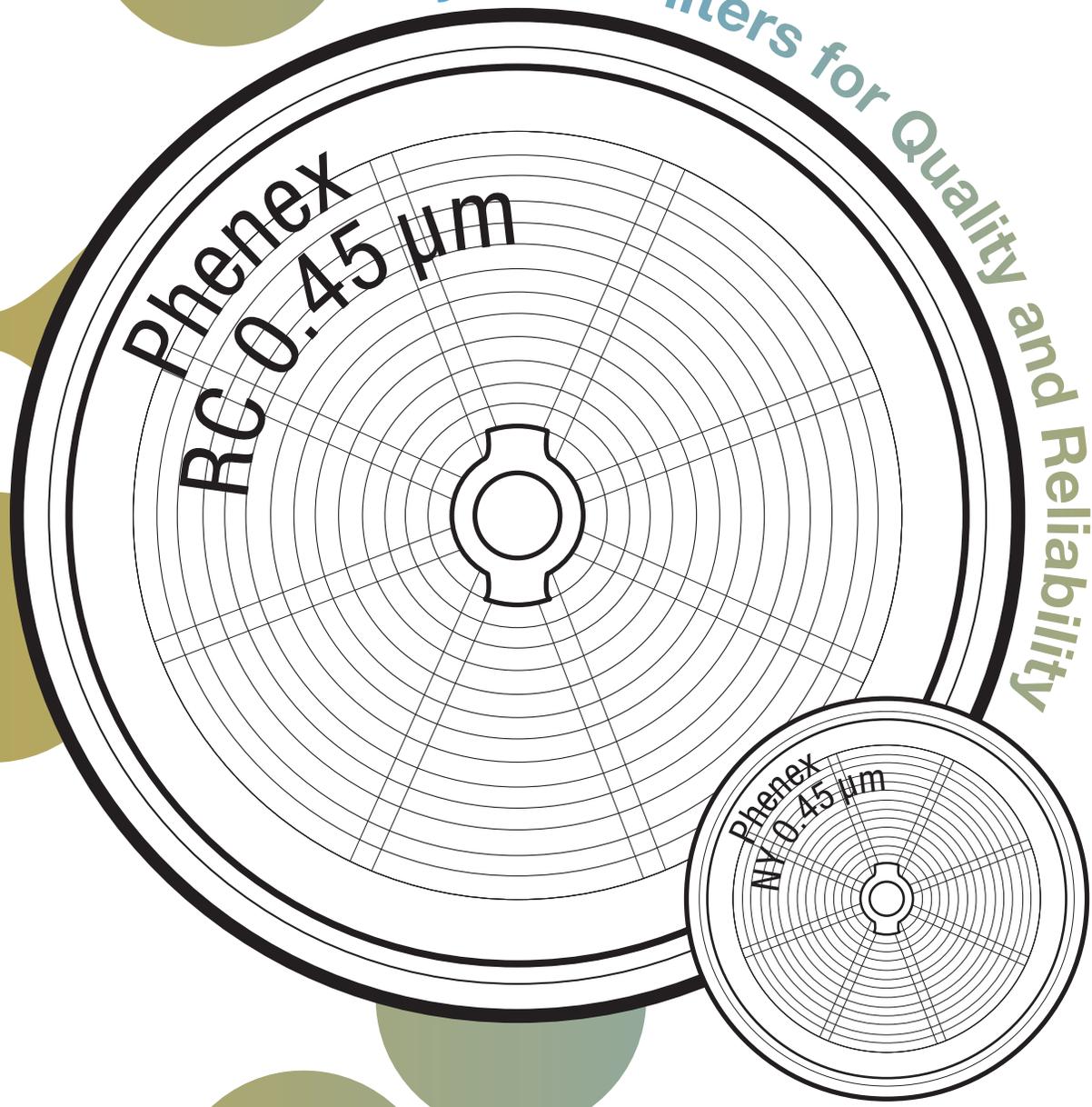


Syringe Filters for Quality and Reliability



Guaranteed Reliability and Consistency

Quality filtration products from Phenomenex offer a convenient way to clean up your samples - for improved analytical results with a simple method. Phenex syringe filters are designed for efficient and rapid filtration of almost any solution prior to analysis, and are optimized for superior flow rates and high throughput. Phenex offers a wide variety of membranes ideal for any application.

