

Ultra High Performance Liquid Chromatograph

Nexera XS inert





SCL-40 SYSTEM CONTROLLER

CONTROL ERROR

DGU-405 DEGASSING UNIT

SPD-M40 PHOTO DIODE ARRAY DETECTOR

0.3000ml MAX 105.0
79.4MPa MIN 0.0
PUMP COND RUN PURGE

LC-40D XSI SOLVENT DELIVERY MODULE

SET ACTUAL T. MAX
25 25.0 90
COLUMN RUN

CTO-40S COLUMN OVEN

SHIMADZU

SHIMADZU

SHIMADZU

SHIMADZU

EXPERIENCE NEWFOUND CLARITY

The potential adsorption of an analyte onto wetted surfaces of UHPLC instruments poses some critical challenges when analyzing biomolecules. While elevated pressure tolerance is required to achieve optimal chromatographic separation when using small particle size columns, the inertness of the wetted surfaces is also of the utmost importance, as is resistance to corrosion due to the use of mobile phases with high salt concentrations and extreme pH values. The Nexera XS inert system offers the ideal solution for the separation of biomolecules by combining the elevated pressure tolerance of a UHPLC system with complete inertness of the sample flow path, ensured by the absence of wetted metal surfaces and offering ultra-high resistance to corrosion.

Unconstrained Recovery and Sensitivity

Reduces sample loss due to adsorption to metal and achieves excellent sensitivity.

Clear Resolution without Restrictions

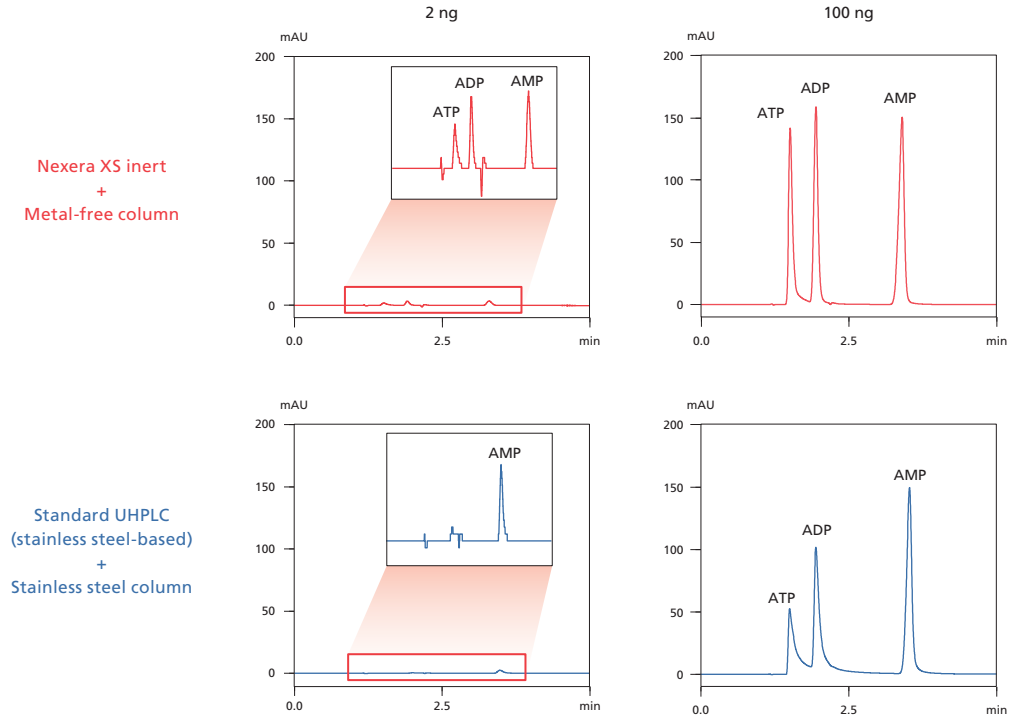
Improves peak shape and achieves excellent chromatographic separation.

Assured Reliability and Reproducibility

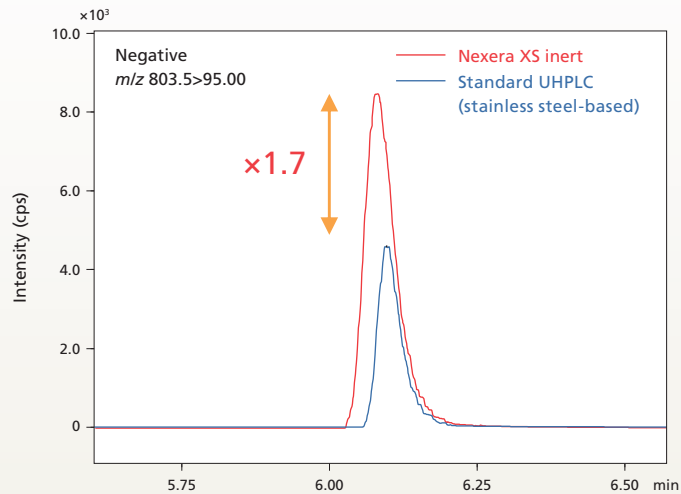
Reliable data for metal-adsorbing compounds with high reproducibility.

