Millipore®

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Wetting Instructions, Integrity Testing, Sterilizing and Drying Guidelines

Filters with Hydrophilic Durapore® Membrane

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the U.S. and Canada.

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NOTE To achieve optimal results, use this wetting procedure prior to conducting an integrity test. Please refer to the appropriate Emprove® Dossier, Validation Guide, or Certificate of Quality for specifications of the filter to be tested.

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Wetting Instructions

- The filter should be completely dry to ensure complete and adequate wetting of the membrane.
- Use purified ambient temperature water or the product to be filtered.
- CARTRIDGES ONLY: Moisten the cartridge O-ring with water to allow ease of insertion into the filter housing.

Water Wetting Instructions

1. Set up installation as shown here and close V1, V2 and V3.
2. Open V2, then slowly open V1 to fill the filter. When fluid flows through V2 and all air has been released, close V2.
3. Gradually increase the upstream pressure to 2.8 bar (40 psig). Do not exceed the maximum differential pressure rating (see Certificate of Quality) for the filter. Maintain this pressure for a minimum of one minute to dissolve any residual gas within the filter and to ensure membrane wetting.
4. After one minute, gradually open V3 and begin to flow fluid through the filter at the minimum flow rate shown in the *Minimum Recommended Flow Rates* table.
5. Flow for five minutes.
6. Close V1 to stop the fluid flow and allow the upstream pressure (P1) to drop to zero.
7. Perform an integrity test.

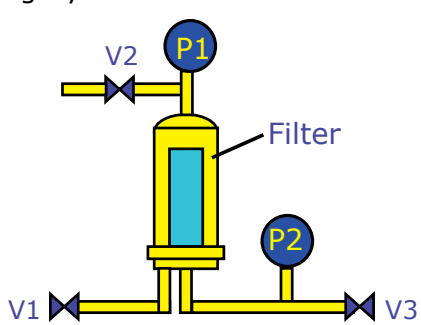


Figure 1. Typical Installation

Minimum Recommended Flow Rates for Water Wetting

Filter Unit	Flow Rate (L/min)	
	Water	70/30 IPA
Millidisk® Filters		
10	0.5	0.25
20	1	0.5
30	1.5	0.75
40	2	1
Millipak® and Millipak® Final Fill Filters		
20/40/60/100	0.5	0.25
200	1	0.5
Optiseal® Filters		
All	2	1
Durapore® Cartridges		
12.5 cm (5 in.)	4	2
25 cm (10 in.)	7.5	4
50 cm (20 in.)	15	7.5
100 cm (30 in.)	22	11
Multimedia Durapore® Cartridges		
25 cm (10 in.)	7.5	4
50 cm (20 in.)	15	7.5
100 cm (30 in.)	22	11
Multilayer Durapore® Cartridges		
25 cm (10 in.)	6	3
50 cm (20 in.)	12	6
100 cm (30 in.)	18	9

*System void volumes (housing, piping, hoses, etc.) should be additive to these minimum recommended flush volumes shown on the Certificate of Quality.

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Integrity Testing Guidelines

Integrity Testing Parameters

- The recommended integrity test for hydrophilic Durapore® filters is a an air/water diffusion test followed by a bubble point test performed with the cartridge in a housing, or a capsule filter, isolated from the rest of the system, with the outlet open to atmospheric pressure.
- Refer to the Certificate of Quality for integrity test specifications.

Post Use 70/30 IPA Alcohol Reference Test

70/30 IPA (70% isopropanol, 30% purified water) wetting may be used to integrity test hydrophilic filters and to troubleshoot post use integrity test failures of hydrophilic filters.

NOTE The polysulfone component of Millidisk® and Millipak® Final Fill filters is not compatible with alcohol at the high temperatures necessary for autoclaving or steam sterilization. IPA used in integrity testing these filters must be completely removed by either air blow down for a specified time or flushing with water at a specified flow rate prior to sterilization.

Ensure that the unit is properly grounded. Use a nitrogen pressure source to minimize flammability.

CARTRIDGE FILTERS ONLY: Moisten the filter O-ring with 70/30 IPA to allow ease of insertion into the filter housing.