- High quality filtration product
- Increased column lifetime
- Less system downtime

The housing attaches to any standard Luer lock syringe, so the sample can easily be pushed through the membrane with minimal pressure. The result is a particulate-free eluent that is ready for use with HPLC, GC, or other analytical techniques.

A Sample Preparation Solution

Filtration is one of the most popular sample preparation methods due to the ability to remove particulates before injection onto the column, the ability to use it in parallel with another sample preparation technique, and requires no method development.



To learn more about sample preparation options, go to www.phenomenex.com/samplepreparation

How to Use Phenex Syringe Filters

Easy to assemble and even easier to get consistent and particulate free samples



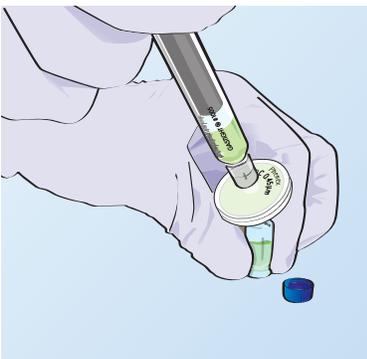
Load

- 1** Fill a syringe barrel with the liquid sample. Allow a small amount of air (approximately 10% of the sample volume) to enter the syringe. The air is used as a purge to minimize fluid retention when expelling the sample from the syringe (Step 3 below).



Assemble

- 2** Twist the luer lock end of the filter securely onto the syringe. (Caution: Do not use syringes without a matching luer lock, otherwise the pressure applied may cause the filter to come off unexpectedly).



Filter

- 3** Apply gentle pressure to the syringe plunger. (Caution: Small syringes can generate excessive pressures) Push the liquid sample, as well as the remaining air, through the syringe filter to maximize sample recovery.



Syringe Filter Finder

Visit: www.phenomenex.com/SyringeFilterFinder

Which Filter Membrane Is Right for Me?

Phenex syringe filters are offered in a variety of chemically compatible membranes that are ideal for any application. Proper membrane and size selection are the keys to choosing the best product to maintain the integrity of your sample components as well as to protect your system from particulate contamination.



Select your filter in three EASY steps:

1. What is your sample volume?

≤ 2 mL Sample Volume	2 to 10 mL Sample Volume	10 to 100 mL Sample Volume
4mm Diameter	15mm Diameter	25 - 28mm Diameter

2. What is your LC column ID?

≥ 3 μm	< 3 μm	OR
0.45 μm	0.20 μm	Viscous samples such as serum, plasma, or other biological matrices. Solutions with high particulate load (e.g., some environmental or food and beverage applications).
		Glass Fiber Filter with 0.45 μm membrane

3. What type of sample are you working with?

Aqueous			Solvents	
Solvents Mixtures	Tissue Culture Media, Buffers	Protein Analysis/ Biological Samples	Non-Aqueous	Aqueous Mixtures
			Hydrophobic/ Strong Acids	Hydrophilic
RC (Regenerated Cellulose)	CA (Cellulose Acetate)	PES (Polyethersulfone)	PTFE (Polytetrafluoroethylene)	RC (Regenerated Cellulose)

Recommendations Based on Your Industry

	<p>Environmental</p> <p>Water, wastewater, soil and sludge, and pollution control samples are especially challenging. No matter the sample type, Phenex offers filtration products to meet your demanding requirements.</p> <p>Recommended Filter: GF/NY</p> <p>First Alternative: RC</p>
	<p>Pharmaceutical / Biotech</p> <p>At every stage of the drug discovery process target compounds must be isolated, purified, and prepared prior to testing. Sample complexity in DMPK work can be even more challenging. Difficult samples such as serum, urine, and other physiological fluids are easily filtered and clarified using Phenex syringe filters.</p> <p>Biological Samples Recommended Filter: PES</p> <p>First Alternative: RC</p>
	<p>Clinical / Toxicology</p> <p>Removal of particulate matter to sub-micron levels is critical before any clinical sample is injected into an LC, GC or mass spectrometer. At every stage in toxicology, samples should be filtered, preferably with a rapid and simple sample preparation method to reduce downtime in the fast paced environment. Phenex is designed for higher flow rates and throughputs than those of competing products.</p> <p>Recommended Filter: RC</p> <p>First Alternative: PES</p>
	<p>Food and Beverage</p> <p>Food safety is more important than ever and lower detection limits are making analysis even more challenging. Accurate and reliable testing is critical and Phenex filters are routinely used in preparation for analysis of pesticides, herbicides, fungicides, flavors, and fragrances. For samples with large amounts of particulate and/or large fibrous matter, use a glass fiber prefilter.</p> <p>Recommended Filter: GF/NY</p> <p>First Alternative: RC</p>

