

High Performance Liquid Chromatograph

Nexera lite inert



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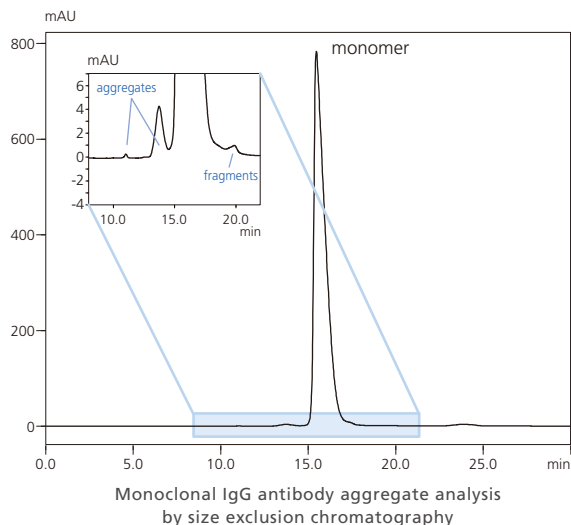
The analysis of proteins such as antibody drugs requires careful operation because a high-salt mobile phase sometimes corrodes the system. In addition, the adsorption of proteins to metal surfaces often results in poor chromatographic performance.

Nexera lite inert is a robust HPLC system that eliminates the risk of corrosion by high-salt mobile phases and sample adsorption onto metal surfaces. It improves the data quality of protein analysis in biological samples with superior reproducibility, without any special considerations for stable and long-term use.



Improved Data Reliability by Preventing System Corrosion by Halogenic Salt

Aggregates of antibody drugs show immunogenicity and cause a decrease in purification efficiency and production. Therefore, an aggregation test is one of the most critical evaluations when manufacturing biopharmaceuticals and controlling their quality. However, a metal-free LC system is required for good repeatability over a long time due to high-concentration, salt-containing mobile phases such as Sodium chloride. With no metal material in the flow path, Nexera lite inert provides stable aggregate assay results with good repeatability.



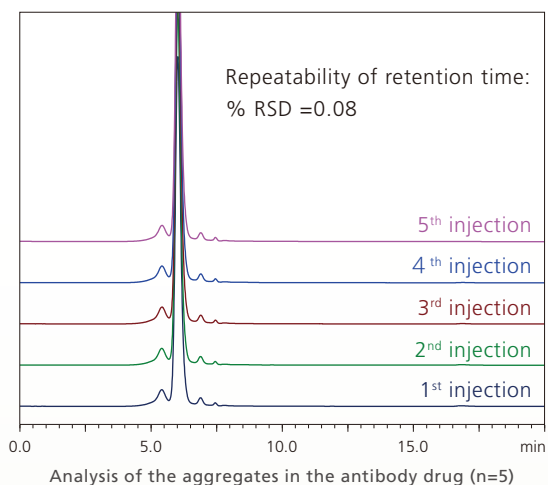
Analytical Conditions

Mobile phase: 0.2 mol/L Potassium phosphate buffer containing 0.25 mol/L Potassium chloride (pH 6.2)
Flow rate: 0.5 mL/min
Column: TSKgel G3000SWXL (300 mmx7.8 mm I.D., 5 µm)
Column temp.: Ambient
Detection: UV, 280 nm



Superior Retention Time Stability by Highly Accurate Solvent Delivery

Thanks to the outstanding flow-rate stability, the Nexera lite inert provides excellent retention time repeatability.



Analytical Conditions

Mobile phase: 0.1 mol/L Potassium phosphate buffer (pH 7.0) containing 0.2 mol/L Sodium chloride aq.
Flow Rate: 0.5 mL/min
Column: Shim-pack Bio Diol (300 mmx4.6 mm I.D., 5 µm)
Column temp.: 25°C
Detection: UV, 280 nm

Real-Time Monitoring of Mobile Phase pH

In ion exchange or size exclusion chromatography, the pH of the mobile phase sometimes affects the separation of compounds. The pH Monitor, pHM-40, continuously monitors and records the pH of the mobile phase. The pH and detector chromatograms are saved within the same data file and can be overlapped, ensuring efficient data traceability.



