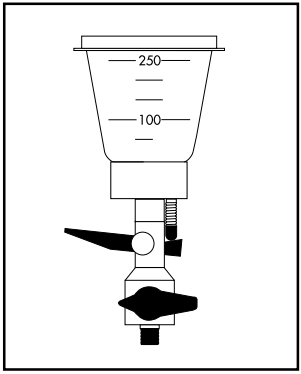
MILLIPORE

Microfil®
User Guide



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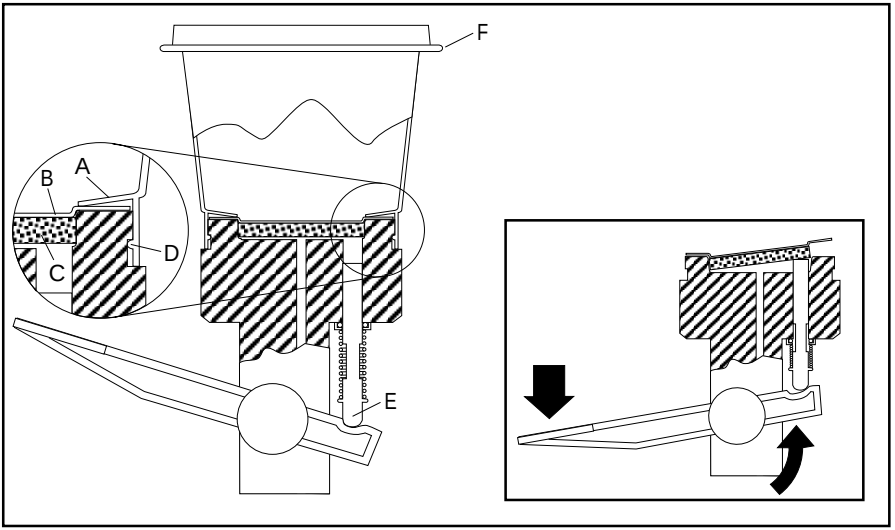
Contents

Introduction

The Microfil® system is fast, reliable and convenient, consisting of unique ready-to-use funnels, membranes, and a stainless steel vacuum support. Equipment cleanup, assembly, packaging, and autoclaving are minimized and the system is much easier to use than conventional test systems. Because the Microfil system is simple to use, operator error is minimized. No clamps or complicated sealing mechanisms are required to ensure a perfect interface between funnel, membrane and support. The Microfil system should be used in conjunction with the EZ-Pak® membrane dispenser for maximum ease of use, speed and cleanliness.

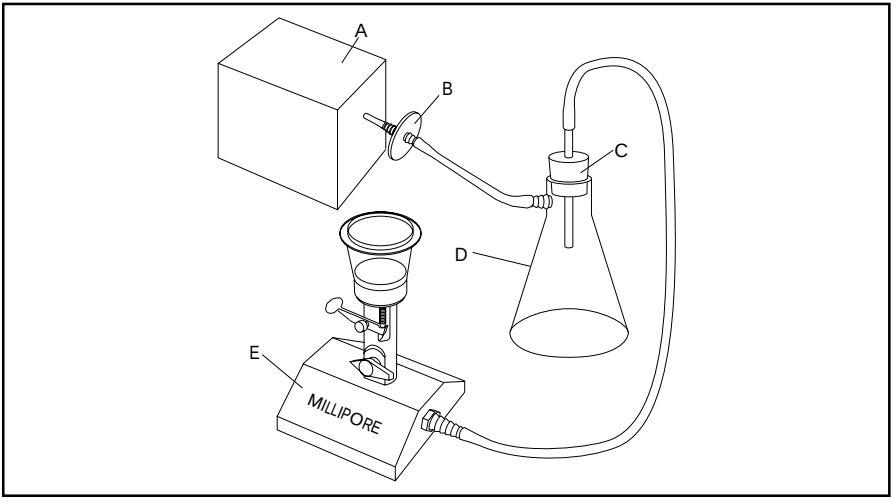
The Microfil system has been carefully designed to provide a more secure and reliable microbiological test. The membrane transfer has been simplified by use of a membrane-lifting device that simultaneously equalizes the vacuum on both sides of the membrane prior to removal. The individual supports can easily be disassembled from the manifold when limited autoclave space is available. As cellulosic membranes expand when they are wetted, the Microfil support design and specific dimensions prevent membrane distortion by giving the filter a “saucer” shape. It is then much easier to transfer onto the media without trapping air bubbles under the membrane. In addition, the funnel is constructed of a hydrophobic polymer that ensures that the sample and microorganisms pass onto the membrane and are not retained on the funnel walls.

