulfinert tube Filler TenaxTA (standard), Carboxene + Carboxene (optional)
Trap Cooling Temperature	-30 to 80 °C (set in 1 °C units, accuracy of ± 1 °C) For a sample line at 250 to 300 °C, room temperature - 30 °C For 150 to 250 °C, room temperature - 40 °C For 150 °C or less, room temperature - 50 °C
Trap Heating Temperature	0 to 350 °C (set in 1 °C units, accuracy of ± 1 °C)
Carrier Gas Control	Electronic control via AFC built into GC
Vial Pressurized-Gas Control	Electronic control via APC built into GC
Carrier Gas and Vial Pressurizing Gas	High-purity helium or nitrogen
PC Interface	USB
Control Software	Operates collectively with LabSolutions LC/GC (FDA CFR 21 Part 11 compliant) HSS Control Software is used for GCMS.
Software Operating Environment	Windows XP, Windows Vista, Windows 7 (32/64-bit)
Guaranteed Operating Environment	15 to 30 °C, humidity up to 70 % RH (performance guaranteed at 18 to 28 °C with temperature fluctuations within ± 1.3 °C)
Power Supply	1200 VA max. (HS-20, HS-20LT), 1500 VA max. (HS-20Trap)
Dimensions	W553 mm x H430 mm x D543 mm, excluding PC
Weight	33 kg (HS-20, HS-20LT), 40 kg (HS-20Trap)

Dimensions (HS-20Trap + GCMS-QP2010 Ultra)



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