Unconstrained Recovery and Sensitivity

For the quantitative analysis of biomolecules, particularly when high sensitivity is required, the adsorption of the target compound to a metal surface can result in a dramatic decrease in sensitivity. The Nexera XS inert system prevents peak tailing and sensitivity loss by eliminating adsorption of proteins, nucleic acids, and other components to metal surfaces. As a result, reliable and accurate quantitation is possible, even for low-concentration samples.



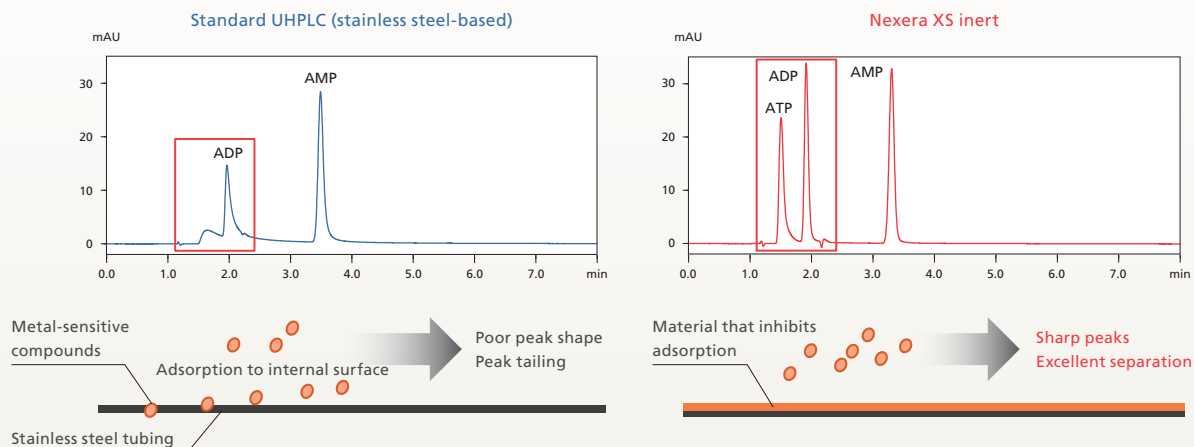
The Nexera XS inert can detect oligonucleic acids with a strong tendency of metal adsorption.





