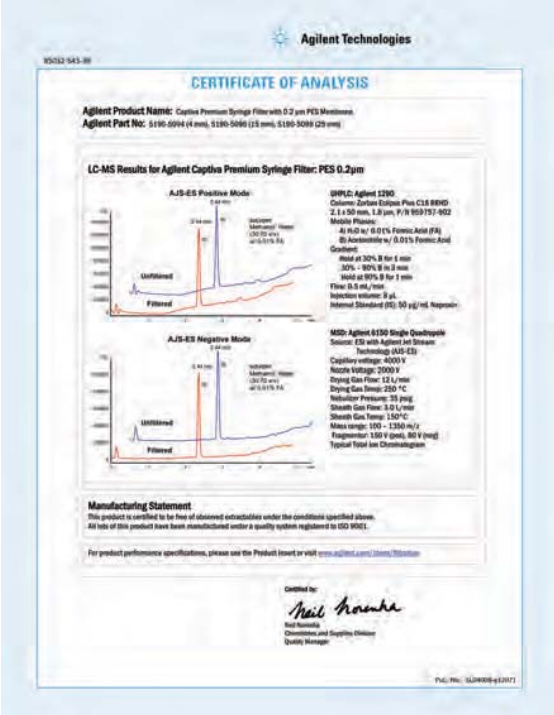
Premium Syringe Filters

- **More choices**. Captiva syringe filters are available in many sizes, formats, and membranes to cover every matrix and sample.
- **Certified**. All products are supplied with an HPLC or LC/MS certificate, guaranteeing extremely low levels of observed extractables.
- **Exceptional flow rate**. Captiva syringe filters have excellent flow rates and maximum sample loading capacity.
- **Highest quality**. Agilent Captiva syringe filters are constructed with the highest-grade virgin polypropylene housing, and are securely welded to prevent bursting and ensure sample integrity.

Sample filtration before HPLC, LC/MS, UHPLC, CE, and ICP-MS analysis is critical to achieving optimal system performance, and Agilent Captiva premium syringe filters make the process faster than ever with the industry's highest flow rates and loading capacities. All syringes are HPLC or LC/MS certified to guarantee low levels of observed extractables. PES (part numbers 5190-5094, 5190-5095,5190-5096, and 5190-5098) and glass fiber (p/n 5190-5120) premium syringe filters are LC/MS certified to be free of extractables.

Choose from a variety of membranes to suit your needs.


Agilent Technologies

CERTIFICATE OF ANALYSIS

Agilent Product Name:

Agilent Part No:

LC-MS Results for Agilent Captiva Premium Syringe Filter: PES 0.2µm

AJS-ES Positive Mode

AJS-ES Negative Mode

Manufacturing Statement

Premium Filters, 100/pk

Description	Diameter (mm)	Pore Size (µm)	Certification	Housing	Part No.
PTFE	4	0.2	LC	Polypropylene	5190-5082
	4	0.45	LC	Polypropylene	5190-5083
	15	0.2	LC	Polypropylene	5190-5084
	15	0.45	LC	Polypropylene	5190-5085
	25	0.2	LC	Polypropylene	5190-5086
	25	0.45	LC	Polypropylene	5190-5087
Nylon	15	0.2	LC	Polypropylene	5190-5088
	15	0.45	LC	Polypropylene	5190-5091
	25	0.2	LC	Polypropylene	5190-5092
	25	0.45	LC	Polypropylene	5190-5093
PES	4	0.2	LC/MS	Polypropylene	5190-5094
	4	0.45	LC/MS	Polypropylene	5190-5095
	15	0.2	LC/MS	Polypropylene	5190-5096
	15	0.45	LC	Polypropylene	5190-5097
	25	0.2	LC/MS	Polypropylene	5190-5098
	25	0.45	LC	Polypropylene	5190-5099
Regenerated Cellulose	4	0.2	LC	Polypropylene	5190-5106
	4	0.45	LC	Polypropylene	5190-5107
	15	0.2	LC	Polypropylene	5190-5108
	15	0.45	LC	Polypropylene	5190-5109
	25	0.2	LC	Polypropylene	5190-5110
	25	0.45	LC	Polypropylene	5190-5111
Cellulose acetate	28	0.2	LC	MBS	5190-5 116
	28	0.45	LC	MBS	5190-5117
Glass microfiber	15	0.7	LC/MS	Polypropylene	5190-5120
	28	0.7	LC	MBS	5190-5122

TIPS AND TOOLS

Our syringe filter online selection guide makes it fast and easy to choose the best syringe filter for your application.

