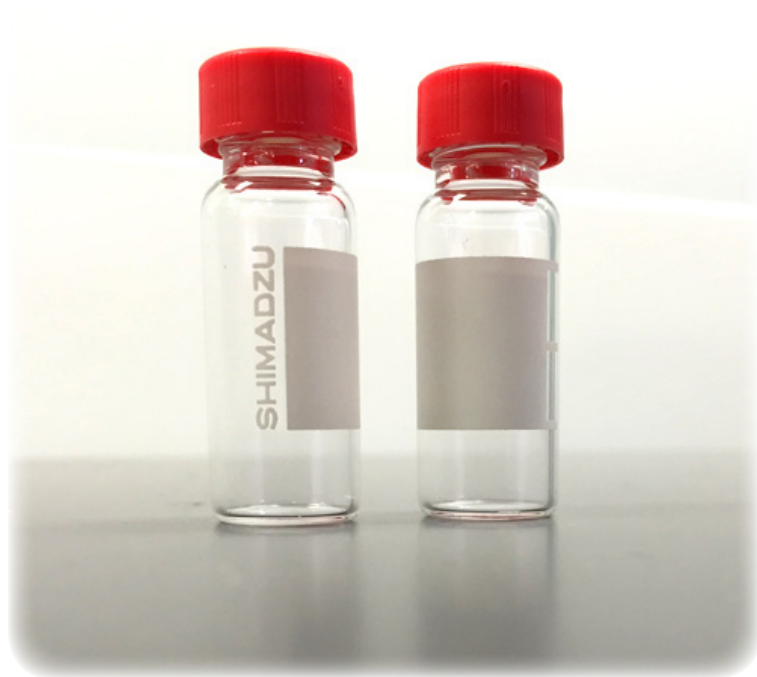


High Performance Liquid Chromatography

# Vial Selection Guide



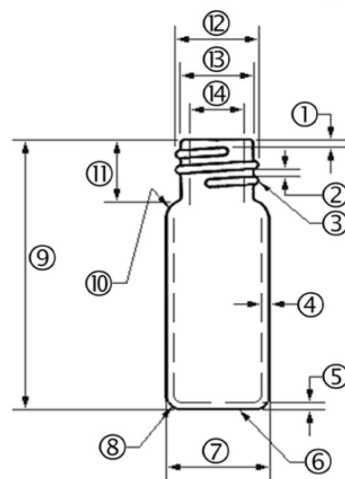
Vial selection for an HPLC system is an important but often overlooked step. Several characteristics of vials and septa are critical for optimum performance in an HPLC run. The following guide will assist you in making the best selection for your specific analysis.

## Vial Mouth Opening

A 6mm opening for the 1.5mL vial provides a better target for the autosampler needle and makes filling easier and cleaner, especially with automatic pipettors. LabTotal vials have a 9mm opening for maximum sample retrieval via pipette.

## Glass Thickness

Uniformity of the vial bottom thickness ensures consistent needle depth from run to run and is one of 14 strictly controlled manufacturing points.



## Septa Quality

The 1.5 and 4mL vials use a PTFE/silicone septum and its cleanliness is suitable for everyday applications as well as the most discriminating LC/MS analyses. The septum is press-fit inside the cap without any bonding agents, which could potentially contaminate samples. It also prevents the needle from pushing the septum into the vial. A pre-slit version is also available.

## One-Twist Cap

For high-throughput labs, our single-twist cap allows fast and easy sample preparation. We also offer a 1.5mL snap-cap vial for extra convenience.

## Low Adsorption Glass

Shimadzu Low and Extra Low Adsorption glass vials are made from pharmaceutical Type I borosilicate glass by a unique process that yields a surface chemistry with significantly reduced sample interactions without the use of a coating. This results in extremely low compound loss through adsorption or catalytic degradation. Our glass vials have very low reactivity, pH shift, and leaching characteristics.

Extra Low Adsorption vials are a must have for MS users or when working with micromolar concentrations and/or low sample volumes, where the surface-to-volume effects are much more pronounced.

The 12x32mm 1.5mL clear and amber vials are also available with silanized glass, which is a conventional way to lower adsorption of polar compounds by chemically modifying the glass with permanently bonded hydrophobic groups via multi-step gas phase deactivation to make the surfaces inert.

# HPLC Vials

Consult your user manual for recommended needle stroke settings prior to starting your analysis.