Other Applications:

Application / Sample*	Recommended Filter**	First Alternative
General GC and LC	RC	PTFE
Aggressive or Pure Organic Solvents	PTFE	RC
High Particulate Loads	GF/NY	GF + RC
Dissolution Testing	GF/NY	RC
Ion Chromatography	RC	PES
Trace Metals (ICP-MS, AAS)	RC	PES
Capillary Electrophoresis (CE)	RC	PES
Tissue Cultures, Media, Buffers	GF/CA	PES

* Removal of high particulate matter with a glass fiber prefilter is critical before any drug, tox, or dirty environmental sample is filtered to ensure the highest syringe filter membrane performance.

** For high load and particulate-laden samples you may consider placing a Glass Fiber (GF) prefilter, either integrated with the membrane as one unit (Phenex-GF/NY or -GF/CA) or in series with the membrane syringe filter of your choice.

Generally, 0.45 µm porosity filters are used to remove particulates from samples and mobile phase solutions. For sterile-filtration, a 0.20 µm porosity filter can be used.



Don't miss out on FREE samples!
Visit: www.phenomenex.com/freesample

Most Popular Filter Membrane Options

RC (Regenerated Cellulose)

For Aqueous and Mixed Organic Solutions
A broad range of aqueous and mixed-organic solutions
Fast-flow and ultra-low protein and non-specific binding characteristics
Broadly recommended as an excellent general purpose/high-performance sample filter for most applications

PTFE, Teflon® (Polytetrafluoroethylene)

For 100% Organic Solutions
Well-suited for the clarification of non-aqueous samples
Hydrophobic membrane, excellent for filtration of organic-based, highly acidic or basic samples and solvents
A hydrophobic membrane, that can be made hydrophilic by wetting with alcohol and then flushing with deionized water

Additional Syringe Filter Membranes

Membrane Types	Recommended Uses
PES (Polyethersulfone)	Polyethersulfone membranes exhibit very fast-flow and ultra-low protein binding characteristics. Phenex-PES membranes are typically broadly recommended for filtering critical biological samples, tissue culture media, additives and buffers.
NY (Nylon)	Nylon has inherent hydrophilic characteristics and works well for filtration of many aqueous and mixed-organic samples. In combination with a glass pre-filter (Phenex-GF/NY), this membrane is excellent for the filtration of particle-laden samples, such as foods and beverages, environmental, biofuels, and dissolution samples.
CA (Cellulose Acetate)	Cellulose Acetate (CA) membranes exhibit ultra-low protein binding and are broadly used in the filtration of biological samples. In combination with a glass pre-filter (Phenex-GF/CA), this membrane is excellent for filtration of tissue culture media, general biological sample filtration and clarification.
GF (Glass Fiber)	Glass Fiber (GF) filters are made of inert borosilicate glass and have a nominal 1.2 µm pore size. They are commonly used with highly viscous samples or samples containing high concentrations of particulate matter (e.g., food analysis, biological samples, soil samples, fermentation broth samples, removal of yeasts, molds, etc.).
PVDF (Polyvinylidene Fluoride)	Hydrophilic PVDF membrane provides high flow rates and throughput, low extractables, and broad chemical compatibility. This membrane binds less protein than nylon or PTFE membranes.

Don't Forget!