Clear Resolution without Restrictions

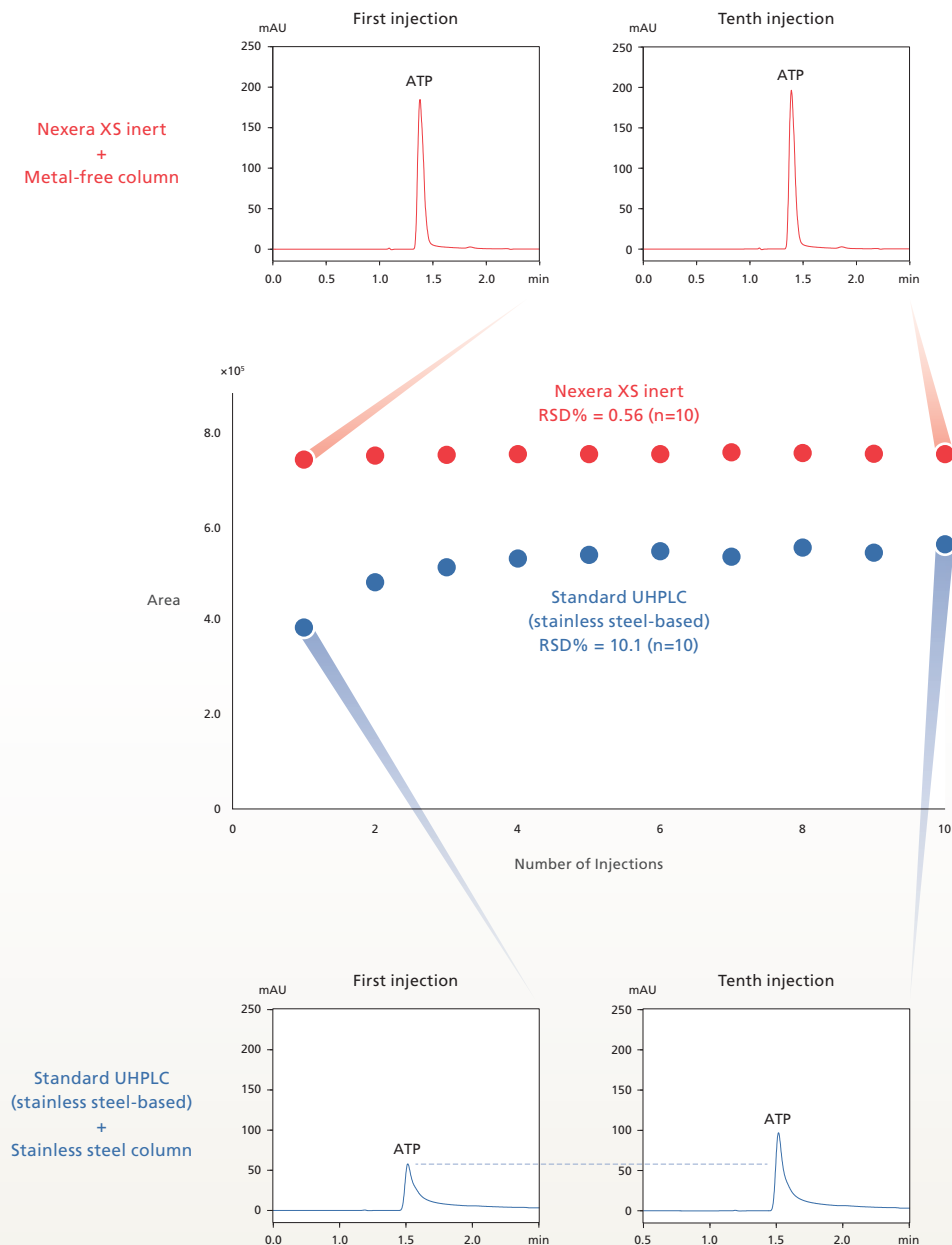
The Nexera XS inert system is equipped with unique technology that ensures the complete inertness of the sample flow path. The system provides excellent peak shape and unsurpassed chromatographic separation by effectively inhibiting the adsorption of target compounds to internal surfaces.



Assured Reliability and Reproducibility

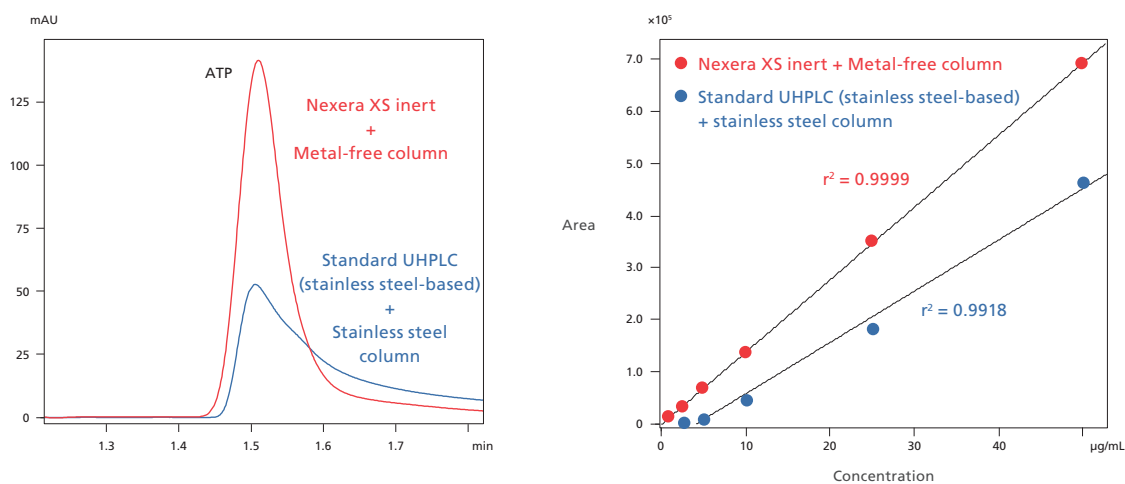
Consistent Analysis Reproducibility

In order to reduce the effect of adsorption of metal-sensitive compounds, a system is often passivated by repeatedly injecting samples that contain the target compounds before starting data acquisition. However, this approach not only wastes valuable samples and time, but can make it extremely difficult to acquire reliable data due to changes in the state of passivation during continuous analysis. Nexera XS inert systems eliminate the need for the preliminary passivation and provide highly reliable data from the first injection and throughout the analytical session.



Improves Quantitative Analysis Performance

Adsorption of target compounds can be especially detrimental in the low-concentration region, and can worsen calibration curve linearity. The Nexera XS inert achieves a wider dynamic range by strongly increasing the quantitative accuracy and detection of low-concentration samples.