Diagram of Microfil Components



A — Flexible lip seal
B — Membrane
C — Stainless steel frit
D — Clamping ring
E — Membrane lifting mechanism
F — Upper rim

Overview of Microfil System



A — Pump (Cat. No. XX55 220 50 for 3-place manifold; Cat. No. XF54 230 50 for stand alone manifold; Cat. No. MIAC HVP 01 for hand vacuum pump)

B — Millex-FG$_{50}$ (Cat. No. SLFG 050 10)

C — #8 Stopper (Cat. No. XX20 047 18)

D — Vacuum flask (Cat. No. XX10 047 05 for 1 L; Cat No. XX10 047 44 for 4 L)

E — Manifold (Cat No. MIAC 01P 01 for stand alone manifold; Cat. No. MIAC 03P 01 for 3-place manifold)

Applications

The Microfil system can be used for microbiological analyses in the following applications.

Potable Water

The Microfil system provides an efficient method for monitoring bacterial contamination in potable and raw water supplies. Microfil cellulosic membranes are manufactured and tested in accordance with procedures referenced in Standard Methods (current edition) and Laboratory standards for equipment and materials set forth by the U.S. Environmental Protection Agency (EPA). The recovery tests performed on each batch are conducted according to ISO 7704: “Evaluation of membrane filters used for microbiological analysis.” Recovery results using the Microfil system meet or exceed the highest suggested recoveries.

Beverages

The Microfil method is ideal for testing soft drinks, mineral water, beer, and wines as well as the aqueous raw materials used during their manufacture.

The 250 mL Microfil funnel is designed for maximum convenience in testing mineral water according to European Council Directives or in testing of foaming beverages such as beer.

Processing a Sample

This section outlines the procedure necessary to use the Microfil system.

Necessary Equipment

To conduct microbial enumeration on a batch of aqueous filterable samples you will need:

- Samples collected in suitable sterile containers
- A Microfil funnel for each sample
- An S-Pak™ or an EZ-Pak membrane for each filtration

NOTE: Where the samples to be tested either contain solvents incompatible with the cellulosic membranes or contain some bacteriostatic compounds that require substantial rinsing of the membrane to prevent growth inhibition, the use of Durapore® membrane may be recommended. Please contact your nearest Millipore office for further details.

- At least one Microfil stainless steel support autoclaved prior to testing

NOTE: Remove protective cap before autoclaving. The cap is used only during shipping to hold the frit in place.

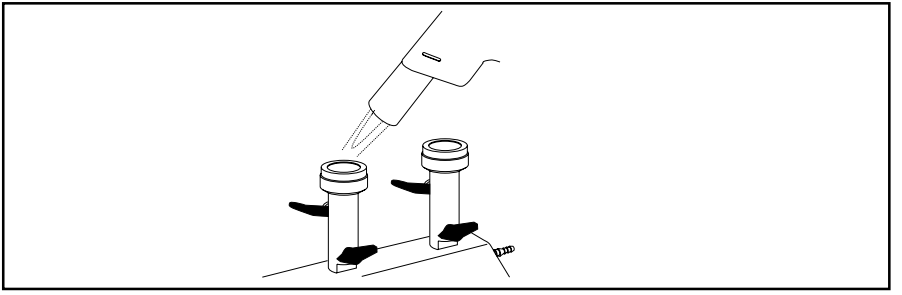
- A 3-place stainless steel vacuum manifold (except when using the stand alone Microfil support)
- A vacuum supply and filtrate collection flask
- Solid or liquid nutrient media
- A 47 mm or a 55 mm Petri dish (solid media) or Petri-Pad™ unit (liquid media)
- Filter forceps
- An incubator
- A funnel dispenser (optional)
- A flame for sanitizing support surface between samples

Procedure

The simple steps required to process a sample are as follows.