Try it now at: **www.agilent.com/chem/SelectFilters**

Captiva disposable syringe, 5 mL, 9301-6476

Captiva disposable syringe, 10 mL, 9301-6474

Captiva disposable syringe, 20 mL, 5190-5103

Layered Filters with Prefilter

Layered Filters, 100/pk

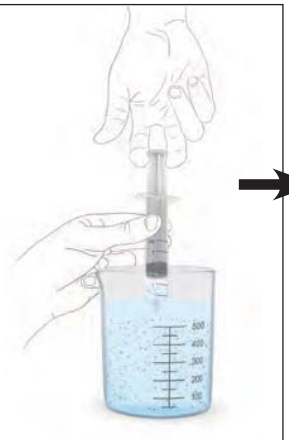
Description	Diameter (mm)	Pore Size (µm)	Certification	Housing	Part No.
Glass Microfiber/PTFE	15	0.2	LC	Polypropylene	5190-5126
	15	0.45	LC	Polypropylene	5190-5127
	25	0.2	LC	Polypropylene	5190-5128
	25	0.45	LC	Polypropylene	5190-5129
Glass Microfiber/Nylon	15	0.2	LC	Polypropylene	5190-5132
	15	0.45	LC	Polypropylene	5190-5133
	25	0.2	LC	Polypropylene	5190-5134
	25	0.45	LC	Polypropylene	5190-5135

Captiva Disposable Syringes, 100/pk

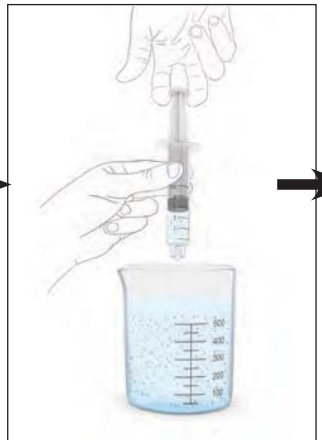
Volume (mL)	Part No.
5	9301-6476
10	9301-6474
20	5190-5103

Step-by-step Instructions

Follow these steps to realize the full benefits of filtration

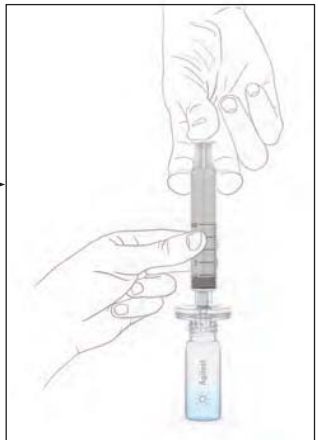


Before filling with sample, draw approximately 1 mL of air into the syringe. This will minimize fluid retention.



Draw your sample into the syringe, then draw in about 1 mL of air. Invert the syringe and wipe residue off tip.

Connect the syringe to the syringe filter using a Luer connection. Twist gently to ensure a secure seal.



Filter syringe contents into a vial. Afterwards, remove the syringe filter, draw air into the syringe, re-attach the syringe filter, and press the plunger to filter the residual sample. This will maximize sample recovery.

WARNING

Use caution with syringes smaller than 10 mL. They can easily generate enough power to burst the syringe filter. Agilent syringe filters are for laboratory use only.

Prewetting the filter, while not necessary, can be performed as an extra step.