Comprehensive Solution for Increasing Bioseparation Efficiency

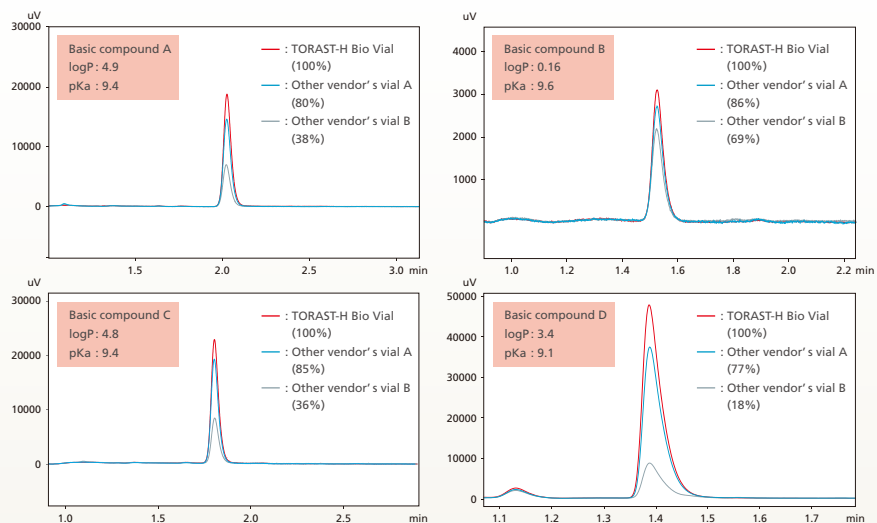
Adsorption of biomolecules can occur not only within instruments, but also in vials, columns, and other equipment used during sample preparation. Shimadzu offers support for resolving such issues with products that feature unique technologies for inhibiting adsorption.



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

TORAST™-H Bio Vial

Compounds 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.

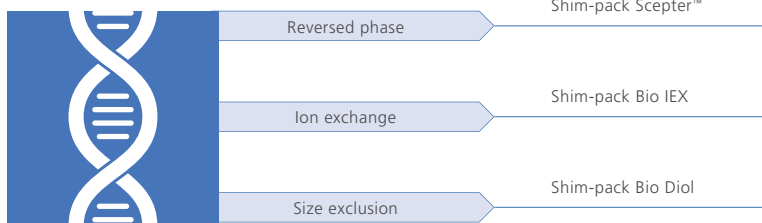


Selecting Analytical Columns Based on Target Components and Objectives

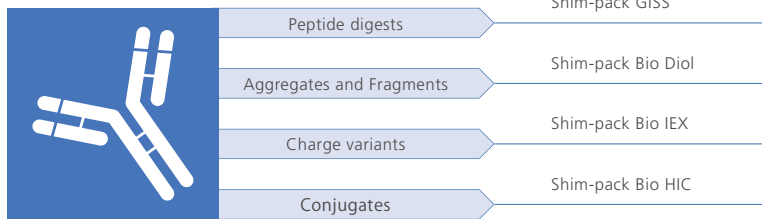
Shim-pack™ Series Columns

Shimadzu offers columns optimized for variety of separation modes to analyze biomolecules, such as proteins, peptides and nucleic acids.

**Nucleic Acids
Oligonucleotides**



**Proteins
Antibodies,
Antibody Drug Conjugates**



Specifications

System Controllers



SCL-40



CBM-40

	SCL-40	CBM-40	CBM-40lite
Monitors	Touch panel LabSolutions™ Web monitor	LabSolutions Web monitor	LabSolutions Web monitor
Connectable unit	Solvent delivery unit: Max. 4, Autosampler: 1, Column oven: Max. 4, Detector: Max. 2, etc.		
Number of connectable units	8 (Using option: 12)		4 (Excluding built-in solvent delivery unit)
Event input/output	Input: 1, output: 2		
Analog board	Up to 2 channels (option)	Up to 1 channel (option)	—
Communication	Ethernet		
Reservoir tray	Built-in	—	—
Dimensions [mm], weight	W 260 × D 500 × H 140, 6 kg	W 260 × D 500 × H 72, 5 kg	—
Operating temperature range	4 to 35 °C		
Power supply	AC 100 to 240 V, 50 VA, 50/60 Hz		Supplied from solvent delivery unit