NOTE: All steps should be conducted using aseptic technique.

1. Prepare sufficient solid or liquid medium in suitable sterile Petri dishes or Petri-Pads to process a batch.
2. Flame the surface of the Microfil support for 3-5 seconds, paying particular attention to the outer edges.

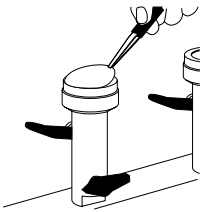


3. a) Open an S-Pak membrane envelope by peeling back one of the two “easy-to-open” corners.

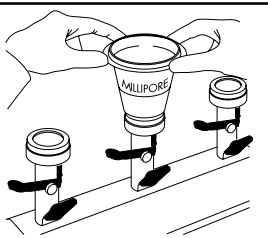
   b) Alternatively, press the lever of the EZ-Pak dispenser to unwrap and dispense a sterile membrane filter.

Procedure, continued

4. Using flamed and cooled forceps, remove the membrane and place it gridded side up onto the center of the stainless steel support.



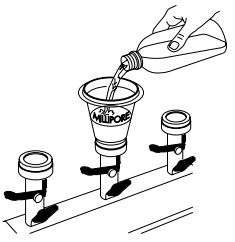
5. Open a pack of funnels from the bottom (V shape sealing). Remove a funnel, base first, from the pack. Grasp the funnel from the middle and position it carefully onto the support. Press on the upper rim until the funnel snaps into position. Do not touch the flexible seal or the interior of the funnel.



NOTE: If you are using the funnel dispenser, see the “Using the Funnel Dispenser” section for more information.

Procedure, continued

6. Fold the packaging over the remaining funnels to close and prevent entry of airborne contamination. (You may use a clip to keep the packaging closed.)
7. Pour the sample into the funnel, aligning the bottom of the meniscus with the desired graduation.



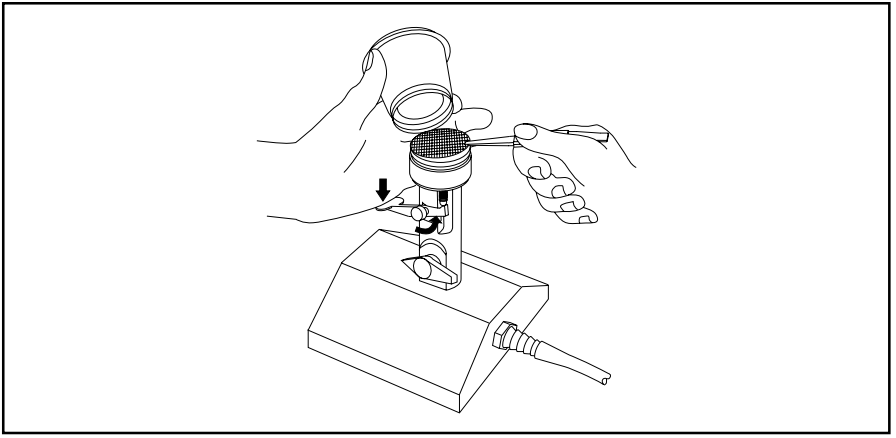
8. Filter the sample under vacuum until the sample has passed entirely through the membrane.

   NOTE: A membrane/funnel rinse may be performed at this stage if necessary. Microfil funnels are designed to prevent sample retention and do not normally require rinsing.

9. Close valve to vacuum.

Procedure, continued

10. Grasp the funnel under the rim and tilt it gently backwards to remove it from the support. Then lower your hand holding the funnel to the lever and depress it using the side of your hand, simultaneously venting the vacuum and lifting the membrane.



Procedure, continued

11. Pick up the membrane using flamed forceps held in your other hand.
12. Transfer the membrane to either a Petri dish filled with solid medium or a Petri-Pad wetted with a suitable liquid medium.

    NOTE: See the “Product Ordering Information” section for a list of available media.
13. If no further filtration of the same sample is required, discard the funnel. If further filtration is required, place a new membrane on the stainless steel support by repeating steps 3 and 4, then replace the funnel on the support, pressing on the upper rim until it snaps back into place. Repeat steps 7 to 13 as required.
14. Transfer the Petri dish(es) to an incubator, membrane surface facing down.