Premium Syringe Filter Chemical Compatibility

Learn more about Agilent Captiva filtration products at **www.agilent.com/chem/filtration**

Legend		Polypropylene membrane	Polyethersulfone membrane	Cellulose Acetate membrane*	Polytetrafluorethylene membrane	Regenerated Cellulouse membrane	Nylon membrane	Glass Fiber membrane*	Housing Methyacrylate Butadiene Styrene	Housing Polypropylene
Compatible	••									
Limited compatibility	•									
Not compatible	–									
Not analyzed	N/A									
Filter		**PP**	**PES**	**CA**	**PTFE**	**RC**	**Nylon**	**GF**		
Housing									**MBS**	**PP**
Solvents										
Acetone		••	–	–	••	••	••	••	–	••
Acetonitrile		•	–	–	••	••	N/A	••	–	••
Benzene		–	–	•	••	••	••	••	–	••
Benzyl alcohol		••	–	–	••	••	••	••	–	•
n-Butyl acetate		N/A	–	–	••	••	••	••	–	••
n-Butanol		••	•	•	••	••	••	••	••	••
Carbon tetrachloride		•	–	–	••	••	••	••	–	–
Chloroform		•	–	–	••	••	••	••	–	••
Cyclohexane		••	–	•	••	••	••	••	•	•
Diethylacetamide		••	–	–	••	••	••	••	–	••
Diethyl ether		•	–	•	••	••	••	••	–	••
Dimethyl formamide		••	–	–	••	•	•	••	–	•
Dimethylsulfoxide		••	–	–	••	••	••	••	–	••
Dioxane		•	–	–	••	••	••	••	–	••
Ethanol, 98%		••	••	•	••	••	••	••	–	•
Ethyl acetate		•	–	–	••	••	••	••	–	•
Ethylene glycol		••	••	•	••	••	••	••	••	••
Formamide		N/A	••	–	••	•	••	••	••	••
Gasoline		•	•	•	••	••	••	••	••	••
Glycerin		••	••	•	••	••	••	••	•	•
n-Heptane		–	••	•	••	••	••	••	•	••
n-Hexane		–	••	•	••	••	••	••	•	•
Isopropanol		••	••	•	••	••	••	••	–	••
Isopropyl acetate		N/A	–	–	••	••	••	••	–	••
Methanol, 30 %		••	••	N/A	••	••	••	••	••	••
Methanol, 98 %		••	•	–	••	••	••	••	••	•
Methyl acetate		•	–	–	••	••	••	••	–	•
Methylene chloride		•	–	–	••	••	••	••	–	••

*CA and GF membranes in MBS housing for 28 mm size.

Contact time: 24 hours at 20 °C.
Chemical compatibilities can be influenced by various factors. Therefore, we recommend that you confirm compatibility with the liquid you want to filter by performing a trial filtration run before you start your actual filtration.

Legend		Polypropylene membrane	Polyethersulfone membrane	Cellulose Acetate membrane*	Polytetrafluorethylene membrane	Regnerated Cellulouse membrane	Nylon membrane	Glass Fiber membrane*	Housing Methyacrylate Butadiene Styrene	Housing Polypropylene
Compatible	••									
Limited compatibility	•									
Not compatible	–									
Not analyzed	N/A									
Filter		**PP**	**PES**	**CA**	**PTFE**	**RC**	**Nylon**	**GF**		
Housing									**MBS**	**PP**
Solvents										
Methyl ethyl ketone		•	–	–	••	••	••	••	–	•
Methyl isobutyl ketone		•	–	–	••	••	••	••	–	•
Monochlorobenzene		••	–	–	••	••	••	••	•	••
Pyridine		•	–	–	••	••	••	••	–	••
Tetrahydrofuran		••	–	–	••	••	••	••	–	••
Toluene		–	–	•	••	••	••	••	–	••
Trichloroethane		N/A	–	–	••	••	••	••	–	N/A
Xylene		–	–	•	••	••	••	••	–	•
Acids										
Acetic acid, 25 %		••	•	•	••	••	–	••	–	•
Acetic acid, 80 %		••	N/A	–	••	••	–	••	–	•
Hydrochloric acid, 20%		••	••	–	••	–	–	••	•	•
Hydrofluoric acid, 25 %		••	•	–	••	•	–	••	•	•
Nitric acid, 25 %		••	•	–	••	–	–	••	•	•
Phosphoric acid, 1 %		••	••	•	••	–	–	••	•	•
Sulfuric acid, 25 %		••	•	–	••	•	–	••	•	••
Trichloroacetic acid, 10 %		••	N/A	–	••	••	–	••	–	•
Bases										
Ammonium hydroxide, 25 %		••	•	•	••	•	•	•	–	•
Sodium hydroxide, 1N		••	••	–	••	•	•	•	–	••
Aqueous solutions										
Formalin, 30 %		••	•	••	••	•	••	••	•	•
Hydrogen peroxide, 30 %		••	••	–	••	–	–	••	•	••
Sodium hypochlorite, 5 %		N/A	••	–	••	–	–	••	•	•
pH range										
pH 1-14		••	–	–	••	–	–	••	–	••
pH 1-13		••	••	–	••	–	–	••	–	••
pH 3-14		••	•	–	••	•	••	••	–	••
pH 3-12		••	••	–	••	••	••	••	•	••
pH 4-8		••	••	••	••	••	••	••	••	••