All-Plastic Disposable Syringes

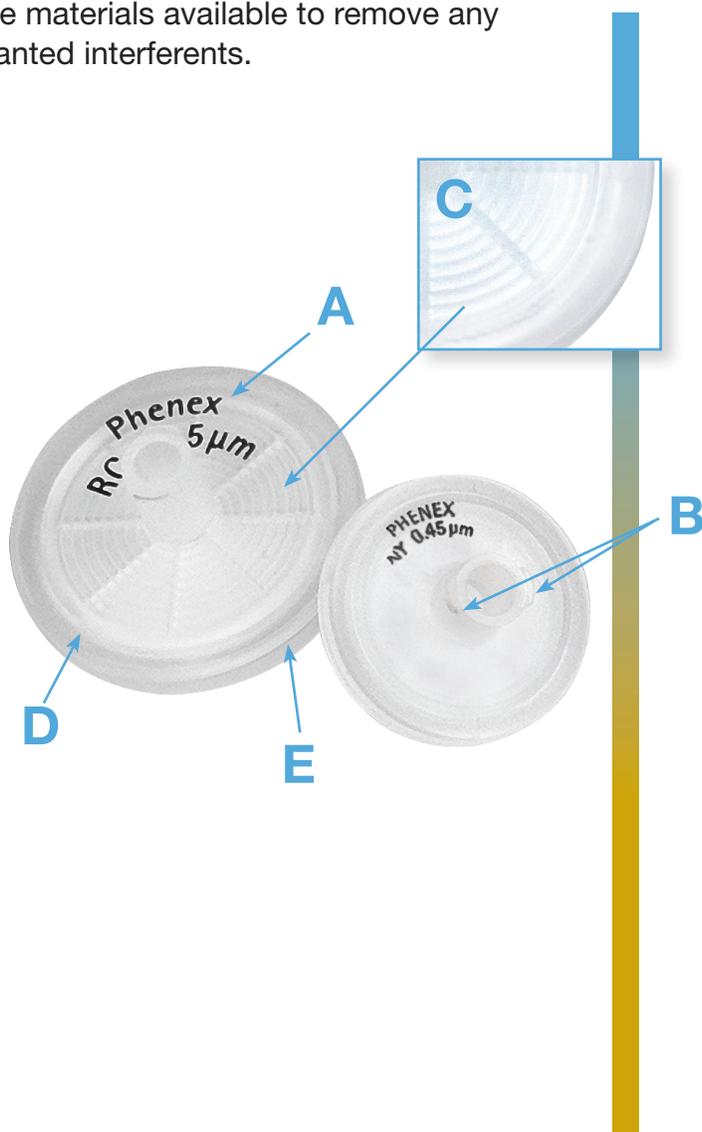
- Use for all syringe filter applications
- Luer-lock outlet makes connection easy
- Capacities ranging from 3 to 20 mL
- Made of ultra-clean, high-purity plastic



Avoid Unnecessary Problems

Using low-quality, low-cost filters can lead to sample contamination by introducing filter membrane and housing extractables directly into your sample. This will negatively affect chromatography and can cause ghost peaks for future runs.

All Phenex filters are made with the highest grade materials available to remove any unwanted interferents.



Phenex Helps Reduce:

- Extraneous peaks
- False quantitation
- Sample co-elution
- Instrument damage

Ensure Quality:

- A Identification**
Membrane type and pore size are clearly marked on individual syringe filters
- B Luer Lock Inlet Tip**
Secures connections to prevent “blow off”
- C Sample Distribution Rings**
Creates even sample distribution for high sample flow rates
- D Medical Grade Polymer Housing**
Offers the most inert syringe filter and helps eliminate unwanted secondary interactions with the filter housing
- E Ultrasonically Welded**
Ensures robust housing - filter integrity



Need help selecting the right Phenex Syringe Filter?
Visit: www.phenomenex.com/SyringeFilterFinder



Enhanced Quality Assures Reliability

After packaging in a clean-room environment, all finished products undergo final quality control. Each production lot is sampled using a random sampling procedure, and individual syringe filter units are inspected and tested for integrity by a comprehensive range of tests.

Each production lot is not released until all in-process and final quality control specifications are met. Further selective testing is periodically performed. The shelf life of packaged product is also monitored and controlled within our warehouses to ensure efficient stock rotation.

The result is a reliable, reproducible, and contaminate-free product.



