C180-E094B

SHIMADZU
Excellence in Science

Headspace Sampler

HS-20 NX series

HS-20 NX series

Headspace Sampler

HS-20 NX Trap model

HS-20 NX Loop model

Next Industry Standard

The HS-20, developed as the best solution for volatile component analysis, has been improved and introduced as the NX series. The excellent basic performance and user-friendly design provide a powerful solution for scientists in both research and quality control laboratories.

01
Next Level Performance

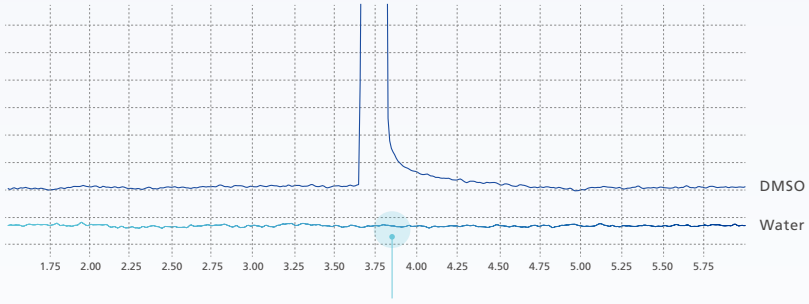
02
Superior Usability

03
Beyond Expectation

Next Level Performance

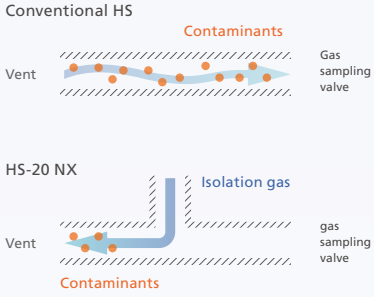
Ultra-low carryover

The HS-20 NX series uses the isolation gas flow to reduce carryover to 1/10 of conventional models. It supports a wide range of chemical species, including high-boiling point compounds and high-polar compounds, and provides reliable analytical results.



The Isolation Gas Flow

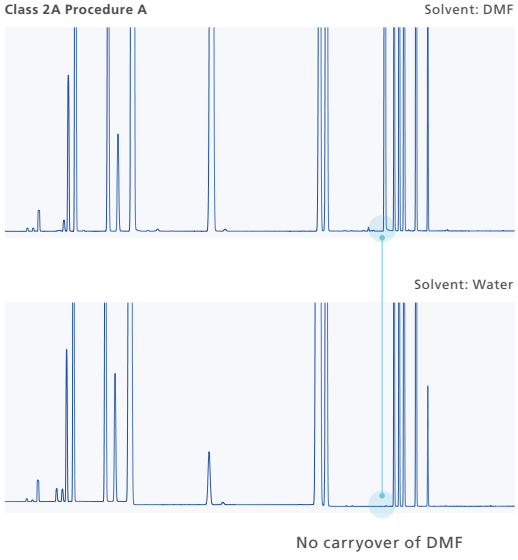
The isolation gas flow prevents sample diffusion from the vent channel, which has been a problem with conventional headspace samplers. (patent pending) Carryover of highly adsorptive compounds is reduced, eliminating the need for repeating blank runs.



Residual Solvents Analysis in Pharmaceuticals

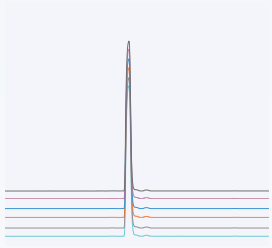
USP <467>

In the residual solvents analysis of medicines, analysis with an aqueous solvent may be performed after analysis with a DMF solvent, but with the HS-20 NX, carryover of DMF is not a problem. HS-20 NX is effective for the analysis of samples with different type of solvents or large concentration differences.



Excellent reproducibility

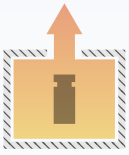
High analysis reproducibility is achieved by the sample vial loading from the lower part of the oven. Shimadzu's unique sample vial delivery system minimizes heat dissipation in the HS oven as the vial enters and leaves the oven, and maintains high temperature stability during repeated analyses.



Ethanol area reproducibility
0.7 % or less (N = 6)

Common HS sampler

Internal heat escapes easily during vial transfer, and oven temperature drops temporarily.