*CA and GF membranes in MBS housing for 28 mm size.

Contact time: 24 hours at 20 °C.
Chemical compatibilities can be influenced by various factors. Therefore, we recommend that you confirm compatibility with the liquid you want to filter by performing a trial filtration run before you start your actual filtration.

Econofilters, PES, 5190-5272

Econofilters

High-quality Econofilters are shipped in large packs and are ideal for busy labs that need fast, efficient filtration at a reasonable price.

Econofilters, 1000/pk

Econofilters

Description	Diameter (mm)	Pore Size (µm)	Housing	Part No.
PVDF	13	0.2	Polypropylene	5190-5261
	13	0.45	Polypropylene	5190-5262
	25	0.2	Polypropylene	5190-5263
	25	0.45	Polypropylene	5190-5264
PTFE	13	0.2	Polypropylene	5190-5265
	13	0.45	Polypropylene	5190-5266
	25	0.2	Polypropylene	5190-5267
	25	0.45	Polypropylene	5190-5268
Nylon	13	0.2	Polypropylene	5190-5269
	13	0.45	Polypropylene	5190-5270
	25	0.2	Polypropylene	5190-5271
	25	0.45	Polypropylene	5190-5272
PES	13	0.2	Polypropylene	5190-5273
	13	0.45	Polypropylene	5190-5274
	25	0.2	Polypropylene	5190-5275
	25	0.45	Polypropylene	5190-5276
Polypropylene	13	0.2	Polypropylene	5190-5277
	13	0.45	Polypropylene	5190-5278
	25	0.2	Polypropylene	5190-5279
	25	0.45	Polypropylene	5190-5280
Regenerated cellulose (RC)	25	0.45	Polypropylene	5190-5307
	15	0.45	Polypropylene	5190-5308
	25	0.2	Polypropylene	5190-5309
	15	0.2	Polypropylene	5190-5310

TIPS AND TOOLS

Request your printed Captiva filtration slide and select guide at **www.agilent.com/chem/syringe-filter-tool**

Agilent Captiva Syringe Filter Selection Guide

Step 1 — Sample Composition

Aqueous

All aqueous solutions

tissue culture/protein applications/large molecules

small molecules/applications/general aqueous

Solvents

Hydrophilic aqueous/solvent mixtures/solvents

hydrophilic solvent mixtures/solvents

hydrophobic solvents/gases/acids/bases

- PES Polyethersulfone, pH Range 3-12
- CA Cellulose Acetate, pH Range 4-8
- RC Regenerated Cellulose, pH Range 3-12
- NY Nylon, pH Range 3-14
- PTFE Polytetra-fluorethylene, pH Range 1-14

Step 2 — Sample Volume

4 mm for **up to 1 mL**	15 mm for **up to 15 mL**	25-28 mm for **up to 150 mL**
		
0.1-1 mL	15 mL	10-150 mL

Step 3 — What is the Particle Size of your LC Column

Columns packed <2 µm particles	Columns packed >2 µm particles
0.2 µm UHPLC	0.2 or 0.45 µm HPLC

Applications

Type of Filtration	Recommended	Alternatives
HPLC • UHPLC • LC/MS • GC	RC	PTFE or Nylon
ICP-MS	PTFE	Glass Fiber/PTFE (High Particle Samples)
CE	RC	Nylon
Undiluted organic solvents	PTFE	Nylon
Protein analysis • samples with biomolecules—buffers	PES	RC or CA
Tissue culture media	PES	RC or CA
High particle-load samples—organic solvents	Glass Fiber/PTFE	
High particle-load samples—aqueous solutions	Glass Fiber/Nylon	
AA, ICP-OES, and MP-AES	PES	PTFE or Polypropylene

Proof of Performance: Filtration Efficiency

Testing Method

The surfactant solution, 0.1 % Triton X-100, was used to prepare 0.01 % Latex Beads (0.3 and 0.5 µm) solution. The 0.1 % Triton X-100 was used to maintain the homogeneity of latex beads solutions.

