User Guide

Non-Sterile

4 mm Millex® Syringe Filters

Millex®-FG, FH, GV, HV, LG, LH

For laboratory use only

Introduction

This document provides chemical compatibility information, operating steps, and specifications for non-sterile 4 millimeter (mm) Millex® syringe filters. These filters are recommended for filtering volumes up to 1 milliliter (mL) 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 polyethylene housing. For details on the type of membrane in your Millex® filter unit, refer to the table below. The stepped outlet facilitates filtration into small vials or vial inserts by eliminating air locks. Where required by the application, the outlet also allows a Luer connection to be made.

Filter	Membrane	Application
FG	0.2 µm hydrophobic PTFE (polytetrafluoroethylene)	Removal of fine particles from organic solutions, also venting applications
FH	0.45 µm hydrophobic PTFE	Clarification of organic solutions
GV	0.22 µm hydrophilic PVDF (polyvinylidene fluoride)	Removal of fine particles from aqueous, protein-containing, or mild organic solutions
HV	0.45 µm hydrophilic PVDF	Clarification of aqueous, protein-containing, or mild organic solutions
LG	0.2 µm hydrophilic PTFE	Removal of fine particles from aqueous, protein-containing, or organic solutions
LH	0.45 µm hydrophilic PTFE	Clarification of aqueous, protein-containing, or 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.

Chemical Compatibility, continued

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 below should be tested with the Millex® syringe filter prior to use.

Chemical

Acetic acid, glacial	Cyclohexane	Hydrogen	Perchloroethylene
Acetone[1]	Dimethyl sulfoxide[1]	Hydrogen peroxide (3%)	Petroleum based oils
Amyl acetate	Ethers	Isobutyl alcohol	Phenol (10%)
Amyl alcohol	Ethyl acetate	Isopropyl acetate	Pyridine[1]
Benzene	Ethylene glycol	Kerosene	Silicone oils
Benzyl alcohol	Formaldehyde	Methyl ethyl ketone	Sulfuric acid (3 N)
Boric acid	Freon® (TF or PCA) solvent	Methyl isobutyl ketone	Tetrahydrofuran
Brine (sea water)	Gasoline	Mineral spirits	Toluene
Butyl alcohol	Glycerine (Glycerol)	Nitrobenzene	Trichloroethane
Carbon tetrachloride	Helium	Nitrogen	Trichloroethylene
Cellosolve® (ethyl)	Hydrochloric acid	Ozone (10 ppm in water)	Trifluoroacetic acid
solvent	Hydrofluoric acid	Paraldehyde	Xylene

[1] Not compatible with GV and HV

The 4 mm syringe filters can be used to filter the agents listed below for low extractable HPLC instrumentation analysis applications.

NOTE: It is recommended that you discard the first 1 mL, or rinse with 1 to 2 mL of primary solvent before sample filtration.

Acetonitrile	Dimethylformamide[1]	Hexane	Methylene chloride
Chloroform	Dioxane	Isopropyl alcohol	Pentane
Dimethylacetamide[1]	Ethyl alcohol	Methyl alcohol	Petroleum ether

[1] Not compatible with GV and HV

How to Use 4 mm Millex® Syringe Filters

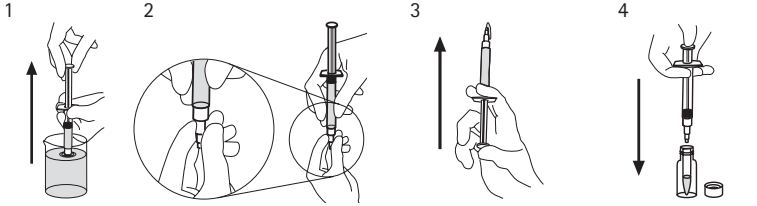
WARNINGS:

- **The 4 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 syringe filter and/or personal injury.**

CAUTIONS:

- Do not use the syringe filter at temperatures above 45 °C (113 °F).
- Before filtering protein-containing solutions, evaluate binding of sample to filter.
- Do not use the same syringe filter to filter solutions in both directions.
- Do not reuse the syringe filter.

How to Use 4 mm Millex® Syringe Filters, continued



1. Fill the syringe with the solution to be filtered.
2. Attach the syringe to the 4 mm 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 Millex® filter and maximize sample throughput, remove the filter from the syringe and draw air into the syringe. Then reattach the filter and push the plunger to force some of the air through the filter.

Specifications

Housing	High density polyethylene
Membrane	
FG, FH	Fluoropore™ hydrophobic PTFE
GV, HV	Durapore® hydrophilic PVDF
LG, LH	LCR hydrophilic PTFE
Dimensions	
Inlet to outlet	19.7 mm (0.78 in.)
Diameter	6.4 mm (0.25 in.)
Filtration surface area	0.1 cm^2 (0.016 in^2)
Pore size	
FG, LG	0.2 µm
GV	0.22 µm
FH, LH, HV	0.45 µm
Temperature limit	45 °C (113 °F) maximum
Pressure limit at 25 °C	14 bar (200 psi) differential
Filtration volume	≤ 1 mL
Hold-up volume	≤ 10 µL after air purge that exceeds bubble point of membrane
Typical flow rate at 25 °C and 2.1 bar (30 psi)	
FG	4.5 mL/min (methanol)
FH	10.9 mL/min (methanol)
GV	1.7 mL/min (water)
HV	5.7 mL/min (water)
LG	3.8 mL/min (water)
LH	8.3 mL/min (water)
Connections	Female Luer-Lok™ inlet Stepped male Luer-slip outlet

Product Ordering Information

This section lists the catalogue numbers for 4 mm non-sterile Millex® syringe filters. See the Technical Assistance section for contact information. You can purchase these products on-line at www.millipore.com/products.

4 mm Millex® Syringe filter	100/pk	1000/pk
Millex®-FG, hydrophobic PTFE membrane, 0.2 µm	SLFGR04NL	
Millex®-FH, hydrophobic PTFE membrane, 0.45 µm	SLFHR04NL	
Millex®-GV, hydrophilic PVDF membrane, 0.22 µm	SLGVR04NL	SLGVR04NK
Millex®-HV, hydrophilic PVDF membrane, 0.45 µm	SLHVR04NL	SLHVR04NK
Millex®-LG, hydrophilic PTFE membrane, 0.2 µm	SLLGR04NL	
Millex®-LH, hydrophilic PTFE membrane, 0.45 µm	SLLHR04NL	SLLHR04NK

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Standard Warranty

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

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