SiMPore
Precision Membrane Technologies™

Simpore.com

Filter Disks

for Microplastics Capture & Analysis

INSTRUCTIONS FOR USE

Product Numbers:
FD Product Family

Customer Service
info@simpore.com
Phone: 585-214-0585

Order Information
sales@simpore.com
Phone: 888-323-NANO
Fax: 888-249-2935

Table of Contents

Kit Materials and Requirements

Provided Kit Materials

- Pre-Cut Silicone Gasket Pair (2)
- 13 / 25 mm Filter Disks (10)
- 2-position Shipping Tray

Required Equipment & Supplies

Equipment

- Vacuum filtration apparatus, 13/25 mm diameter
- Vacuum source

Supplies

- Tweezers suitable for Filter Disk manipulation (SiMPore K6TWZR, or equivalent)
- User-supplied tubing or fluidic interface(s)

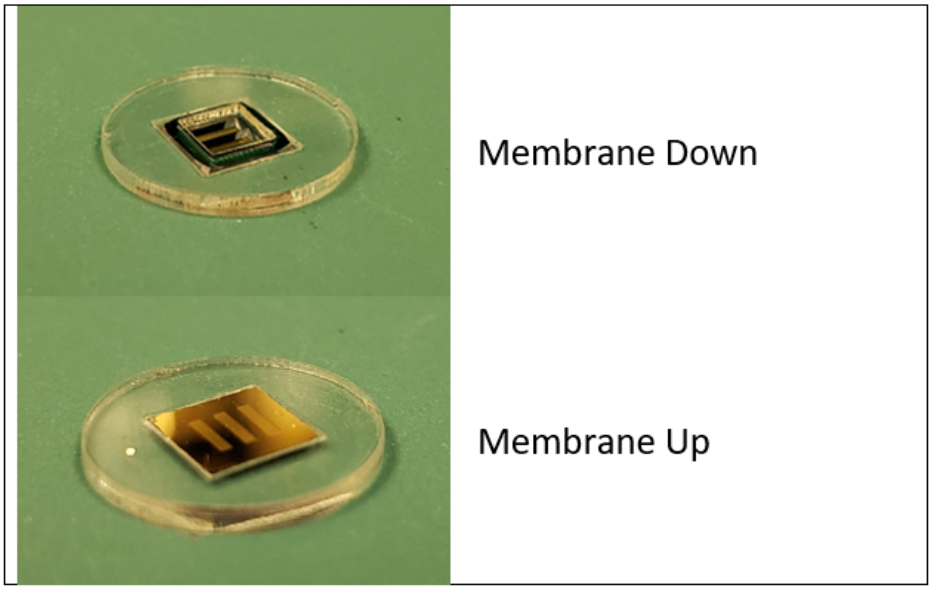


Figure 1: Filter Disk Orientation. “Membrane down” and “membrane up” orientations of the supplied Filter Disks are shown. When using Filter Disks, the “membrane down” side should face the vacuum source and the “membrane up” side should face the liquid sample.

Instructions

Please read all **instructions** before proceeding.

NOTE: HANDLE FILTER DISK ONLY BY THE PLASTIC HOUSING TO PREVENT FILTER DAMAGE.

Filter Disk Installation and Filtration

1. Assemble filtration apparatus as per vendor instructions.
2. Using tweezers or gloved fingers, retrieve both silicone gaskets included with the packaging and clean these in a similar fashion as labware would be cleaned prior to filtration.
3. Using tweezers or gloved fingers, retrieve one silicone gasket and place onto the frit or outflow support of the filtration apparatus.
4. Using tweezers, transfer a Filter Disk and place on top of the previously placed gasket such that the Filter Disk's membrane is **up,** per **Figure 1.**
5. Using tweezers of gloved fingers, retrieve the second silicone gasket and place it on top of the Filter Disk, ensuring that the second silicone gasket never touches the Filter Disk's membrane.

NOTE: Any contact with the membrane surface may damage or destroy the membrane.