Phenomenex Phenex syringe filters are manufactured by state-of-the-art production machines and must pass a battery of certification methods and tests. Both manufacturing and packaging processes adhere to the most current quality systems and methods such as:

- ISO
- DIN
- ASTM

Critical specifications are set for:

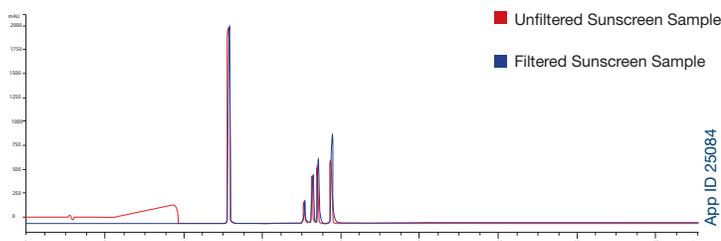
- Bubble point
- Burst pressure
- Membrane adsorption (protein)
- Flow rate
- UV extractables (by HPLC)

Filtration of Samples

Clean up and Filtration of Topical Sunscreen

Sample Preparation

1. A sample of sunscreen was dissolved in 10 mL of reagent grade ethanol.
2. The sample was vortexed and centrifuged (@ 4700 rpm)
3. Filter it through a Phenex PTFE 0.45um Syringe Filter (Part No.: AF0-1102-52)



A significant reduction in chromatographic interference can be observed in the overlay with no loss of analyte intensity.

LC Conditions

Column: Kinetex[®] 2.6 μ m Biphenyl
Dimension: 100 x 4.6 mm
Part No.: 00D-4622-E0
Mobile Phase: A: 0.1% TFA in Water
B: 0.1% TFA in Acetonitrile
Gradient:

Time (min)	% B
0	40
0.5	40
10	100
13	100
14	70
17	70

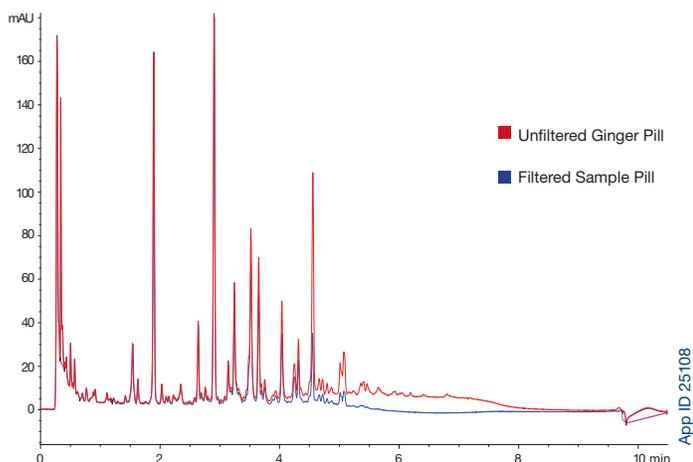
Flow Rate: 1.5 mL/min
Injection Volume: 10 μ L
Temperature: 40 $^{\circ}$ C
Detection: UV-VIS (@ 310 nm)
Sample: 1. Oxybenzone
2. Octisalate
3. Homosalate
4. Avobenzone
5. Oxycrylene

Clean up and Filtration of Topical Sunscreen

Sample Preparation

1. Dissolve a Gaia[®] Supreme Ginger Pill in 10 mL of Methanol/Water (80:20) into a Verex[™] Vial
2. Filter it through a Phenex PTFE 0.45um Syringe Filter (Part No.: AF0-1102-52)

Ginger Pill Sample Filtered by A Phenex PTFE Syringe Filter



LC Conditions

Column: Kinetex 2.6 μ m Biphenyl
Dimensions: 50 x 4.6 mm
Part No.: 00B-4622-E0
Mobile Phase: A: 0.01% Phosphoric acid in Water
B: 0.01% Phosphoric acid in Acetonitrile
Gradient:

Time (min)	%B
0	30
7	100
9	100
9.5	30
12.5	30

Flow Rate: 1.8 mL/min
Injection: 2 μ L
Temperature: 30 $^{\circ}$ C
Detection: UV-VIS (@282 nm)

Phenex provides a reduced baseline with no change in peaks!

Syringe Filter Chemical Compatibility

Chemical compatibility is a critical consideration when selecting the proper sample prep syringe filter for your application. This chart outlines the chemical compatibility of the most common syringe filters. The contact time was 24 hours at 20°C.