QC Sample Quantitative Analysis Results (stainless steel-based standard UHPLC)

QC Sample	Spiked Conc. (µg/mL)	Intra-Assay (n = 6)		
		Measured Conc. (µg/mL)	Accuracy (%)	Precision (%)
Low	2	4.53	226	1.6
Medium	20	18.4	91.9	5.7
High	45	46.4	103	3.3

QC Sample Quantitative Analysis Results (Nexera XS inert)

QC Sample	Spiked Conc. (µg/mL)	Intra-Assay (n = 6)		
		Measured Conc. (µg/mL)	Accuracy (%)	Precision (%)
Low	2	2.01	101	0.78
Medium	20	20.4	102	0.35
High	45	45.0	100	0.79

Full-range of Bio-inert UHPLC Capabilities

The Nexera XS inert system eliminates the risk of sample adsorption or surface corrosion, while still providing all the exceptional features of the Nexera series, making it the perfect solution for a wide variety of applications.



Nexera XS inert combines excellent resistance to corrosion with the inertness of surfaces in contact with the sample and mobile phases. The system provides excellent chromatographic separation performances for a wide range of applications.

System Controller

SCL-40, CBM-40/40lite

Used to coordinate actions of the overall system, this controller offers intuitive operation that minimizes the stress involved in operating the system, from startup to shutdown.

Detector

SPD-40/40V/M40

Inert type cells for UHPLC analysis eliminate the risk of adsorption on the detector. Low-diffusion cell, which has 5 mm of optical path length, can also be selected.

Solvent Delivery Unit

LC-40D XSi

Designed with corrosion-resistant non-stainless steel materials, it offers rugged, low-pulsation performance, advanced AI features and solvent blending capabilities. (optional).

Autosampler

SIL-40C XSi

This high-performance autosampler features non-metal materials for all surfaces that contact liquids. That inhibits metal-adsorption of biomolecules.

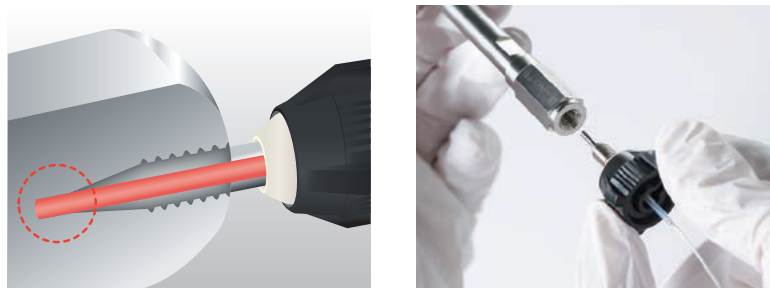
UHPLC Inert Switching Valve

FCV-0206H2i/FCV-0607H2i

Designed with adsorption-inhibiting materials for all wetted surfaces (refer to p. 9).

Finger-Tightened Fittings for Simple and Secure Connections

Nexera XS inert systems feature tubing connections with unique finger-tightened fittings. They can achieve joints with up to 105 MPa of pressure capacity by finger-tightening and without creating any dead volume.

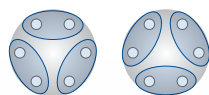


Flow Channel Switching Valves for Metal-absorbing Compounds

All valves used in Nexera XS inert systems are designed to inhibit metal adsorption. That ensures worry-free switching between multiple columns for method development or even for trap-and-elute analysis without being concerned about adsorption.

FCV-0206H2i

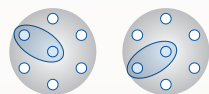
2-Position/6-Port Valve



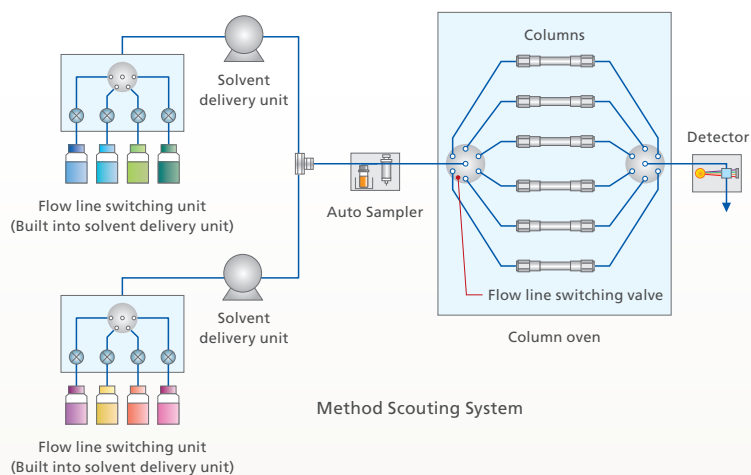
Used to automatically switch between columns and detectors.