6. Add the upper funnel assembly or media inlet device assembly and securely fasten with vendor-supplied hardware.
7. Attach a vacuum source and filter accordingly.
8. Process all liquid through the Filter Disk to dryness, then disassemble and place the Filter Disk on a clean, dry surface until analysis.

NOTE: Do not exceed 15 PSI differential pressure as membrane damage may occur.

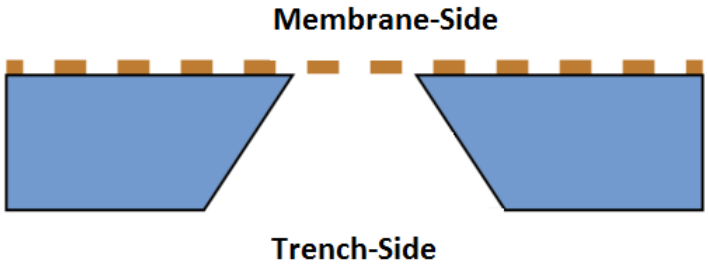


Figure 2: Membrane Chip Geometry. SiMPore membranes are deposited across the surface of a silicon wafer support material. Access to the ultra-thin membrane is achieved by etching trenches through the thicker silicon wafer support, yielding the cross-sectional geometry shown above. One of the resulting membrane chips is assembled into the supplied Filter Disks.

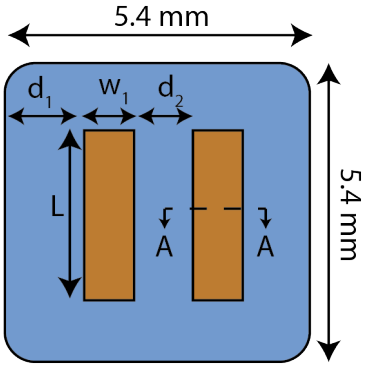
Tips And Troubleshooting

- **Inspection:** Prior to assembling the device, carefully inspect the surface of the Filter Disk's membrane and gaskets for debris. If found, CDA or compressed N_2 may be used to clean the surface(s).
- **Packaging:** Silicone gaskets for use with filtration are included as part of the packaging. This is to prevent shifting and rubbing during shipment, which in turn prevents particle generation. Silicone gaskets are cleaned prior to shipment, but should be cleaned again prior to use.
- **General Use of Gaskets:** The flexible silicone gaskets may be reused, but appropriate cleaning protocols should be conducted before and between filtration events. For instance, clean silicone gaskets in a similar fashion as one would clean labware.
- **General Use of Filter Disks:** Filter Disks are a one-time-use consumable and cannot be cleaned nor re-used for filtration of a second sample. Any attempt to do so may result in membrane damage or breakage and loss of the previously captured sample.
- **Filtration Rates:** The liquid flow rate through the Filter Disk will vary depending on pore size cutoff, membrane porosity, and samples' total dissolved solids. Generally, clear water samples should filter at a rate of 100 ml/min with suitable backpressure (~8-20 PSI). Flux through the membrane will slow or may stop completely if a cake layer forms, particularly with heterogeneous particulate-loaded or high dissolved solid suspensions. If fouling occurs, discontinue filtration, and either dilute the sample with deionized water or process a smaller volume with a new Filter Disk.
- **Proper Sealing:** Best filtration performance is achieved when a tight seal is formed between the filtration apparatus, silicone gaskets, and the Filter Disk. During assembly, ensure no excessive movement or misalignment of the sandwiched layers has occurred, which could affect filtration performance. Poorly aligned gaskets may cause fluid leakage from the sides of the layers, or create an aspiration of air into the system when vacuum is applied.