Filtration

The challenging solution was passed through each individual syringe filter and a 1 mL filtrate was collected in a 2 mL vial for HPLC run. Ten different filters from each kind of filter were tested.

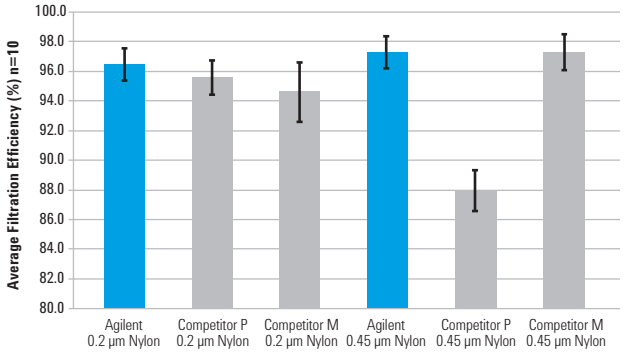
Filtrate measuring on HPLC/UV

The maximum absorbance of the latex beads solutions was observed at 272 nm, which was used to correlate latex bead concentration with absorbance. A simple HPLC method was used for automatic testing under UV 272 nm. No column was used. The mobile phase was water, and the flow rate of 1.0 mL/min was used.

An eluted peak at 272 nm was used for filtration efficiency calculation. Blank 0.1 % Triton X-100 was run to correct contributions from surfactant absorbance at 272 nm.

The Agilent Captiva syringe filters provide equivalent or better filtration efficiency than competitors' equivalent products for particulates removal

Average Filtration Efficiency of Agilent Captiva Syringe Filters vs. Competitors



Filtration efficiency (%) calculation

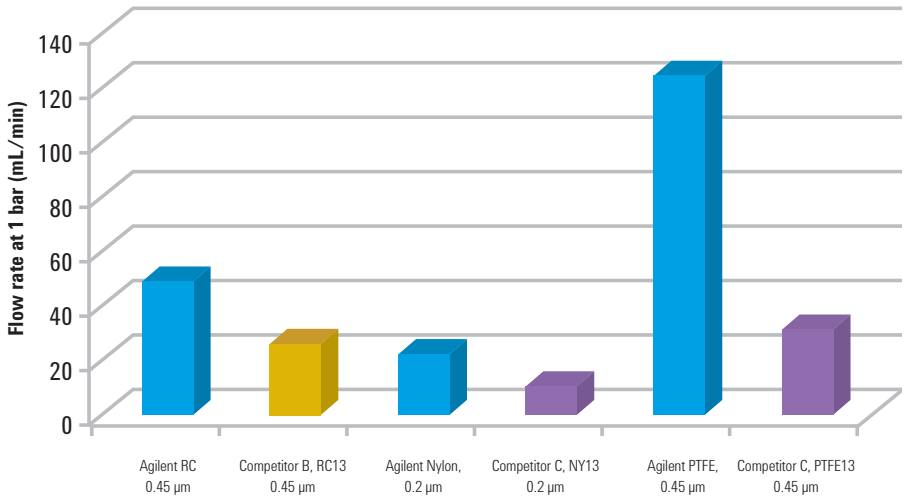
$$Filtration\ EFF\ (\%) = \frac{(PeakArea_{\text{Unfiltered LBsolution}} - PeakArea_{\text{Unfiltered Blank}})\,(PeakArea_{\text{Filtered LBsolution}} - PeakArea_{\text{Filtered Blank}})}{(PeakArea_{\text{Unfiltered LBsolution}} - PeakArea_{\text{Unfiltered Blank}})} \times 100\%$$