FCV-0607H2i

6-Position/7-Port Valve



Used to switch between up to six columns for method development.



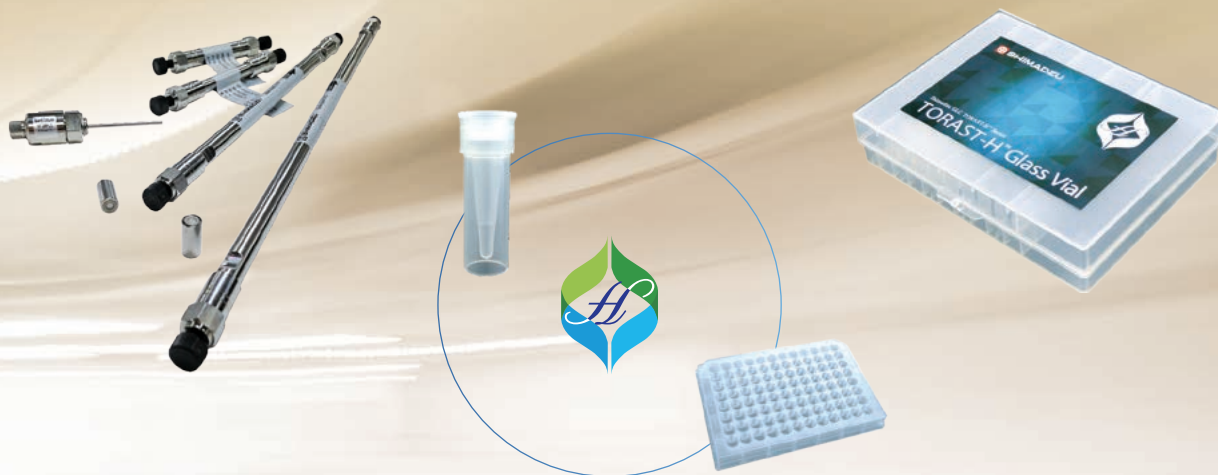
Mobile Phase pH Monitor: pHM-40 (optional)

In the case of Ion-exchange chromatography or size-exclusion chromatography used for the analysis of proteins or other biomolecules, the mobile phase pH can strongly affect chromatographic separation. The pH monitor pHM-40 continuously monitors the pH of mobile phases to identify any changes in mobile phase pH in real time.



Comprehensive Solution for Increasing Bioseparation Efficiency

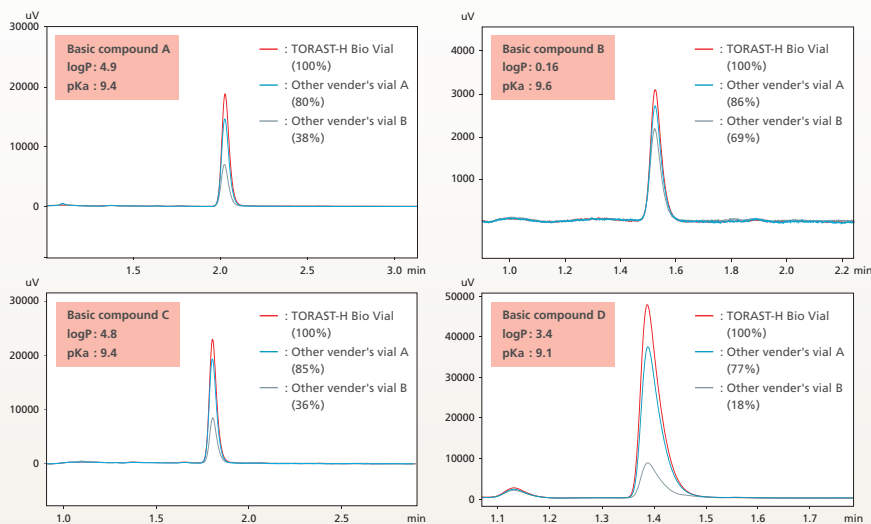
Adsorption of biomolecules can occur not only within instruments, but also in vials, columns, and other equipment used during sample preparation. Shimadzu offers support for resolving such issues with products that feature unique technologies for inhibiting adsorption.