Using the Funnel Dispenser

The funnel dispenser is designed to allow rapid dispensing of Microfil funnels without compromising sterility. It can be used with or without laminar flow facilities.

NOTE: Each funnel should be dispensed only prior to immediate use.

Procedure

1. Open a sleeve of funnels at the base of the pack.

   NOTE: If you are using 100 mL funnels, choose a 24-count sleeve for use with S-Pak membrane filters or a 25-count sleeve for use with EZ-Pak membranes. For 250 mL funnels, a 30-count sleeve can be used with either type of membrane.

2. Stand the sleeve on a hard surface, opened side up, and slide the dispenser magazine down between the funnels and packaging.
3. Insert and position the magazine, with the funnels and packaging, on the dispenser while holding the funnels straight and in place through the packaging with the thumb and index finger. Avoid catching packaging between the funnel dispenser magazine and base.
4. Leave the packaging in place for use in uncontrolled environments, (i.e. other than laminar flow).
5. To gain access to a funnel, stabilize the dispenser with the index finger and fully slide the dispenser lever sideways with the thumb. A funnel will automatically drop into position.
6. Remove the funnel and process the sample as described in the “Processing a Sample” section.

System Maintenance

The Microfil funnels and membranes are not reusable and should be discarded after single use.

Adapting manifold setup for right- or left-handed users

If you need to reconfigure the manifold setup in order to use it more comfortably, follow the procedure below.

1. Turn manifold tubing adaptor to the side closest to the vacuum source.
2. Change the orientation of the lever by disconnecting the vacuum tubing attached to the bottom of the stem, unscrewing the wingnut, and rotating the stem 180°. Then retighten the wing nut and reconnect the tubing.
3. Remove the valve clip with pliers to reposition the vacuum knob on the opposite side of the stem, with the Millipore logo positioned horizontally. Then replace clip.

Cleaning and Sanitizing

Follow the procedures below to clean and sanitize the Microfil system components.

■ Microfil Funnel Support

Fabrication in 316 stainless steel ensures the funnel support is autoclavable. To save autoclave space, the supports may easily be disassembled from the manifold as follows:

1. Tip the manifold backwards.
2. Pull on the olive shape connections between the tubing and the supports.
3. Unscrew the support bolts.
4. Put the manifold back in upright position and remove the supports.

After autoclaving, perform these steps in the reverse order. A catch on the support and manifold will assure the valve is correctly positioned for the operator.

Cleaning and Sanitizing, continued

If filtering beverages, sample residues should be rinsed from the support with hot water or a mild neutral detergent prior to autoclaving. Do not use oxidizing agents.

The lever mechanism can be disassembled by unscrewing the knurled nut and pulling the lever out from its socket.

The support and manifold must be autoclaved prior to use. Proper flaming of the support head is sufficient to prevent cross-contamination from sample to sample.

After every ten autoclavings (or boilings when using the stand-alone support in the field), deposit one drop of silicone oil on the O-ring after pulling the spring down a few millimeters. (Do not use a silicone grease, as this could block the venting system.)

The O-rings should be replaced on a yearly basis. To replace the O-rings of the integrated two-way valve, disassemble the valve by removing the retaining clip and pulling on the handle.

■ Microfil dispenser

This unit is not autoclavable and should not normally require sanitation. If necessary, the funnel magazine may be sanitized with 70% alcohol.

The critical surfaces of the Microfil funnel do not contact any surface of the dispenser.

The dispenser may be cleaned using a mild detergent. Do not use oxidizing agents.

Cleaning and Sanitizing, continued

■ Frits

The frits are designed for maximum flow rate. Microfil frits will allow flow rates up to 50% higher than those obtained with glass frits. Their specific manufacturing process annihilates the stainless characteristics of the stainless steel material. The frits are therefore susceptible to oxidizing with time and will gradually develop a darker brown color. When the aspect is no longer satisfactory, the frits should be replaced (see “Product Ordering Information” section). The exposure to oxidizing/ corroding agents such as bleach will accelerate this phenomenon.