Syringe Filter Chemical Compatibility	MEMBRANE							HOUSING	
	Regenerated Cellulose (RC)	Polytetrafluoroethylene (PTFE)	Cellulose Acetate (CA)	Cellulose Acetate + Glass Fiber (CA + GF)	Polyethersulfone (PES)	Nylon (NY)	Glass Fiber (GF)	MBS	PP
Filter Housing	PP	PP	MBS	MBS	MBS	PP	MBS	MBS	PP
Sterilization									
Ethylene oxide	++	++	++	++	++	++	++	++	++
Gamma irradiation	—	—	++	++	++	—	++	++	—
Autoclaving 121 °C, 30 min	++	++	—	—	—	++	—	—	++
Solvents									
Acetone	++	++	—	—	—	++	—	—	++
Acetonitrile	++	++	—	—	—	n.a.	—	—	++
Benzene	++	++	—	—	—	++	—	—	++
Benzyl alcohol	+	+	—	—	—	+	—	—	+
n-Butyl acetate	++	++	—	—	—	++	—	—	++
n-Butanol	++	++	+	+	+	++	++	++	++
Carbon tetrachloride	—	—	—	—	—	—	—	—	—
Cellosolve	—	—	—	—	—	—	—	—	—
Chloroform	++	++	—	—	—	++	—	—	++
Cyclohexane	+	+	+	+	—	+	+	+	+
Cyclohexanone	+	+	—	—	—	+	—	—	+
Diethylacetamide	++	++	—	—	—	++	—	—	++
Diethyl ether	++	++	—	—	—	++	—	—	++
Dimethyl formamide	+	+	—	—	—	+	—	—	+
Dimethylsulfoxide	++	++	—	—	—	++	—	—	++
Dioxane	++	++	—	—	—	++	—	—	++
Ethanol, 98%	+	+	—	—	—	+	—	—	+
Ethyl acetate	+	+	—	—	—	+	—	—	+
Ethylene glycol	++	++	+	+	++	++	++	++	++
Formamide	+	++	—	—	—	++	++	++	++
Glycerin	+	+	+	+	+	+	+	+	+
n-Heptane	++	++	+	+	+	++	+	+	++
n-Hexane	+	+	+	+	+	+	+	+	+
Isobutanol	—	—	+	+	++	—	++	++	—
Isopropanol	++	++	—	—	—	++	—	—	++
Isopropyl acetate	++	++	—	—	—	++	—	—	++
Methanol, 98%	+	+	—	+	+	+	++	++	+
Methyl acetate	+	+	—	—	—	+	—	—	+
Methylene chloride	++	++	—	—	—	++	—	—	++
Methyl ethyl ketone	+	+	—	—	—	+	—	—	+
Methyl isobutyl ketone	+	+	—	—	—	+	—	—	+
Monochlorobenzene	+	+	—	—	—	+	—	—	+
Nitrobenzene	+	+	—	—	—	+	—	—	+
n-Pentane	++	++	+	+	+	++	+	+	++
Perchloroethylene	++	++	—	—	—	++	—	—	++
Pyridine	++	++	—	—	—	++	—	—	++
Tetrahydrofuran	++	++	—	++	—	++	—	—	++
Toluene	++	++	—	++	—	++	—	—	++
Trichloroethane	n.a.	n.a.	—	—	—	n.a.	—	—	n.a.
Trichloroethylene	++	++	—	++	—	++	—	—	++
Xylene	+	+	—	—	—	+	—	—	+
Acids									
Acetic acid, 25%	+	+	—	—	—	—	—	—	+
Acetic acid, 80%	+	+	—	—	—	—	—	—	+
Hydrofluoric acid, 25%	+	+	—	—	+	—	+	+	+
Hydrofluoric acid, 50%	+	+	—	—	—	—	+	+	+
Hydrochloric acid, 15%	—	+	+	+	+	—	+	+	+
Hydrochloric acid, 20%	—	+	—	—	+	—	+	+	+
Nitric acid, 30%	—	+	—	—	—	—	+	+	+
Nitric acid, conc.	—	—	—	—	—	—	—	—	—
Perchloric acid, 25%	—	+	—	—	—	—	n.a.	n.a.	+
Phosphoric acid, 1%	—	+	+	+	+	—	+	+	+
Phosphoric acid, 86%	—	+	+	+	+	—	+	+	+
Sulfuric acid, 25%	+	++	—	—	+	—	+	+	++
Sulfuric acid, 98%	—	+	—	—	—	—	—	—	+
Trichloroacetic acid, 25%	+	+	—	—	—	—	—	—	+
Bases									
Ammonia, 1N	+	++	—	—	—	++	—	—	++
Ammonium hydroxide, 25%	+	+	—	—	—	+	—	—	+
Potassium hydroxide, 32%	—	++	—	—	—	+	—	—	++
Sodium hydroxide, 32%	—	+	—	—	—	+	—	—	+
Sodium hydroxide, 1N	+	++	—	—	—	++	—	—	++
Aqueous Solutions									
Formalin, 30%	+	+	+	+	+	+	+	+	+
Sodium hypochlorite, 5%	—	+	—	—	+	—	+	+	+
Hydrogen peroxide, 35%	—	++	—	—	+	—	+	+	++