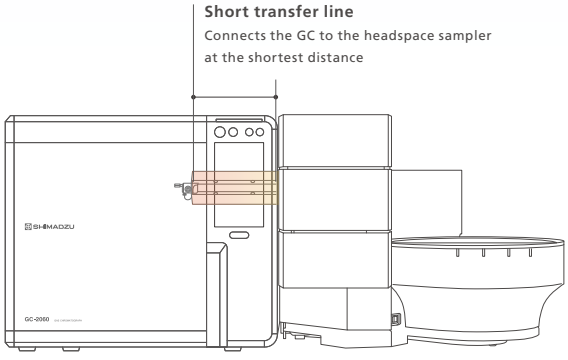


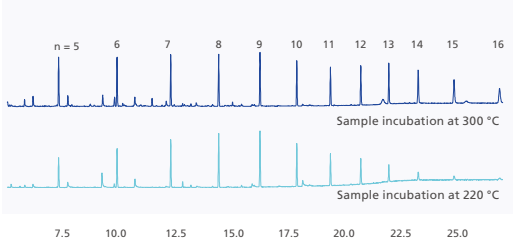
HS-20 NX **(U.S. Patent: No. 8806965)**

If it is transported from the bottom of the oven, the internal heat does not dissipate easily and the stability of the oven temperature is improved.

High temperature capability and short inert flow path

The vial oven and sample line can be set to 300 °C and the transfer line can be set to 350 °C. In addition, the sample path is designed to be inert and at the shortest distance, so that adsorption of analytes, including high-boiling compounds, and peak broadening are suppressed.





Cyclic Siloxane (*m/z* 73) in Resin Outgas at 300 °C
Achieved high recovery rate even for high-boiling point compounds.

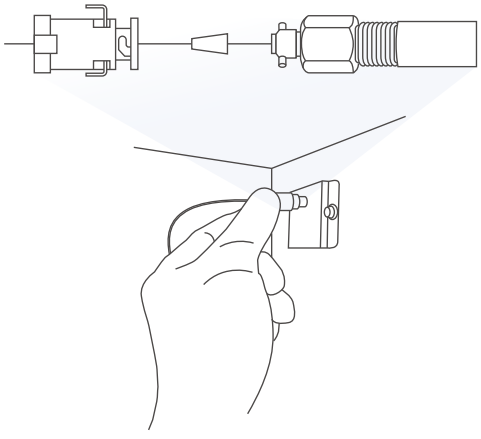
Ready to use alternative carrier gas

The HS-20 NX series with the latest electronic AFC (Advanced Flow Controller) offers highly accurate carrier gas control at constant linear velocity, constant flow and constant pressure modes. It supports the use of nitrogen and hydrogen as alternative carrier gases, and makes it easy to transfer analysis methods.

Trap model

Loop model

Superior Usability



Simplifies the column connection

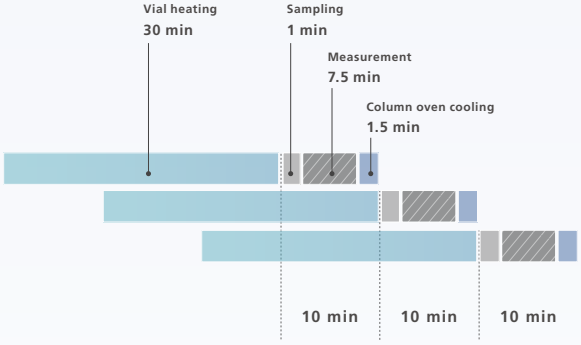
ClickTek™ NX Connector

ClickTek, adopted by Nexis™ GC-2030, has been optimized and applied to the HS-20 NX. ClickTek NX enables anyone to connect columns easily and without tools, simplifying column replacement and routine system maintenance.