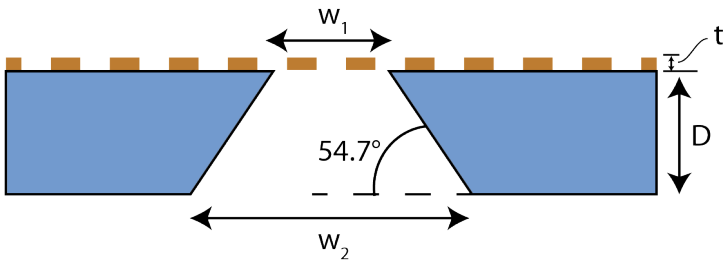
Physical Properties

Property	Value
Membrane Composition	Silicon Nitride (SiN)
Membrane Surface Area	1.4 mm^2 (single slot), 6.3 mm^2 (three slot), 9 mm^2 (one square window)
Maximum Differential Pressure	15 PSI
Membrane Thickness	100 nm (NPN) / 400 nm (SiN)
Pore Size Cut-Off	varies
Porosity	varies
Surface Charge	Neutral to slightly negative
Surface Coating	Varies (Low Binding, 120nm Au, 200nm Al)
Wetted Components Material(s)	Si, SiN, Au/Al, Medical Grade PSA

Membrane Specifications



top view



x-section A-A

Dimension Type	Dimension ID	Membrane Window Format (Dimensions in um)						
		1 Slot	2 Slot	3 Slot	4 Slot	5 Slot	1 Square	
Frame Thickness	D	310 µm						
Window Width	W1	700	700	700	300	150	1000	2000
Membrane Window Length	L	2000	2500	3000	3000	3000	1000	2000
Frame Window Width	W2	1138	1138	1138	738	538		
Edge Margin (Sides)	d1	2300	1625	1100				
Window Gap	d2	N/A	750	500				
Membrane Surface Area	A	1.4mm^2	3.5 mm^2	6.3 mm^2	3.6 mm^2	1.5 mm^2	1 mm^2	2 mm^2
Example Applications		Cell Culture, Flow Cells, Microfluidics		Dead-End Filtration, Microfluidics			Cell Culture	

Sterilization

Filter Disks may be sterilized via Ethylene Oxide, Hydrogen Peroxide Gas, 70% IPA immersion, gamma, UV, and E-Beam irradiation after removal from the shipping container. **Do Not** Sterilize via steam autoclave as damage may occur.

Chemical Stability

Filter Disks are incompatible with strong bases, as membrane degradation may occur. Avoid long exposure durations to solvents, as this may compromise Filter Disk integrity. Do not apply solvents, acids, bases, organics, or other compounds that are incompatible with the stated device components.

Filter Disks Storage

Store in a clean and dry environment, preferably at room temperature conditions (21°C, 50% RH). Prolonged exposure to UV may discolor some of the Filter Disk's components, but should not affect filter performance.

STANDARD WARRANTY

SiMPore Inc. (“SiMPore”) warrants its products will meet their applicable published specifications when used in accordance with their applicable instructions for a period of one year from shipment of the products. **SIMPORE MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED. THERE IS NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

The warranty provided herein and the data, specifications, and descriptions of SiMPore products appearing in SiMPore’s published catalogs and product literature may not be altered except by express written agreement signed by an officer of SiMPore.

Representations, oral or written, which are inconsistent with this warranty or such publications are not authorized and if given, should not be relied upon.

In the event of a breach of the foregoing warranty, SiMPore’s sole obligation shall be to repair or replace, at its option, the applicable product or part thereof, provided the customer notifies SiMPore promptly of any such breach. If after exercising reasonable efforts, SiMPore is unable to repair or replace the product or part, then SiMPore shall refund to the customer all monies paid for such applicable product or part. **SIMPORE SHALL NOT BE LIABLE FOR CONSEQUENTIAL, INCIDENTAL, SPECIAL, OR ANY OTHER INDIRECT DAMAGES RESULTING FROM ECONOMIC LOSS OR PROPERTY DAMAGE SUSTAINED BY ANY CUSTOMER FROM THE USE OF ITS PRODUCTS.**

Patents

Patent-pending: EP3837544, US20210215584, and US20210129146