Legend

Compatible: ++
 Limited compatibility: +
 Not compatible: —
 MBS: Methacrylate Butadiene Styrene
 PP: Polypropylene
 n.a.: Not analyzed

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. Both membrane & housing compatibility need to be considered together.

Ordering Information



	4mm Diameter for ≤2 mL sample volumes		15mm Diameter for 2–10 mL sample volumes		25–30mm Diameter for 10–100 mL sample volumes	
Membrane Type/Size	Part No.	Unit	Part No.	Unit	Part No.	Unit
0.20 µm						
Phenex-RC (Regenerated Cellulose)	AF0-3203-12	100/pk	AF0-2203-12	100/pk	AF0-8203-12	100/pk
	AF0-3203-52	500/pk	AF0-2203-52	500/pk	AF0-8203-52	500/pk
Phenex-PES ² (Polyethersulfone)	—	—	—	—	AF0-8208-12	100/pk
	—	—	—	—	AF0-8208-52	500/pk
Phenex-PTFE (Polytetrafluoroethylene)	AF0-3202-12	100/pk	AF0-2202-12	100/pk	AF0-1202-12	100/pk
	AF0-3202-52	500/pk	AF0-2202-52	500/pk	AF0-1202-52	500/pk
Phenex-NY (Nylon)	AF3-3207-12	100/pk	AF0-2207-12	100/pk	AF0-1207-12	100/pk
	AF3-3207-52	500/pk	AF0-2207-52	500/pk	AF0-1207-52	500/pk
Phenex-GF/NY ¹ (Glass Fiber/Nylon)	An integrated syringe filter unit containing an inert borosilicate glass fiber prefilter and a Nylon (NY) membrane. Excellent for filtration of particle-laden samples, such as foods and beverages, environmental, biofuels, and dissolution samples. Use less hand pressure to filter even the most difficult samples. Outlet connection is luer lock.				AF0-1A47-12	100/pk
					AF0-1A47-52	500/pk
Phenex-PVDF (Polyvinylidene Fluoride)	—	—	AF6-5206-12	100/pk	AF6-6206-12	100/pk
	—	—	AF6-5206-52	500/pk	AF6-6206-52	500/pk
Phenex-GF/PVDF (Glass Fiber/Polyvinylidene Fluoride)	An integrated syringe filter unit containing an inert borosilicate glass fiber prefilter and a PVDF membrane. The hydrophilic PVDF membrane provides high flow rates and throughput, low extractables and broad chemical compatibility. This membrane binds less protein than nylon or PTFE membranes.				AF6-6C06-12	100/pk
					AF6-6C06-52	500/pk
Phenex-CA ³ (Cellulose Acetate)	—	—	—	—	AF0-8204-12	100/pk
	—	—	—	—	AF0-8204-52	500/pk
Phenex-GF/CA ^{1,2,3} (Glass Fiber/Cellulose Acetate)	An integrated syringe filter unit containing an inert borosilicate glass fiber prefilter and a CA membrane. Excellent for filtration of tissue culture media, general biological sample filtration and clarification. Outlet connection is luer lock.				AF0-8A09-12	100/pk
					AF0-8A09-52	500/pk
0.45 µm						
Phenex-RC (Regenerated Cellulose)	AF0-3103-12	100/pk	AF0-2103-12	100/pk	AF0-8103-12	100/pk
	AF0-3103-52	500/pk	AF0-2103-52	500/pk	AF0-8103-52	500/pk
Phenex-PES ² (Polyethersulfone)	—	—	—	—	AF0-8108-12	100/pk
	—	—	—	—	AF0-8108-52	500/pk
Phenex-PTFE (Polytetrafluoroethylene)	AF0-3102-12	100/pk	AF0-2102-12	100/pk	AF0-1102-12	100/pk
	AF0-3102-52	500/pk	AF0-2102-52	500/pk	AF0-1102-52	500/pk
Phenex-NY (Nylon)	AF3-3107-12	100/pk	AF0-2107-12	100/pk	AF0-1107-12	100/pk
	AF3-3107-52	500/pk	AF0-2107-52	500/pk	AF0-1107-52	500/pk
Phenex-GF/NY ¹ (Glass Fiber/Nylon)	An integrated syringe filter unit containing an inert borosilicate glass fiber prefilter and a Nylon (NY) membrane. Excellent for filtration of particle-laden samples, such as foods and beverages, environmental, biofuels, and dissolution samples. Use less hand pressure to filter even the most difficult samples. Outlet connection is luer lock.				AF0-1B47-12	100/pk
					AF0-1B47-52	500/pk
Phenex-PVDF (Polyvinylidene Fluoride)	—	—	AF6-5106-12	100/pk	AF6-6106-12	100/pk
	—	—	AF6-5106-52	500/pk	AF6-6106-52	500/pk
Phenex-GF/PVDF (Glass Fiber/Polyvinylidene Fluoride)	An integrated syringe filter unit containing an inert borosilicate glass fiber prefilter and a PVDF membrane. The hydrophilic PVDF membrane provides high flow rates and throughput, low extractables and broad chemical compatibility. This membrane binds less protein than nylon or PTFE membranes.				AF6-6D06-12	100/pk
					AF6-6D06-52	500/pk
Phenex-GF/CA ^{1,2,3} (Glass Fiber/Cellulose Acetate)	An integrated syringe filter unit containing an inert borosilicate glass fiber prefilter and a CA membrane. Excellent for filtration of tissue culture media, general biological sample filtration and clarification. Outlet connection is luer lock.				AF0-8B09-12	100/pk
					AF0-8B09-52	500/pk
1.20 µm						
Phenex-GF ^{1,2} (Glass Fiber)	Prefiltration of heavily contaminated or highly viscous samples. When used in-line preceding a membrane filter, clogging of the membrane filter is prevented and sample clean up is optimized. Outlet connection is luer lock.				AF0-8515-12	100/pk
					AF0-8515-52	500/pk