Product Ordering Information

This section lists the catalogue numbers for the Microfil Filtration System. See the Technical Assistance section for information about contacting Millipore. You can also buy Millipore products on-line at www.millipore.com/purecommerce.

Description			Qty	Catalogue Number
Microfil Expendables				
100 mL funnels, with 47 mm, sterilized, individually-sealed membranes				
0.22 µm MCE	white	gridded	72/pk	MIGS WG0 72
0.45 µm MCE	white	gridded	72/pk	MIHA WG0 72
0.45 µm MCE	white	gridded	36/pk	MIHA WG0 36
0.45 µm MCE	black	gridded	72/pk	MIHA BG0 72
0.7 µm asymetric	white	gridded	72/pk	MIHC WG0 72
0.8 µm MCE	white	gridded	72/pk	MIAA WG0 72
0.8 µm MCE	black	gridded	72/pk	MIAA BG0 72
1.2 µm MCE	white	gridded	72/pk	MIRA WG0 72
0.45 µm Durapore	white	plain	72/pk	MIHV WP0 72

Product Ordering Information, continued

Description			Qty	Catalogue Number
Microfil Expendables				
250 mL funnels, with 47 mm, sterilized, individually-sealed S-Pak membranes				
0.22 µm MCE	white	gridded	90/pk	MIGS WG0 90
0.45 µm MCE	white	gridded	90/pk	MIHA WG0 90
0.45 µm MCE	black	gridded	90/pk	MIHA BG0 90
0.7 µm asymetric	white	gridded	90/pk	MIHC WG0 90
0.8 µm MCE	white	gridded	90/pk	MIAA WG0 90
0.8 µm MCE	black	gridded	90/pk	MIAA BG0 90
1.2 µm MCE	white	gridded	90/pk	MIRA WG0 90
100 mL funnels, with 47 mm, sterilized, EZ-Pak membranes				
0.8 µm	black	gridded	150/pk	MZAA BG1 01
0.8 µm	white	gridded	150/pk	MZAA WG1 01
0.22 µm	white	gridded	150/pk	MZGS WG1 01
0.45 µm	white	gridded	150/pk	MZHA WG1 01
0.45 µm	black	gridded	150/pk	MZHA BG1 01
250 mL funnels, with 47 mm, sterilized, EZ-Pak membranes				
0.8 µm	white	gridded	150/pk	MZAA WG2 51
0.45 µm	white	gridded	150/pk	MZHA WG2 51
0.45 µm	black	gridded	150/pk	MZHA BG2 51
Extension funnels 500 mL		sterilized	24/pk	MXEF 500 24

Product Ordering Information, continued

Description	Qty	Catalogue Number
Microfil Equipment		
3-position vacuum manifold with Microfil supports		MIAC 03P 01
Stainless steel Microfil support (single-position stand-alone)		MIAC 01P 01
Microfil support with integrated valve (1/4" NPTM)		MIAC 014 01
Funnel dispenser (for use with 100 mL funnels)		MIAC FD1 01
Funnel dispenser (for use with 250 mL funnels)		MIAC FD2 01
Microfil hand-vacuum syringe for use with single-position stand		MIAC HVP 01
Culture Medium		
Tomato juice medium, 2 mL ampoules	20/pk	MX00 TJ2 20
Tryptic Soy Broth medium (TSB), total bacteria, 2 mL ampoules	20/pk	MX00 TT2 20
Yeast and mold medium, 2 mL ampoules	20/pk	MX00 YM2 20
Wallerstein nutrient medium (yeast, mold, and bacteria), 2 mL ampoules	20/pk	MX00 WN2 20
Wallerstein differential medium (bacteria), 2 mL ampoules	20/pk	MX00 WD2 20
Total coliform (m-Endo Broth)		
2 mL glass ampoules	24/pk	M000 000 2E
dehydrated, 110g (1/4 lb)	1/pk	MB00 000 0E
50 mL vial with septum cap	8/pk	M000 050 8E
2 mL plastic ampoules	50/pk	M000 00P 2E

