Millipore

User Guide

Nonsterile 13 mm Millex® Syringe Filters

Millex®-FG, FH, LG, LCR, GV, HV, GN, HN, GP, HP

For laboratory use only

Introduction

This document provides chemical compatibility information, operating steps, and specifications for nonsterile 13 millimeter (mm) Millex® syringe filters. These syringe filters are recommended for filtering 1–10 milliliter (mL) volumes to remove particles prior to instrumentation analysis. The single-use, disposable filter removes particles larger than the membrane's rated pore size.

The Millex® syringe filter consists of a membrane sealed in a polypropylene housing. For details on the type of membrane in your Millex® filter, refer to the table below. The syringe filter is available with either a male Luer-slip outlet or an extended tube outlet. The extended tube outlet facilitates filtration into and out of cuvettes, small volume autosampler vials, and vial inserts by eliminating airlocks.

Filter	Membrane	Application
FG	0.20 µm hydrophobic PTFE (polytetrafluoroethylene)	Filtration of organic solutions
FH	0.45 µm hydrophobic PTFE	Filtration of organic solutions
LG	0.20 µm hydrophilic PTFE	Filtration of protein-containing solutions, and aqueous or organic solutions
LCR	0.45 µm hydrophilic PTFE	Filtration of protein-containing solutions, and aqueous or organic solutions
GV	0.22 µm PVDF (polyvinylidene fluoride)	Filtration of protein-containing solutions, and aqueous or mild organic solutions
HV	0.45 µm PVDF	Filtration of protein-containing solutions, and aqueous or mild organic solutions
GN	0.20 µm nylon	Filtration of aqueous or organic solutions
HN	0.45 µm nylon	Filtration of aqueous or organic solutions
GP	0.22 µm PES (polyethersulfone)	Filtration of protein-containing solutions, and aqueous or mild organic solutions
HP	0.45 µm PES	Filtration of protein-containing solutions, and aqueous or mild organic solutions

Chemical Compatibility

Millex® syringe filters are compatible with aqueous, mild organic, and organic solutions. You can use them to filter the agents listed in the following table. This information was developed from technical publications, materials suppliers, and laboratory tests, and is believed to be accurate and reliable. However, because of variability in temperature, concentrations, exposure time, and other factors beyond our control that may affect the use of the unit, no warranty is provided or implied with respect to such information. Agents not listed in the following table should be tested with the Millex® syringe filter prior to use.

NOTE: For low extractable HPLC instrumentation analysis applications, it is recommended that you discard the first 1 mL or rinse with 1 to 2 mL of primary solvent before sample filtration.

Chemical Compatibility, continued

Acetic acid, glacial [1]	Formaldehyde	Nitrogen
Acetone [2, 3]	Formic acid (50%) [1, 3]	Ozone (10 ppm in water)
Acetonitrile [3]	Freon® (TF or PCA) solvent	Paraldehyde
Ammonium hydroxide [1, 3]	Gasoline [3]	Perchloroethylene [1, 3]
Ammonium sulfate (saturated) [2, 3]	Glycerine (glycerol)	Petroleum based oils [3]
Amyl acetate [3]	Helium	Petroleum ether [3]
Amyl alcohol	Hexane [3]	Phenol (10%)
Benzyl alcohol	Hydrochloric acid [1]	Potassium hydroxide [1, 3]
Boric acid	Hydrofluoric acid [1]	Pyridine [1, 2, 3]
Butyl alcohol	Hydrogen	Silicone oils
Cellosolve® (ethyl) solvent [3]	Hydrogen peroxide (3%)	Sodium carbonate (aqueous solution) [1, 3]
Chloroform [1, 3]	Hypo (sodium thiosulfate) [3]	Sodium chloride (2 M)
Cyclohexane [3]	Isobutyl alcohol	Sodium hydroxide (3 N) [1, 3]
Cyclohexanone [2, 3]	Isopropyl acetate [3]	Sulfuric acid (3 N) [1]
Dimethylacetamide [2, 3]	Isopropyl alcohol	Tetrahydrofuran [3]
Dimethylformamide [2, 3]	Kerosene [3]	Toluene [3]
Dimethylsulfoxide [2, 3]	Lactic acid (50%) [1, 2, 3]	Trichloroacetic acid (aqueous solution) [1, 3]
Dioxane [3]	Methyl alcohol	Trichloroethane [1, 3]
Ethers [3]	Methylene chloride [1, 3]	Trichloroethylene [1, 3]
Ethyl acetate [3]	Methyl ethyl ketone [2, 3]	Trifluoroacetic acid [1, 3]
Ethyl alcohol	Methyl isobutyl ketone [2, 3]	Urea (8 M) [3]
Ethylene glycol	Mineral spirits [3]	Xylene [3]