	Agilent premium 0.2 µm syringe filters						Agilent premium 0.45 µm syringe filters					
	Nylon	**PTFE**	**RC**	**PES**	**GF/NY**	**GF/PTFE**	**Nylon**	**PTFE**	**PES**	**CA**	**GF/NY**	**GF/PTFE**
1	96	92.3	89.8	92.1	99	99.4	95.2	97	93.6	92.4	96.8	98.4
2	95.9	91.4	90.6	91.4	99	98.9	93.2	96.5	93.6	95	97.1	98.8
3	94.5	93.3	90.3	89.5	99.2	99	95.5	97.5	93.5	96.3	96.4	97.7
4	96.6	92.3	91.7	99	99.6	98.6	95.4	96.6	88.5	97.2	99.3	98.8
5	95.4	91.2	92.4	96.3	98.8	98.8	94.9	96	88.2	96	99	99.7
6	95.6	91.1	90.8	99.9	99.3	98.5	95.3	95.7	92.3	95.6	100	96.8
7	99.9	91.1	98.2	99	99.4	99.4	99.5	95.2	94.9	96.7	98.2	97.6
8	99.8	91.2	99	97.8	95	99	98	97.8	89.4	93.8	98.9	98.5
9	99.7	90.9	96.4	95.2	95.9	99.9	97.7	94.9	87.3	92.5	100.2	98
10	99.2	91.3	95.7	96.1	94.7	99.6	99.7	94.8	87.5	92.8	100.5	101.3
Average Eff (%)	**97.3**	**91.6**	**93.5**	**95.6**	**98**	**99.1**	**96.4**	**96.2**	**90.9**	**94.8**	**98.6**	**98.6**
RSD (%)	2.2	0.8	3.7	3.7	2	0.5	2.2	1.1	3.3	1.9	1.5	1.3

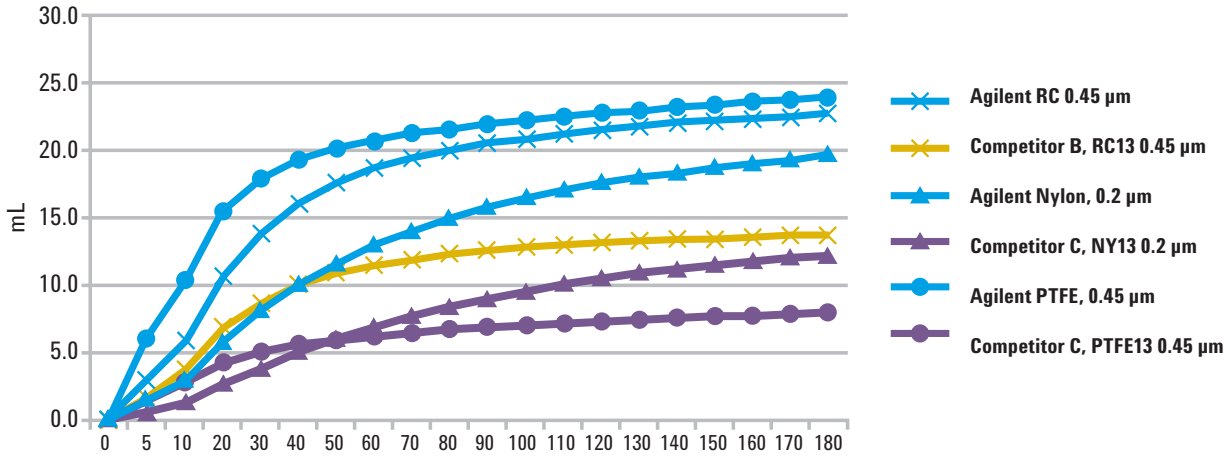
Proof of Performance: Flow Rate and Volume Capacity

Agilent Captiva premium syringe filters provide unparalleled loading capacity with the fastest flow rates in the market today to allow for maximum efficiency.

Flow rate for 15 mm premium syringe filters



Capacity (volume) of 15 mm syringe filters over time (with particulate-laden samples)



Filtration Impact on LC Column Life

Importance of Filtration

Column plugging is the most frequent cause of column failure encountered by analytical chemists. Injection of samples containing even small amounts of particulate will clog the column inlet, causing high column backpressure, retention time shift, and loss of resolution, which shortens the normal column lifetime. This impact can be more significant for sub-2 µm columns. These smaller particle size columns are usually used under high pressure, and are therefore more sensitive to pressure increases caused by the accumulated particulates on the column.