Improved lab productivity

Easy access and automatic overlap analysis

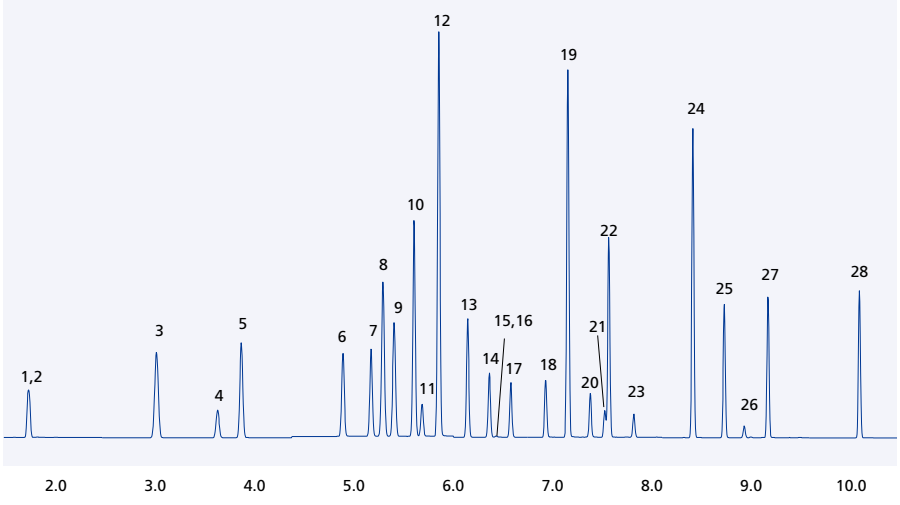
The HS-20 NX features a vial tray for easy access. In addition, up to 12 vials can be kept warm in the HS oven, increasing laboratory productivity with automatic overlap analysis that optimizes the total analysis time, even for methods that require longer vial heating times.



Rapid Analysis of Volatile Organic Compounds (VOC) in Water by HS-GC/MS

25 VOC components in water, including vinyl chloride monomers and 1,4-dioxane, were analyzed simultaneously at high speed. This method requires 30 minutes of vial heating time with a headspace sampler, but with automatic overlapped analysis, up to three samples* per hour can be measured.

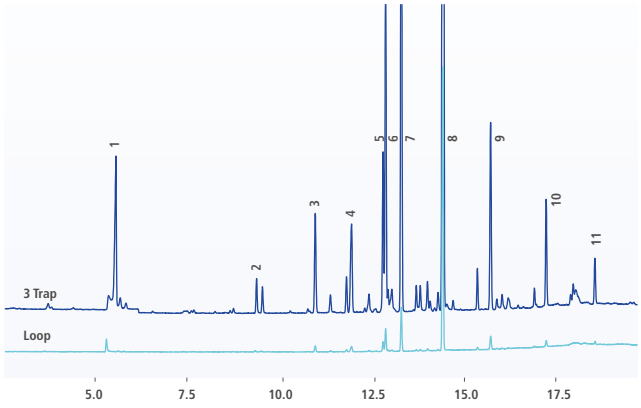
* The vial heating time of the first analysis (30 min) is not overlapped, so up to one sample can be measured in the first hour.



1 Vinyl chloride monomer-d3 (IS)
2 Vinyl chloride monomer
3 1,1-Dichloroethylene
4 Dichloromethane
5 trans-1,2-Dichloroethylene
6 cis-1,2-Dichloroethylene
7 Chloroform
8 1,1,1-Trichloroethane
9 Carbon tetrachloride
10 Benzene
11 1,2-Dichloroethane
12 Fluorobenzene (IS)
13 Trichloroethylene
14 1,2-Dichloropropane
15 1,4-Dioxane-d8 (IS)
16 1,4-Dioxane
17 Bromodichloromethane
18 cis-1,3-Dichloro-1-propene
19 Toluene
20 trans-1,3-Dichloro-1-propene
21 1,1,2-Trichloroethane
22 Tetrachloroethylene
23 Dibromochloromethane
24 m- and p-Xylene
25 o-Xylene
26 Bromoform
27 4-Bromofluorobenzene (IS)
28 p-Dichlorobenzene

Beyond Expectation

Ultra-sensitive analysis



1 Acetic Acid
2 2,3-Butanediol
3 alpha - Pinene
4 beta. - Pinene
5 D-Limonene
6 m-Cymene
7 gamma. - Terpinene
8 Linalool
9 Camphor
10 Cuminaldehyde
11 Geranyl acetate

Trace Fragrance Analysis in Spices by HS-20 NX Trap Mode

In some cases, the HS-20 NX loop model may not be sensitive enough to analyze trace amounts of flavor in food samples like spices. The HS-20 NX trap model can concentrate the analytes in a sample by using some trap materials, which enables ultra-sensitive analysis.