Compatible Systems		
<u>Vials</u>	1mL Clear, Plug Cap	1mL Amber, Plug Cap
Part Number	220-91521-06	220-91521-07
SIL-30AC	x	x
SIL-30ACMP	x	x
SIL-20ACXR	x	x
SIL-20ACHT	x	x
SIL-20AC	x	x
SIL-HTA/HTC	x	x
SIL-10A/Ai/AF/AP	N/A	N/A
LC-2030/2040	x	x
LC-2010AC/HT	x	x
Quantity	250	
Dimensions	8 x 40mm	
Recommended Fill Volume	900µL	
Residual Volume (default needle stroke)	77µL	
Glass Adsorption Type	Low Adsorption	
<u>Replacement Cap</u>		
Part Number	220-91521-13	
Cap Type	Plug	
Quantity	1000	
<u>Inserts</u>		
Part Number	220-91521-04	
Volume	200µL	
Quantity	100	

# HPLC Vials

Consult your user manual for recommended needle stroke settings prior to starting your analysis.

Compatible Systems							
<u>Vials</u>	1.5mL Clear w/ Snap Cap	1.5mL Amber w/ Snap Cap	1.5mL Clear w/ Screw Cap	1.5mL Clear Silanized w/ Screw Cap	1.5mL Amber w/ Screw Cap	1.5mL Amber Silanized w/ Screw Cap	1.5mL Clear w/ Screw Cap, Pre-Slit Septa
Part Number	220-91498-00	220-91521-17	228-45450-91	228-45451-91	228-45452-91	228-45453-91	220-91521-18
SIL-30AC	x	x	x	x	x	x	x
SIL-30ACMP	x	x	x	x	x	x	x
SIL-20ACXR	x	x	x	x	x	x	x
SIL-20ACHT	x	x	x	x	x	x	x
SIL-20AC	x	x	x	x	x	x	x
SIL-HTA/HTC	x	x	x	x	x	x	x
SIL-10A/Ai/AF/AP	x	x	x	x	x	x	x
LC-2030/2040	x	x	x	x	x	x	x
LC-2010AC/HT	x	x	x	x	x	x	x
Quantity	100		100				
Dimensions	12 x 32mm		12 x 32mm				
Recommended Fill Volume	1.5mL		1.5mL				
Residual Volume (default needle stroke)	185µL		185µL				
Glass Adsorption Type	N/A		Low Adsorption				
<u>Replacement Cap</u>							
Part Number	220-91521-22 (nonslit), 220-91521-23 (pre-slit)		228-45454-91 (nonslit), 220-91521-16 (pre-slit), 220-91521-16 (septumless)				
Cap Type	Snap Cap		Screw Cap				
Quantity	1000		1000				
<u>Inserts</u>							
Part Number	220-91521-04						
Volume	200µL						
Quantity	100						

# HPLC Vials

Consult your user manual for recommended needle stroke settings prior to starting your analysis.

Compatible Systems							
<u>Vials</u>	1.5mL MT-IT Clear Center Draining w/Screw Cap	1.5mL MT-IT Amber Center Draining w/Screw Cap	1.5mL MT-IT Clear Center Draining w/o Caps	1.5mL Certified* LabTotal Vial for MS w/ Screw Cap	200uL Q-sert™ fused insert w/ Screw cap	200uL Q-sert™ fused in-sert w/Snap cap	300uL Polypropylene w/ Screw cap
Part Number	220-91521-01	220-91521-02	220-91521-19	227-34001-01	220-91521-03	220-91521-21	220-91521-05
SIL-30AC	x	x	x	x	x	x	x
SIL-30ACMP	x	x	x	x	x	x	x
SIL-20ACXR	x	x	x	x	x	x	x
SIL-20ACHT	x	x	x	x	x	x	x
SIL-20AC	x	x	x	x	x	x	x
SIL-HTA/HTC	x	x	x	x	x	x	x
SIL-10A/Ai/AF/AP	x	x	x	x	x	x	x
LC-2030/2040	x	x	x	x	x	x	x
LC-2010AC/HT	x	x	x	x	x	x	x
Quantity	100			100	100		100
Dimensions	12 x 32mm			12 x 32mm	12 x 32mm		12 x 32mm
Recommended Fill Volume	1.2mL			1.5mL	200µL		290µL
Residual Volume (default needle stroke)	8µL			185µL	6µL		8µL
Glass Adsorption Type	Extra Low Adsorption			Extra Low Adsorption	Low Adsorption		N/A
<u>Replacement Cap</u>							
Part Number	228-45454-91 (nonslit), 220-91521-16 (pre-slit), 220-91521-12 (septumless)			N/A	228-45454-91 (nonslit), 220-91521-16 (pre-slit), 220-91521-12 (septumless)		
Cap Type	Screw Cap			N/A	Screw Cap		
Quantity	1000			N/A	1000		
<u>Inserts</u>							
Part Number	N/A			220-91521-04	N/A		
Volume	N/A			200µL	N/A		
Quantity	N/A			100	N/A		

\*Includes inspection certificate for integrity of multiple manufacturing points as well as residual compounds for LCMS and GCMS analysis

# HPLC Vials

Consult your user manual for recommended needle stroke settings prior to starting your analysis.