State-of-the-Art Technology for Inhibiting Adsorption and Increasing Recovery Rates

TORAST-H Bio Vials

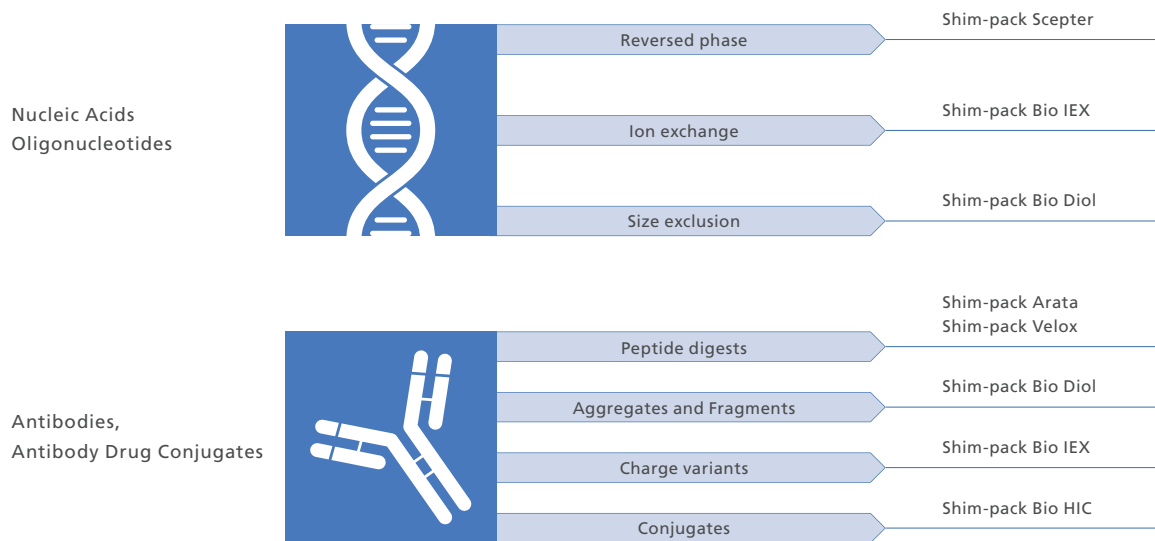
Biomolecules are most likely to adsorb to vials they contact the longest. TORAST-H Bio vials offer exceptional resistance to adsorption by biomolecules, which helps maximize recovery rates from valuable samples and increase sensitivity for analyzing trace components.



Selecting Analytical Columns Based on Target Components and Objectives

Shim-pack™ Series Columns

Analyzing biomolecules, such as proteins and nucleic acids, requires using columns intended for a variety of separation modes. In particular, samples sensitive to metal ions require a column that is optimized to reduce adsorption. Shimadzu offers columns optimized for a wide variety of molecules.

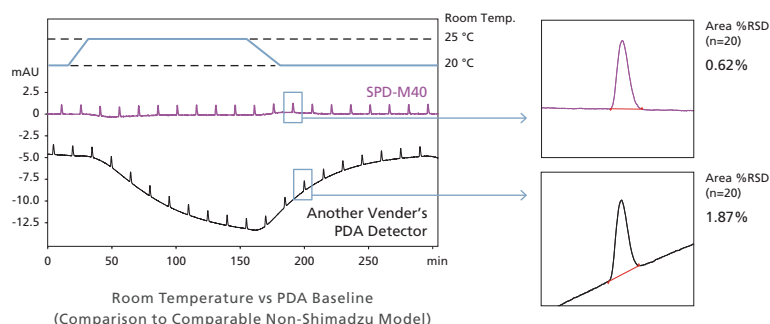


Nexera Series Features for Assisting Analytical Operations

The same outstanding instrument performance capabilities offered by Nexera series systems are also available in Nexera XS inert systems. For a more advanced analysis, Nexera XS inert can be used with Analytical Intelligence technology for automatic analysis.

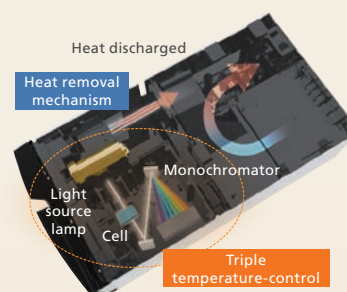
Stable Baseline

Baseline fluctuations can affect peak area calculations, reducing the accuracy of quantitative results. The SPD-M40 photodiode array detector's "Advanced TC-Optics" function adjusts the temperature of the flow cell, lamp, and optical system to lessen the impact of external temperature changes. Noise and drift have also been reduced by 40% compared to the previous model.



Advanced TC-Optics (SPD-M40) (patented)

With the SPD-M40, in addition to conventional cell temperature regulation, the lamp and spectrometer, which are responsible for thermal effects on absorbance, are also thermally regulated, further reducing baseline fluctuations caused by the light source.