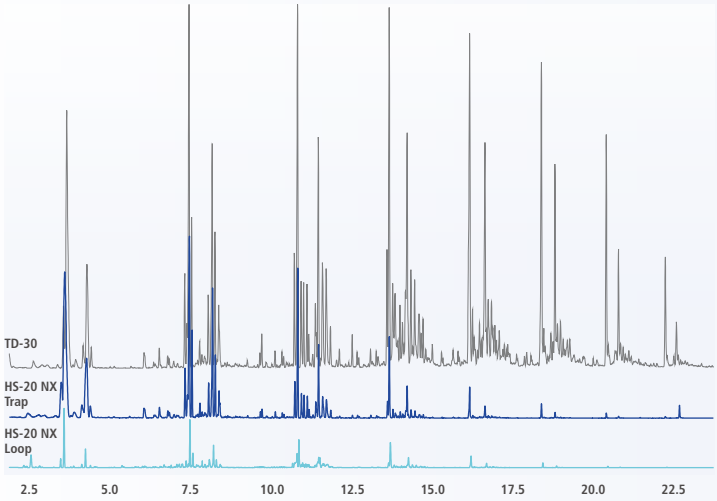
Trap model

Loop model

With the trap mode of the HS-20 trap model, which can concentrate samples, 10 - 100 times more sensitive analysis can be achieved than with the loop mode. The HS-20 trap model also operates in the loop mode, giving users the flexibility to meet multiple analytical requirements.

Analysis of extractables and leachables contained in packages

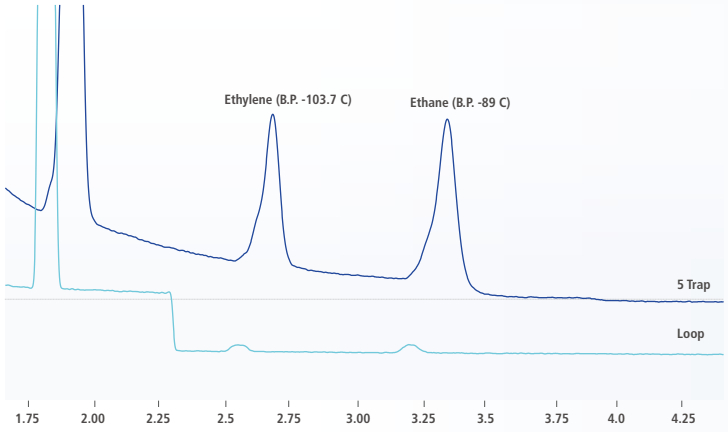
It has been pointed out that there are safety concerns about extractables and leachables contained in pharmaceutical packages and medical devices leaching into human bodies and medicines. Thus, it is required to understand residual solvents and residual monomers contained in polymers. The use of the HS-20 NX trap mode and the Xtra Low Bleed HS septa, which is made of highly heat resistant and clean material, enables the analysis and evaluation of extractables and leachables, an analysis that is difficult with the loop mode.



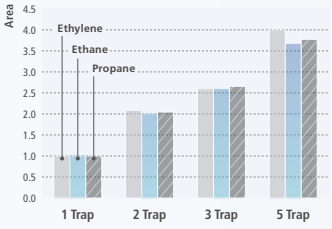
Comparative Analysis of Extracts from Eye Drops Caps
(TD-30 vs HS-20 NX Trap mode vs HS-20 NX Loop mode)

Sample enrichment using an electronic cooling trap

The HS-20 NX Trap model includes an electronic cooling trap. Since the HS-20 NX Trap models can be cooled down to -20 °C or less, it is possible to concentrate and analyze chemicals over a wide boiling range.



Comparison of analysis of 1 ppm of hydrocarbons (loop vs trap x 5)



Trap	Ethylene	Ethane	Propane
X1	1.0	1.0	1.0
X2	2.1	2.0	2.0
X3	2.6	2.6	2.7
X5	4.0	3.7	3.8

Tested and Proven Consumables

CoreFocus
The Smart Choice In Consumables SHIMADZU

Proven quality consumables are critical to getting the right analysis results and minimizing system downtime. Shimadzu offers a wide range of consumables to maximize the performance of GC/GCMS systems.

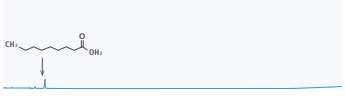
Xtra Low Bleed HS Septa

The Xtra Low Bleed HS septa, which has high heat resistance, allows for high-temperature applications that were previously difficult with headspace samplers because it does not elute much bleed components even at 300 °C.