Testing Method

Sample Preparation

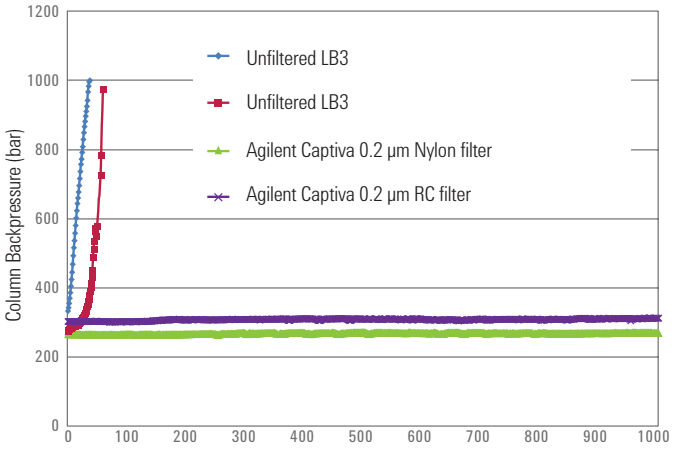
A.) The surfactant solution, 0.002 % Triton X-100, was used to prepare 0.05 % latex bead (0.3 µm and 0.5 µm) solution.

B.) Latex bead solution (0.3 µm) was used for sub-2 µm column life test. Unfiltered and filtered (by 0.2 µm filters) samples were used for comparison of impact on sub-2 µm column life.

C.) Human plasma extract was used for sub-2 µm column life application test. Unfiltered, centrifuged, and filtered (by 0.2 µm filters) samples were used for comparison of impact on sub-2 µm column life. The sample was prepared using the following steps.

1. 2 mL of human plasma was aliquoted in to a test tube.
2. 10 mL of Acetonitrile with 1 % Acetic Acid was added.
3. Sample was vortexed vigorously and then centrifuged at 4000 rpm for 5 min.
4. The supernatant was transferred into a clean test tube.
5. The supernatant was blown dry with N_2 flow at 37 °C.
6. The dried sample was reconstituted in 10:90 MeOH/H_2O, vortexed and sonicated.

Results—Filtration impact on sub-2 µm column A by latex bead 0.3 µm solution



Filtration

The challenging solution was passed through each individual syringe filter and a 1 mL filtrate was collected in a 2 mL vial for HPLC run.

UHPLC instrumentation (for sub-2 column life test)

Column: Agilent ZORBAX Eclipse Plus C18 RRHD column, 2.1 x 50 mm, 1.8 µm, p/n 959757-902.

Column was disconnected from the detector and allowed to run to drain.

Mobile phase: Acetonitrile: Water (35:65, v/v)

Flow rate: 0.4 mL/min, isocratic.

Injections: 10 µL per injection, one injection per minute.

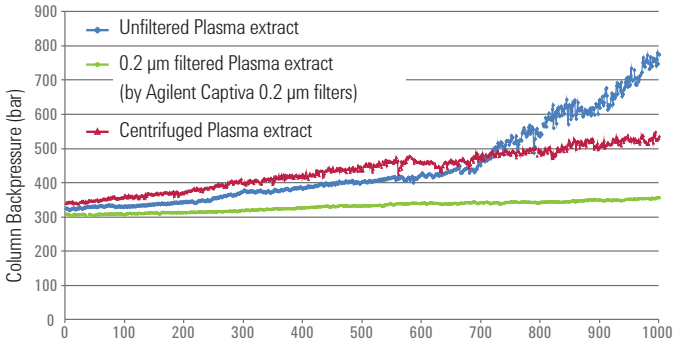
Monitoring: Column backpressure was recorded with the number of injections.

Column failure: When column back pressure exceeded 1000 bar.

Sequence: A 1000 injections sequence was usually used, unless the column failed in the middle due to high pressure. A new column was used for each individual sequence.

Conclusion: Filtration before sample introduction into an HPLC system significantly improves column life time.

Results—Filtration impact on sub-2 µm column B by human plasma PPT extract



Number of injections of unfiltered, centrifuged, and filtered human plasma PPT Extract.