Compatible Systems						
Vials	4mL Clear w/ Screw Cap	4mL Amber w/ Screw Cap	4mL Clear w/ Screw Cap, Pre-Slit Septa	4mL MT-IT Clear Center Draining w/ Screw Cap	4mL MT-IT Amber Center Draining w/ Screw Cap	13mL Clear w/ Screw Cap
Part Number	220-91521-08	220-91521-09	220-91521-20	220-91521-10	220-91521-11	228-21280-92
SIL-30AC	x	x	x	x	x	n/a
SIL-30ACMP	x	x	x	x	x	n/a
SIL-20ACXR	x	x	x	x	x	n/a
SIL-20ACHT	x	x	x	x	x	n/a
SIL-20AC	x	x	x	x	x	n/a
SIL-HTA/HTC	x	x	x	x	x	n/a
SIL-10A/Ai/AF/AP	x	x	x	x	x	x
LC-2030/2040	x	x	x	x	x	n/a
LC-2010AC/HT	x	x	x	x	x	n/a
Quantity	100			100		30
Dimensions	15 x 45mm			15 x 45mm		23 x 45mm
Recommended Fill Volume	3.5mL			3.0mL		12.5mL
Residual Volume (default needle stroke)	342µL			12µL		500µL
Glass Adsorption Type	Low Adsorption			Extra Low Adsorption		n/a
Replacement Cap						
Part Number	220-91521-14 (nonslit), 220-91521-24 (pre-slit)					n/a
Cap Type	Screw Cap					n/a
Quantity	1000					n/a
Inserts						
Part Number	228-21284-91 (w/spring), 228-21285-91 (insert only)			n/a		
Volume	300µL			n/a		
Quantity	100			n/a		

# Autosampler Racks

Consult your user manual for recommended needle stroke settings prior to starting your analysis.

Nexera/Prominence/Integrated Systems			
Compatible Systems	1mL 175 position Rack	1.5mL 105 position Rack	1.5mL 105 position cooled Rack
SIL-30AC	228-37614-92	n/a	228-50761-92
SIL-30ACMP	n/a	n/a	n/a
SIL-20ACXR <sup>1</sup>	228-37614-92	228-45409-92	228-50761-92
SIL-20ACHT <sup>1</sup>	228-37614-92	228-45409-92	228-50761-92
SIL-20AC <sup>1</sup>	228-37614-92	228-45409-92	228-50761-92
SIL-HTA / HTC <sup>1,2</sup>	228-37532-91	228-37533-91	228-37534-91
LC-2030 / 2040	n/a	n/a	n/a
LC-2010AC / HT <sup>1,2</sup>	228-37532-91	228-37533-91	228-37534-91
Rack Changer	n/a	n/a	n/a

Compatible Systems	1.5mL 70 position cooled Rack	1.5mL 54 position Vial Tray	4mL 50 position Rack
SIL-30AC	228-44617-92	n/a	228-37616-92
SIL-30ACMP	n/a	228-50830-92 (set of 2) 228-50830-91 (set of 3) <sup>3</sup>	n/a
SIL-20ACXR <sup>1</sup>	228-44617-92	n/a	228-37616-92
SIL-20ACHT <sup>1</sup>	228-44617-92	n/a	228-37616-92
SIL-20AC <sup>1</sup>	228-44617-92	n/a	228-37616-92
SIL-HTA / HTC <sup>1,2</sup>	n/a	n/a	228-37544-91
LC-2030 / 2040	n/a	228-50830-92 (set of 2) 228-50830-91 (set of 3) <sup>3</sup>	n/a
LC-2010AC / HT <sup>1,2</sup>	n/a	n/a	228-37544-91
Rack Changer	n/a	228-50830-92 (set of 2) 228-50830-91 (set of 3) <sup>3</sup>	n/a

1. Use cooled racks in SILs with cooling
2. Racks sold as set of 2
3. Also comes as set of 12, 220-91532-00

SIL-10A/Ai/AF/AP				
Rack Type	Part Number	1.5mL vials	4mL vials	13mL vials
Rack S <sup>4</sup>	228-21046-91	x		
Cooler S	228-45063-41	x		
Rack L	228-21046-92		x	
Cooler L	228-45064-91		x	
Rack LL	228-39384-91			x

4. requires Universal Sample Tray, 499-00206-91

## Filter Vials

Our filter vials offer a single sample filtration system, all performed in an autosampler-ready vial. The filter vial consists of two parts: a filter vial shell and a plunger which includes a filter on one end and a vial cap on the other end. Samples are filtered by pipetting the sample into the filter vial shell, inserting the plunger into the shell, and then pushing the plunger into the shell.