[1] Not compatible with GN and HN [2] Not compatible with GV and HV [3] Not compatible with GP and HP

How to Use 13 mm Millex® Syringe Filters

WARNINGS:

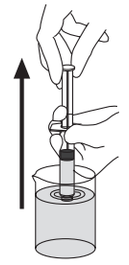
- The 13 mm Millex® syringe filter is intended for laboratory use only and is not a medical device for direct patient care applications.
- Do not use with syringes smaller than 10 mL because pressures in excess of the maximum pressure rating may be reached, potentially causing damage to the filter unit and/or personal injury.

CAUTIONS:

- Do not use the syringe filter at temperatures above 45 °C (113 °F).
- Do not use the same 13 mm syringe filter to filter solutions in both directions.
- Do not reuse the syringe filter.
- Do not use the syringe filter to filter emulsions or suspensions.
- Perform a binding study before use if there is a concern about loss of analyte (proteins, nucleic acids, active pharmaceuticals) due to binding.

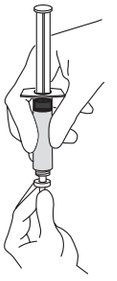
Instructions for Use

1



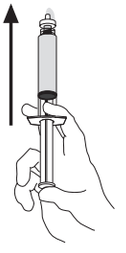
Fill the syringe with the solution to be filtered.

2



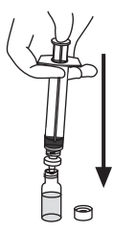
Attach the syringe to the Millex® syringe filter.

3



Hold the syringe with filter pointing up and "top off" by pushing a few drops through the filter.

4



Push the syringe plunger to deliver a filtered solution.

Optional: To purge the syringe filter and maximize sample throughput, remove the Millex® filter from the syringe and draw air into the syringe. Then reattach the Millex® filter and push the plunger to force some of the air through the filter.

Specifications

Housing	Polypropylene
Membrane	
FG, FH	Hydrophobic Fluoropore® PTFE
LG, LCR	Hydrophilic PTFE
GV, HV	Hydrophilic Durapore® PVDF
GN, HN	Hydrophilic nylon
GP, HP	Hydrophilic Millipore Express® PES
Dimensions	
Inlet to outlet	21 mm (0.83 in.)
Diameter	19 mm (0.75 in.)
Filtration surface area	0.8 cm^2 (0.12 in^2)
Pore size	
GV, GP	0.22 µm
FG, LG, GN	0.20 µm
FH, LCR, HV, HN, HP	0.45 µm
Temperature limit	45 °C (113 °F)
Connections	Female Luer-Lok™ inlet, male Luer-slip outlet or male Luer-slip outlet extended by tube
Pressure limit at 21 °C	10.3 bar (150 psi) differential
Filtration volume	1–10 mL
Hold-up volume	≤ 15 µL after air purge at pressure that exceeds bubble point of membrane

Performance

Membrane Type	Typical Flow Rate at 21 °C and 2.1 bar (30 psi)	Bubble Point	Solvent Used
FG	53 mL/min	≥ 0.8 bar (≥ 11 psi)	Methanol
FH	137 mL/min	≥ 0.6 bar (≥ 8 psi)	Methanol
LG	43 mL/min	≥ 3.0 bar (≥ 43 psi)	Water
LCR	107 mL/min	≥ 1.4 bar (≥ 21 psi)	Water
GV	16 mL/min	≥ 3.4 bar (≥ 50 psi)	Water
HV	101 mL/min	≥ 1.5 bar (≥ 22 psi)	Water
GN	18 mL/min	≥ 3.0 bar (≥ 43 psi)	Water
HN	37 mL/min	≥ 2.2 bar (≥ 32 psi)	Water
GP	48 mL/min	≥ 4.1 bar (≥ 59 psi)	Water
HP	104 mL/min	≥ 2.0 bar (≥ 29 psi)	Water