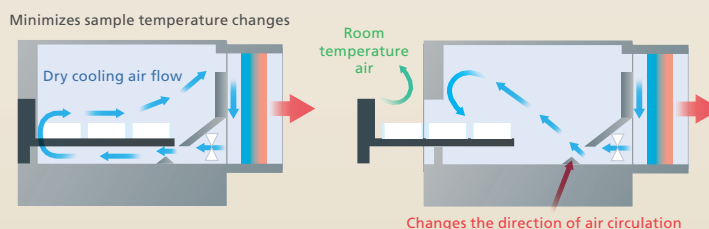


Proprietary Structure for Ensuring Sample Cooling

SIL-40 series autosamplers include a direct-access function that helps improve analytical operating efficiency by allowing additional sample vials or MTP plates to be inserted even during data acquisition. A dry air flow control system ensures reliable sample cooling and relieves operators from the inconvenience of dealing with condensation water.

Dry Air Flow Control (patented)

The sample rack serves the role of controlling the flow of cooling air inside the autosampler. Even if the sample rack is pulled out, ingress of external air is prevented to inhibit the formation of condensation inside the autosampler or any sharp increases in sample temperature.



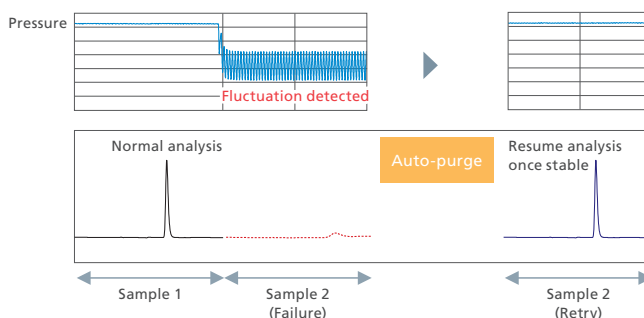
Auto-Diagnostics and Recovery



In rare cases, air bubbles can form in the mobile phase and cause problems if inhaled into the pump. Nexera has the ability to monitor baseline changes and pressure fluctuations to check for abnormalities. When it detects an unusual fluctuation, it can automatically pause the analysis, purge the flow path, and restart analysis once it has confirmed recovery to normal pressure.

Auto-Diagnostics for Trapped Bubbles (patented)

If an air bubble becomes trapped in the pump head, it causes an abrupt drop in pressure, after which periodic pressure changes (pulsations) will occur. This can be detected using Shimadzu's proprietary bubble detection algorithm which assesses these distinctive pressure fluctuations caused by trapped bubbles to distinguish them from any expected changes in pressure.



Mobile Phase Levels Measured in Real Time



Reservoir tray weight sensors (optional) can be used to monitor the volume of the mobile phase or autosampler rinse solution in up to twelve* containers. The containers can also be checked remotely from a smart device. You will no longer need to worry about running out of mobile phase mid-analysis, because the device will notify you before starting the run if the volume remaining is too low.

*Up to 12 solutions can be monitored using 1-liter containers or up to 4 solutions using larger containers (2-liter or up to 5-liter containers).

Comparing Solvent Volume Measurements with Predicted Consumption (patented)

The required mobile phase volume is predicted at the start of analysis from the weight sensor's measurement data, the instrument configuration information (the mobile phase used and the rinsing liquid configuration), and the analysis method. If a shortage is expected, the user will be notified.



Monitoring Levels Even from Outside the Laboratory



- Automated support functions utilizing digital technologies, such as M2M, IoT, and Artificial Intelligence (AI), that enable higher productivity and maximum reliability.
- Allows a system to monitor and diagnose itself, handle any issues during data acquisition without user input, and automatically behave as if it were operated by an expert.
- Supports the acquisition of high quality, reproducible data regardless of an operator's skill level for both routine and demanding applications.