Solvent Delivery Unit



LC-40i

	LC-40i
Pumping method	Serial-type double plunger
Allowable maximum pressure	Water: 30 MPa (≤ 4.0000 mL/min) Organic solvents: 22MPa (≤ 4.0000 mL/min) Water and Organic Solvents: 15 MPa (4.0001 to 5.0000 mL/min)
Flow rate setting range	0.0001 to 5.0000 mL/min
Flow rate accuracy	±2% or ±2 µL/min Whichever is greater (Specified conditions)
Flow rate precision	≤ 0.06% RSD or 0.02 minSD Whichever is greater
Gradient mode	High-pressure gradient (2 or 3 solvents) Low-pressure gradient (4 solvents)
Gradient range of set concentrations	0 to 100% (0.1% step)
Gradient concentration accuracy	HPGE: ±1.0% (1 mL/min, 10 MPa, water / caffeine aq.) LPGE: ±1.0% (1 mL/min, 10 MPa, water / caffeine aq.)
Wetted materials	PEEK, ruby, sapphire, Perfluoroelastomer, high molecular weight polyethylene
Available pH range	1 to 14
Automatic rinsing kit	Optional
Degassing unit	1 unit connectable
Dimensions [mm], weight	W 260 × D 500 × H 140 mm, 10 kg
Operating temperature range	4 to 35°C
Power supply	AC 100V to 240V, 150 VA, 50/60 Hz

Degassing Units



DGU-403

	DGU-403	DGU-405
Number of degassed solvents	3	5
Wetted materials	PEEK, PTFE	
Degassed flow line capacity	400 µL/1 line	
Dimensions [mm], weight	W 260 × D 500 × H 72, 4 kg	
Operating temperature range	4 to 35 °C	
Power supply	Supplied from solvent delivery unit	

Autosamplers



SIL-20AC

	SIL-20AC (with inert kit)	SIL-20A (with inert kit)
Injection method	Total-volume injection, Variable injection volume (No sample loss by injection)	
Allowable maximum pressure	20 MPa	
Injection volume	0.1 to 50 μ L (standard), 0.1 to 2000 μ L (optional) (0.1 to 0.9 μ L : 0.1 μ L step, 1 to 2000 μ L : 1 μ L step)	
Injection volume accuracy	$\leq \pm 1\%$ (50 μ L injection, n=10)	
Samples for processing	175 (1 mL sample vial), 105 (1.5 mL sample vial), 50 (4mL sample vial) 192 (microtiter plate 96 well \times 2 plates), 768 (microtiter plate 384 well \times 2 plates)	
Injection volume repeatability	RSD $\leq 0.3\%$ (10 μ L injection)	
Carryover	$\leq 0.005\%$ (under specified conditions)	
Sample cooler	Standard equipment	—
Sample cooler temperature accuracy	C model : ± 3 $^{\circ}$ C (microtiter plate and deep well plate cannot be cooled $\leq \pm 6$ $^{\circ}$ C, 1 $^{\circ}$ C.)	—
Wetted materials	PEEK, PEEK blend, Ceramic	
Available pH range	1 to 14	
Dimensions [mm], weight	W 260 \times D 500 \times H 415 mm, 27 kg	W 260 \times D 509 \times H 415 mm, 30 kg
Operating temperature range	4 to 35 $^{\circ}$ C	
Power supply	AC 100 to 240 V, 180 VA, 50/60 Hz	

Column Ovens



CTO-40C



CTO-40S

	CTO-40C	CTO-40S
Temperature control type	Forced air circulation	
Cooling method	Electronic cooling	
Temperature control range	Room temperature -10 $^{\circ}$ C to 100 $^{\circ}$ C	Room temperature -10 $^{\circ}$ C to 85 $^{\circ}$ C
Temperature accuracy	± 0.5 $^{\circ}$ C	± 0.8 $^{\circ}$ C
Temperature precision	± 0.05 $^{\circ}$ C	± 0.1 $^{\circ}$ C
Containable column size and number	Up to 250 mm L. column \times 6 or 300 mm L. column \times 3	Up to 100 mm L. column \times 6 or 300 mm L. column \times 3
Dimensions [mm], weight	W 260 \times D 500 \times H 415, 21 kg	W 130 \times D 500 \times H 553, 15 kg
Operating temperature range	4 to 35 $^{\circ}$ C	
Power supply	AC 100 to 120 V / 220 to 240 V (Automatic switching), 400 VA, 50/60 Hz	AC 100 to 240 V, 300 VA, 50/60 Hz