HPLC Certification

Millex®-LG, LCR, GN, and HN 13 mm syringe filters are tested for UV-absorbing extractables. HPLC analysis of 1 mL samples of acetonitrile and water collected after discarding the first 1 mL of solvent showed no peaks greater in intensity than 0.004 AUFS (after column frontal volume) at either 214 or 254 nm. Representative samples of all lots manufactured are tested.

Product Ordering Information

This section lists the catalogue numbers for 13 mm non-sterile Millex® syringe filters. See the Technical Assistance section for contact information. You can purchase these products on-line at www.sigmaaldrich.com/products.

		Catalogue Number		
Syringe Filter	**Color**	**(Luer-slip outlet)**	**(Tube outlet)**	**Qty/pk**
Millex®-FG, PTFE membrane, 0.20 µm	Red	SLFGX13NL	SLFGX13TL	100
Millex®-FG, PTFE membrane, 0.20 µm	Red	SLFGX13NK	–	1000
Millex®-FH, PTFE membrane, 0.45 µm	Red	SLFHX13NL	SLFHX13TL	100
Millex®-FH, PTFE membrane, 0.45 µm	Red	SLFHX13NK	–	1000
Millex®-LG, PTFE membrane, 0.20 µm	Light Blue	SLLGX13NL	–	100
Millex®-LG, PTFE membrane, 0.20 µm	Light Blue	SLLGX13NK	–	1000
Millex®-LCR, PTFE membrane, 0.45 µm	Light Blue	SLCRX13NL	SLCRX13TL	100
Millex®-LCR, PTFE membrane, 0.45 µm	Light Blue	SLCRX13NK	–	1000
Millex®-GV, PVDF membrane, 0.22 µm	Yellow	SLGVX13NL	SLGVX13TL	100
Millex®-GV, PVDF membrane, 0.22 µm	Yellow	SLGVX13NK	–	1000
Millex®-HV, PVDF membrane, 0.45 µm	Yellow	SLHVX13NL	SLHVX13TL	100
Millex®-HV, PVDF membrane, 0.45 µm	Yellow	SLHVX13NK	–	1000
Millex®-GN, Nylon membrane, 0.20 µm	Purple	SLGNX13NL	SLGNX13TL	100
Millex®-GN, Nylon membrane, 0.20 µm	Purple	SLGNX13NK	–	1000
Millex®-HN, Nylon membrane, 0.45 µm	Purple	SLHNX13NL	SLHNX13TL	100
Millex®-HN, Nylon membrane, 0.45 µm	Purple	SLHNX13NK	–	1000
Millex®-GP, PES membrane, 0.22 µm	Green	SLGPX13NL	–	100
Millex®-GP, PES membrane, 0.22 µm	Green	SLGPX13NK	–	1000
Millex®-HP, PES membrane, 0.45 µm	Green	SLHPX13NL	–	100
Millex®-HP, PES membrane, 0.45 µm	Green	SLHPX13NK	–	1000

Notice

We provide information and advice to our customers on application technologies and regulatory matters to the best of our knowledge and ability, but without obligation or liability. Existing laws and regulations are to be observed in all cases by our customers. This also applies in respect to any rights of third parties. Our information and advice do not relieve our customers of their own responsibility for checking the suitability of our products for the envisaged purpose.

Contact Information

For the location of the office nearest you, go to www.sigmaaldrich.com/offices.

Technical Assistance

Visit the tech service page on our web site at www.sigmaaldrich.com/techservice.

Standard Warranty

The applicable warranty for the products listed in this publication may be found at www.sigmaaldrich.com/terms (“Conditions of Sale”).

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