Product Ordering Information, continued

Description	Qty	Catalogue Number
Culture Medium, continued		
Fecal coliform (m-Fc Broth)		
2 mL plastic ampoules	50/pk	M000 00P 2F
dehydrated, 110 g (1/4 lb)	1/pk	MB00 000 0F
Rosolic Acid, 25 g bottle	1/pk	MB00 000 0R
Total Count (m-Tge Broth)		
2 mL plastic ampoules	50/pk	M000 00P 2T
dehydrated, 110 g (1/4 lb.)	1/pk	MB00 000 0T
50 mL vial with septum cap	8/pk	M000 050 8T
Total Count with Indicator (m-Tge Broth)		
2 mL plastic ampoules	50/pk	M000 0P2 TT
HPC (m-Spc) Total Count, 2 mL plastic ampoules	50/pk	M000 00P 2S
Pseudomonas Broth		
2 mL plastic ampoules	50/pk	M000 00P 2P
Fecal Streptococcus (KF Agar)		
dehydrated, 110 g (1/4 lb.)	1/pk	MB00 000 0S
TTC Indicator Fecal Strep, 5 g bottle	1/pk	MB00 00T TC
Yeast and Mold (m-Green Broth)		
2 mL plastic ampoules	50/pk	M000 00P 2M
dehydrated, 110 g (1/4 lb.)	1/pk	MB00 000 0Y
50 mL vial with septum cap	8/pk	M000 050 8M

Product Ordering Information, continued

Description	Qty	Catalogue Number
Culture Medium, continued		
Yeast and Mold (Selective Broth), 2 mL plastic ampoules	50/pk	M000 0P2 SM
Orange Serum Broth, 2 mL plastic ampoules	50/pk	M000 00P 20
Bacterial and Yeast (WL Nutrient Broth), 2 mL plastic ampoules	50/pk	M000 00P 2N
Bacteria (yeast inhibited) WLD Broth, 2 mL plastic ampoules	50/pk	M000 00P 2D
For dispensing media into multiple Petri Dishes, use a repeating syringe and the 50 mL septum-capped vials.		
Accessories		
Forceps, stainless steel, smooth tip	1/pk	XX62 000 06
Petri Dishes, 47 mm, tight-lid	100/pk	PD10 047 00
Petri Dishes, 55 mm, loose-lid	1,620/pk	PD55 3I1 5P
Petri Dishes, 47 mm, tight-lid	500/pk	PD10 047 05
Petri-Pad	100/pk	PD10 047 S0
Petri-Pad	500/pk	PD10 047 S5
Pad Dispensers	3/pk	XX62 000 24
Pad Dispenser with sterile pads	200/pk	AP10 045 S1
Sterile absorbent pads, 45 mm	1,000/pk	AP10 045 S0

Product Ordering Information, continued

Description	Qty	Catalogue Number
Accessories, continued		
Vacuum/pressure pump, 220 V/150 Hz	1/pk	XX55 220 50
Vacuum/pressure pump, 115 V/60 Hz	1/pk	XX55 000 00
Millivac pump (EU only)	1/pk	XF54 230 50
Filtrate collection flask, 1 L	1/pk	XX10 047 05
Single chamber incubator, 230 V, for lab use	1/pk	XX63 1K0 05
Single chamber incubator, 115 V, for lab use	1/pk	XX63 1K0 00
Single chamber incubator, 230 V, for field use	1/pk	XX63 1K2 30
Single chamber incubator, 115 V, for field use	1/pk	XX63 1K1 15
Spare Parts		
for Microfil Support		
O-Ring and lever kit		MISP 000 14
Lever set (rod, spring, ring, gasket)	1/pk	
O-ring for rod	3/pk	
Silicon tubing, 40 cm, 3/16” ID		
O-ring set for valve	3/pk	
O-ring for olive connector	5/pk	
Filtration frits	3/pk	MISP 000 02
for Microfil Hand Vacuum Pump		MISP 000 15
Silicone seal set	4/pk	
Ball valve set	4/pk	

Technical Assistance

For more information, contact the Millipore office nearest you. In the U.S., call **1-800-MILLIPORE** (1-800-645-5476). Outside the U.S., see your Millipore laboratory catalogue for the phone number of the office nearest you. You can reach us by e-mail at tech_service@millipore.com or visit our web site (www.millipore.com).

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Контактная информация сервисных центров

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