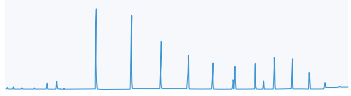
Analysis Comparison of Xtra Low Bleed HS Septa and Septa A

Xtra Low Bleed HS Septa Blank 300 °C

Septa A Blank 300 °C



Xtra Low Bleed HS Septa Acetone 300 °C



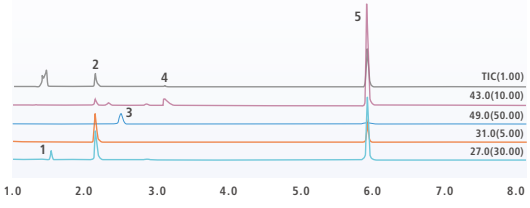
Septa A Acetone 300 °C

HS vial

Xtra Low Bleed HS septa

Xtra Life HS Needle, Anti-Corrosion

In the analysis of blood that has an added strong acid, corrosion of the HS needle causes not only deterioration of analysis accuracy but also risk of unexpected system downtime due to needle clogging. The use of acid-resistant Xtra Life HS needles reduces corrosion and enables long-term stable analysis.



1 hydrogen cyanide
2 Ethanol
3 2-propanol-d8 (ISTD)
4 hydrogen azide
5 2-Methyl -1 propanol (ISTD)

Analysis of Volatile Toxins in the Blood

Even blood samples prone to needle corrosion can be analyzed with confidence. Simultaneous analysis of alcohol and volatile toxins (Cyanide, azide, methanol, ethyl acetate, toluene) in blood is streamlined by using the Forensic Toxic Database.

HS-20 LT (Long transfer line model)

The HS-20 LT can be connected to the GC-2014 and GC-2025 series to create a cost-effective system.

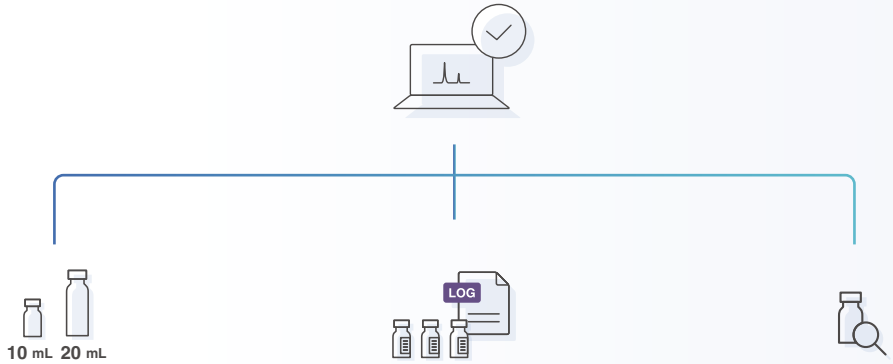
Data management

Compliant with ER/ES Guidelines and Data Integrity

In some cases, data integrity can be compromised due to the manipulation or replacement of data. LabSolutions™ and GCMSsolution™, Shimadzu CDS (Chromatography Data Systems), have a variety of functions to ensure compliance with FDA 21 CFR Part 11 and Japanese Ministry of Health, Labour and Welfare guidelines on electronic records and electronic signatures.

Centralized Management of Data and User Information

Data and user information are managed on a database with restrictions on data file deletion and a version number management function that ensures safe storage. Furthermore, fine-grained division of operational restrictions allows optimum user management based on role, such as system administrator, analysis operator, etc. LabSolutions records the access status of the system, changes to data and methods, operations performed during analysis and re-analysis, changes to system settings, etc.



Auto recognition of vial size

10 mL and 20 mL vials can be mixed in the sample tray without any special attachment for multiple analyses. All types of vials, such as crimp/screw type, aluminum/steel cap, etc., are supported.*

* Details are described in specification sheet of HS-20 NX series (C180-E095).

Data log

The optional bar code reader is available to prevent human error in the input of sample information. In addition, even if the vial is misplaced, the system will operate according to pre-configured behavior (Skip/Stop) and traceability will be accurately recorded in the analysis log.