1. Set up installation as shown here and close V1, V2 and V3.
2. Open V2, then slowly open V1 to fill the filter. When fluid flows through V2 and all air has been released, close V2.
3. Gradually increase the upstream pressure to 1 bar (15 psig). Do not exceed the maximum differential pressure rating (see Certificate of Quality) for the filter. Maintain this pressure for a minimum of one minute to dissolve any residual gas within the filter and to ensure membrane wetting.
4. After one minute, gradually open V3 and begin to flow fluid through the filter at the minimum flow rate shown in the *Minimum Recommended Flow Rates* table.
5. Flow for five minutes.
6. Close V1 to stop the fluid flow and allow the upstream pressure (P1) to drop to zero and perform an integrity test.

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Sterilizing Guidelines

Autoclaving Parameters for Sterilizing Wet or Dry Filters

- Pre-test treatment conditions described are not a substitute for filter sterilization validation.
- Validate the autoclave cycle using thermocouples and biological indicators. Contact Technical Service for more information.
- Refer to the Certificate of Quality for autoclave specifications.

Steam-in-place Parameters for Sterilizing Dry Cartridges

- Do not steam-in-place capsule filters.
- To avoid excessive differential pressure, ensure that filter is thoroughly dry prior to steam sterilization.
- Refer to the Certificate of Quality for steam-in-place and maximum differential pressure specifications.
- Perform steam sterilization on a dry cartridge to ensure that process sterility is not compromised during steaming.
- If a pre-use integrity test is required, it must be performed after filter sterilization.

Drying Guidelines

Blow Down Drying Procedure for Durapore® Filters and Cartridges

1. With the outlet open to atmospheric pressure, set compressed gas pressure to 340 mbar (5 psig). Start compressed gas flow into the filter. Slowly increase pressure to 10 psi above the bubble point of the installed membrane.
2. As the filter dries, the air flow rate will increase and the differential pressure will decrease.
3. Allow air flow through the filter until either the inlet pressure decreases to < 340 mbar (5 psig) or, apply pressure up to 10 psi above bubble point until bulk air (physically detectable air flow through the filter) is detected at the outlet. Continue to flow air through the filter for an additional 30 minutes.

Oven Drying Procedure for Durapore® Cartridges

A standard area cartridge may be dried in a ventilated oven for 4.5 hours at 80°C (176°F) or > 9 hours at 60°C (140°F).

A high area cartridge may be dried in a ventilated oven for 10.5 hours at 80°C (176°F).

Cartridge drying can be verified by weighing a dry unused cartridge and comparing it to the cartridge weight measured after oven drying.

Filter Storage Conditions

Store filters in their original packaging, away from direct sunlight, and at room temperature. Do not remove the filter from its bag until ready to use.