For Shimadzu autosamplers, needle stroke needs to be set to no more than 49mm for the 1.5mL vial rack. For non-Shimadzu autosamplers, needle stroke needs to be set to 5mm from the bottom of the filter vial. Consult your user manual for instructions on how to change needle stroke settings.

Filter vials are available in a variety of filter membranes and pore sizes and come with pre-slit septa. Vials are 12 x 32mm and come 100/pack.

Membrane Material	Aqueous Samples	Organic Samples	Low Protein Binding Samples
PTFE (polytetrafluoroethylene)		x	
Nylon	x	x	
PVDF (polyvinylidene difluoride)	x	x	x
PES (polyethersulfone)	x	x	x

Membrane Material Explanations	
PTFE (polytetrafluoroethylene)	hydrophobic membrane for use for samples containing >50% organic solvents
Nylon	membrane for hydrophilic samples
PVDF (polyvinylidene difluoride)	low protein binding membrane for use with samples containing <50% organic solvents including proteins, peptides and E.coli
PES (polyethersulfone)	low protein binding membrane for aqueous samples, mostly used for mammalian cell culture (antibodies and proteins)

Pore Size	Cells / Cell Debris in Sample	LC Column Particle Size < 3µm	LC Column Particle Size > 3µm
0.2µm	x	x	
0.45µm			x



## Filter Vials

0.2µm Pore Size	Membrane	Max Fill Volume (µL)	Dead Volume (µL)	Recommended for
220-91521-40	PTFE	450	120	simple replacement of HPLC vials
220-91521-48	eXtreme PTFE	450	120	high particulate samples (up to 30%)
220-91521-57	nano PTFE	250	10 (min volume)	limited volume samples
220-91521-41	Nylon	450	120	simple replacement of HPLC vials
220-91521-49	eXtreme Nylon	450	120	high particulate samples (up to 30%)
220-91521-58	nano Nylon	250	10 (min volume)	limited volume samples
220-91521-42	PVDF	450	120	simple replacement of HPLC vials
220-91521-50	eXtreme PVDF	450	120	high particulate samples (up to 30%)
220-91521-59	nano PVDF	250	10 (min volume)	limited volume samples
220-91521-43	PES	450	120	simple replacement of HPLC vials
220-91521-51	eXtreme PES	450	120	high particulate samples (up to 30%)
220-91521-60	nano PES	250	10 (min volume)	limited volume samples
0.45µm Pore Size	Membrane	Max Fill Volume (µL)	Dead Volume (µL)	Recommended for
220-91521-44	PTFE	450	120	simple replacement of HPLC vials
220-91521-52	eXtreme PTFE	450	120	high particulate samples (up to 30%)
220-91521-61	nano PTFE	250	10 (min volume)	limited volume samples
220-91521-45	Nylon	450	120	simple replacement of HPLC vials
220-91521-53	eXtreme Nylon	450	120	high particulate samples (up to 30%)
220-91521-46	PVDF	450	120	simple replacement of HPLC vials
220-91521-54	eXtreme PVDF	450	120	high particulate samples (up to 30%)
220-91521-62	nano PVDF	250	10 (min volume)	limited volume samples
220-91521-47	PES	450	120	simple replacement of HPLC vials
220-91521-55	eXtreme PES	450	120	high particulate samples (up to 30%)

For additional assistance in filtering, we offer the Filter Vial Toggle Press. This Press provides the extra force required to filter very viscous and/or particulate laden samples.

220-91521-56 Filter Vial Toggle Press



## | Important



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Please read the instruction manual included with all products before use.



The replacement and maintenance periods listed in the guide are presented only as guidelines and not as a guarantee. Routine maintenance and inspection will vary depending on usage conditions.



Should you have questions on items listed in this guide, please contact your nearest Shimadzu representative.

## | Links

Shimadzu Scientific Instruments U.S. Webstore:  
<http://store.shimadzu.com>

Shimadzu Nexera Virtual Advisor:  
<https://nexerava.ssi.shimadzu.com/>

Shimadzu Prominence Virtual Advisor:  
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