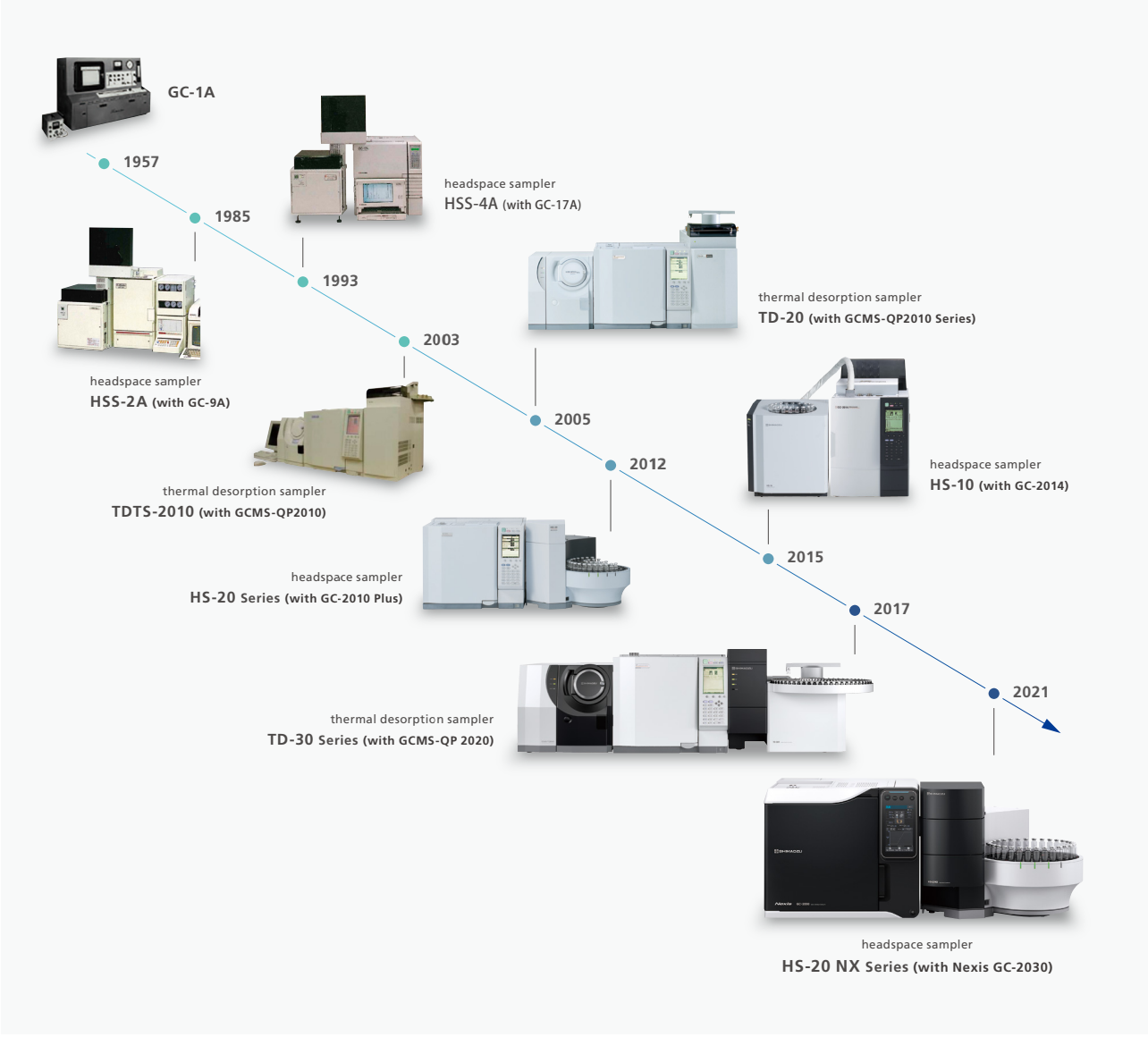
Automatic checking function

It automatically checks for vial leaks on a per-sample basis and can skip vials that detect leaks, so you don't waste time at night or on weekends. It also has a function to detect needle clogging by checking the resistance of the needle to prevent analysis failure.

Support for third-party software

Third-party software such as Empower™, OpenLab™ CDS, and Thermo Scientific™ Chromeleon™ Chromatography Data System software can also take advantage of the advanced features of HS-20 NX through control drivers.

Timeline of Shimadzu Pretreatment Equipment (Headspace sampler, thermal desorption)



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