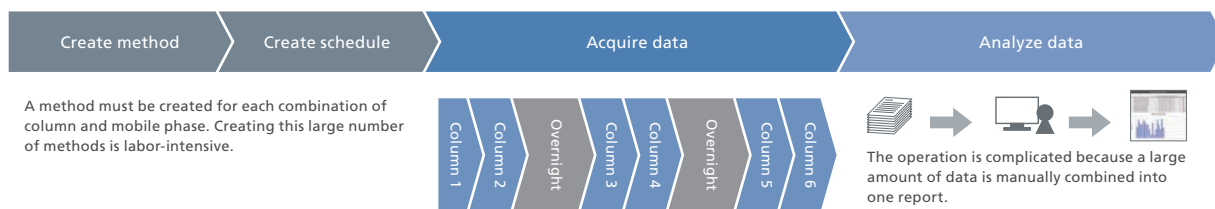
Quickest Way to Results

Automates Development of Analytical Conditions

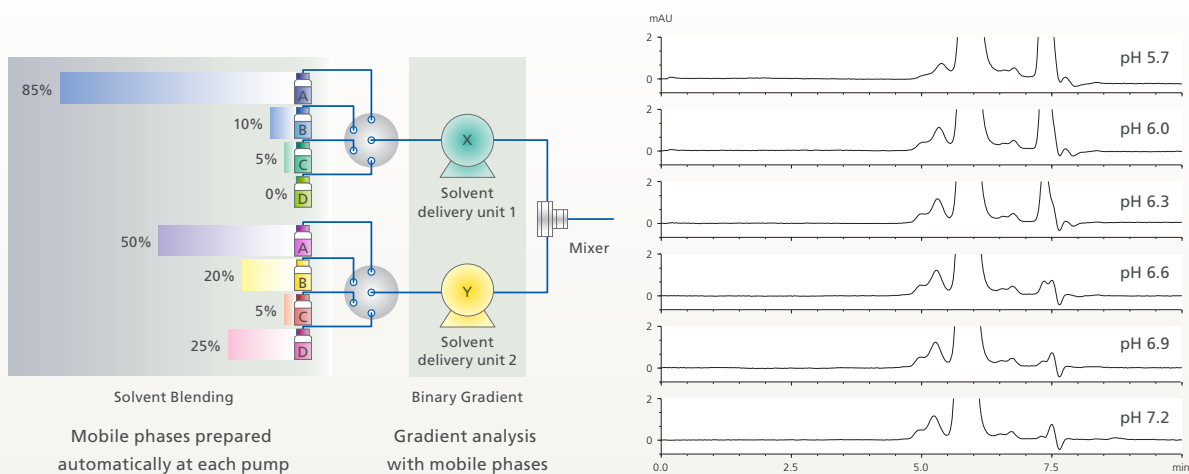
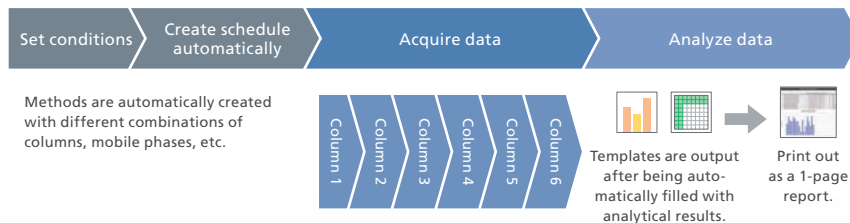
Method Scouting

The process of considering which analytical conditions to specify for LC separation requires evaluating a huge number of possible combinations of columns, mobile phases, column temperatures, and other factors, which can be taxing on analytical personnel. The Nexera method scouting system offers functionality for automatically switching between multiple mobile phase conditions and columns for analysis. Consequently, it can be used to develop methods more efficiently by automating the process of optimizing mobile phase pH, salt concentration, or other analytical condition settings.

Previous Method



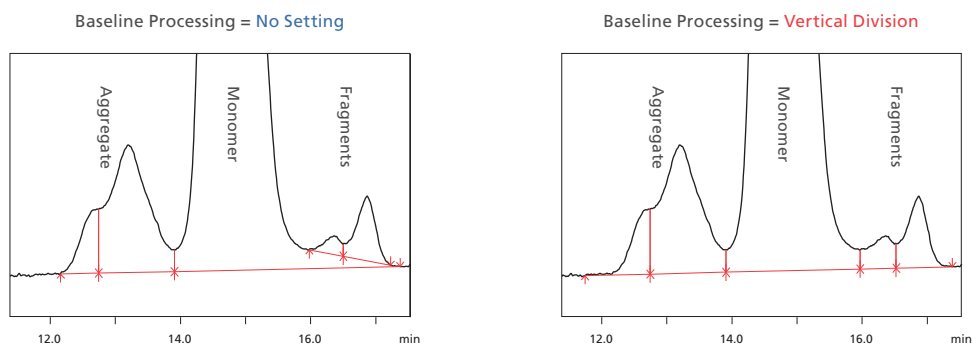
Method Scouting System + LabSolutions MD



Unique Functionality Reduces Data Analysis Work

i-PeakFinder™

The process of identifying peaks obscured by baseline undulations or noise, identifying shoulder peaks with inadequate separation, and so on, can be very tedious and produce results that vary depending on skill level. Shimadzu's unique i-PeakFinder peak integration algorithm is perfect for accurately detecting peaks in troublesome chromatograms.



Carefully Selected Functionality for Supporting Data Analysis

LabSolutions Insight™ Software for LC/MS Data Analysis

This dedicated LC/MS analysis software features functionality that provides powerful support for multiple-component and multi-sample data analysis, such as functionality for flagging, filtering, and peak comparison.



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