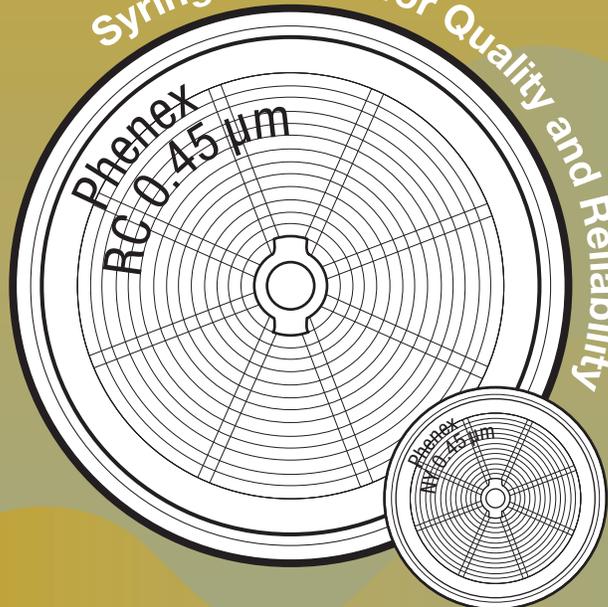
- Glass fiber filters are 28 mm diameter and made of borosilicate. They will remove 90% of all particles > 1.2 µm.
- Housing material is methacrylate butadiene styrene (MBS) polymerisate. Also known as Cyrolite®.
- Cellulose acetate is surfactant-free.

Above syringe filters are non-sterile. Housing is made of medical-grade polypropylene (PP). Luer lock inlet/slip outlet connections unless otherwise indicated. Additional dimensions and membrane types are available, including sterile filters. Please contact your local Phenomenex technical consultant or distributor for availability or assistance.



If Phenex Syringe Filters do not perform as well or better than your current syringe filter product of similar membrane, diameter and pore size, return the product with comparative data within 45 days for a FULL REFUND.

Syringe Filters for Quality and Reliability



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