UV-Vis Detectors



SPD-40V

	SPD-40	SPD-40V
Light source	Deuterium (D ₂) lamp	Deuterium (D ₂) lamp, tungsten lamp
Wavelength range	190 to 700 nm	190 to 1000 nm
Bandwidth	8 nm	
Wavelength accuracy	$\leq \pm 1$ nm	
Wavelength repeatability	$\leq \pm 0.1$ nm	
Drift*	$\leq 0.1 \times 10^{-3}$ AU/h (under specified conditions, typically)	
Noise*	$\leq 5.0 \times 10^{-6}$ AU (under specified conditions)	
Linearity*	2.5 AU (under specified conditions, typically)	
Recommended flow cell	Inert cell (optical path length: 10 mm, cell volume: 12 μ L, equipped with temperature control function) Materials of wetted parts: PEEK, PFA, quartz	
Sampling rate	Max. 100 Hz (Single wavelength mode)	
Cell temperature control range	19 to 50 $^{\circ}$ C, 1 $^{\circ}$ C step	
Optional flow cell	UHPLC inert cell (optical path length: 10 mm, cell volume: 8 μ L, equipped with temperature control function) Low-diffusion inert cell (optical path length: 5 mm, cell volume: 2.5 μ L, equipped with temperature control function) Inert cell (optical path length: 10 mm, cell volume: 12 μ L, equipped with temperature control function)	
Available pH range	1 to 13 (Cell quartz might be damaged by a mobile phase of pH>10.)	
Dimensions [mm], weight	W 260 \times D 500 \times H 140 mm, 11 kg	
Operating temperature range	4 to 35 $^{\circ}$ C	
Power supply	AC 100 to 240 V, 150 VA, 50/60 Hz	

*when using inert flow cell for UHPLC analysis



SPD-M40

PDA Detector

	SPD-M40
Light source	Deuterium (D ₂) lamp, tungsten lamp
Number of diode elements	1024
Wavelength range	190 to 800 nm
Wavelength accuracy	≤ ±1 nm
Wavelength repeatability	≤ ±0.1 nm
Slit width	1.2 nm, 8 nm
Spectral resolution	≤ ±1.4 nm
Drift*	≤ 0.4 × 10 ⁻³ AU/h (under specified conditions, typically)
Noise*	≤ 6.0 × 10 ⁻⁶ AU (under specified conditions)
Linearity*	2.5 AU (under specified conditions, typically)
Recommended flow cell	Inert cell (optical path length: 10 mm, cell volume: 12 μL, equipped with temperature control function) Materials of wetted parts: PEEK, PFA, quartz
Sampling rate	Max. 100 Hz (Single wavelength mode)
Cell temperature control range	19 to 50 °C, 1 °C step
Optional flow cell	UHPLC inert cell (optical path length: 10 mm, cell volume: 8 μL, equipped with temperature control function) Low-diffusion inert cell (optical path length: 5 mm, cell volume: 2.5 μL, equipped with temperature control function) Inert cell (optical path length: 10 mm, cell volume: 12 μL, equipped with temperature control function)
Available pH range	1 to 13 (Cell quartz might be damaged by a mobile phase of pH>10.)
Dimensions [mm], weight	W 260 × D 500 × H 140 mm, 10 kg
Operating temperature range	4 to 35 °C
Power supply	AC 100 to 240 V, 180 VA, 50/60 Hz

*when using inert flow cell for UHPLC analysis

pH monitor



pHM-40

	pHM-40
Available pH range	1 to 14
Precision	pH ±0.1 (under specified conditions)
Drift	pH ±0.1/10 h (under specified conditions)
Maximum flow rate	10 mL/min
Allowable maximum pressure	0.1 MPa
Cell volume	approx. 80 μL
Available liquid temperature	4 to 60 °C
Wetted materials	glass, PEEK, PCTFE, silicon
Calibration point	1 to 5 point is settable.
Dimensions [mm], weight	W 130 × D 393 × H 206, 6 kg
Power supply	DC 5 V, 5 VA

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