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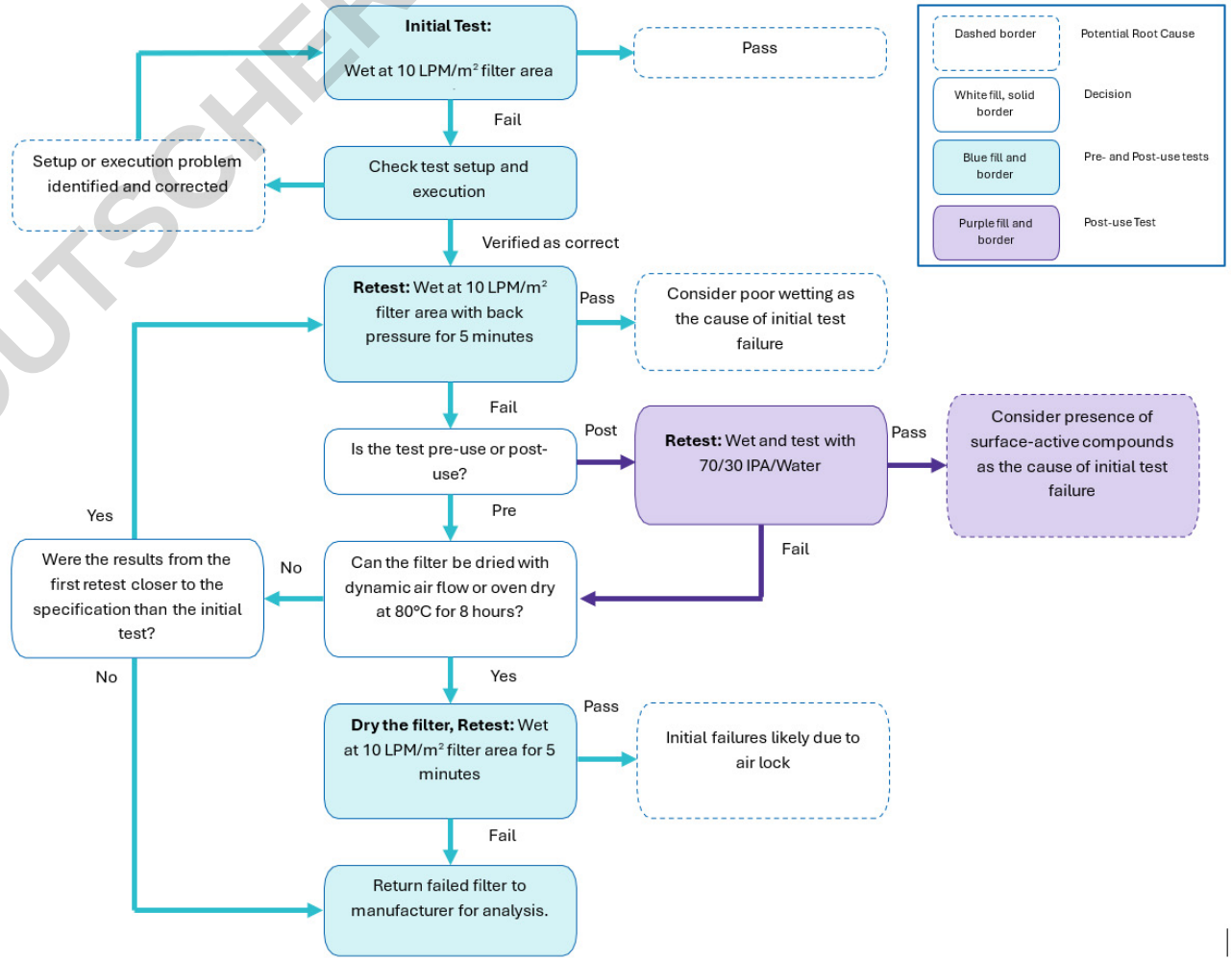
Troubleshooting

Drying and rewetting the filter prior to retesting can minimize integrity test failure.

Integrity test values that are out of specification may be caused by:

- Improperly or incompletely wetted filter
- Contaminant or product residue on the filter
- Improper O-ring seal on cartridge
- Improper upstream vent seal
- Temperature outside manufacturer's recommended temperature
- System hardware leak (if automatic integrity tester is used)
- If a problem is encountered:
  - Do not remove the cartridge from the housing (for a post-use test).
  - Check connections for leaks (if automatic integrity tester is used).
  - Ensure that appropriate integrity test specifications are used for the filter and housing.
  - Ensure the environmental and/ or test fluid temperature is within the manufacturer's recommended specification.
  - Ensure an appropriate test fluid is used.

For additional troubleshooting information, refer to TB84820000, Integrity Test Troubleshooting - Beyond Rewet and Retest.



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Addendum

Special Considerations for using vents on Opticap® XL and XLT gamma-compatible capsules containing Durapore® membrane

Opticap® XL and XLT gamma-compatible capsules containing Durapore® membrane contain a black silicone-EPDM O-ring on the capsule vent. These vents can self-open if torque is applied opposite to the closed direction of the vent. The following procedures are recommended to avoid undesired vent opening:

1. If tubing is added to the vent hose barb connection, ensure vent is closed and ensure tubing is not imposing anti-clockwise rotation or torque on vent stem. Clockwise rotation will not result in vent opening.
2. Support any sample bags or bottles attached to tubing. When removing sample bags or bottles, make sure tubing is not twisted to avoid vent opening.
3. When the filter capsule is not under pressure, make sure the vent is closed.
4. If the operator closes the vent while the filter capsule is under pressure, the vent may not fully close. If the vent self-opens, remove rotation or torque and re-close the vent. Vent will remain closed if no new rotation or torque is added.

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