

Diffusive Flow Test

Hydrophilic Cartridge

Preface

All integrity test procedures outlined below should be followed when performing integrity testing of membrane filters only. Use of these procedures on other types of filters such as polypropylene or glass fiber cartridges will not give consistent or accurate results. Before starting the procedure ensure your system is set up properly. If you need guidance we have instructions here.

Introduction

Diffusive Flow is one common integrity test. In this test, we apply a constant pressure of air (approximately 70% of the membrane bubble point) on the upstream side of the properly wetted membrane filter and then measure the flow rate of air diffused through the filter. This test can precisely detect defects that may cause passage through the filter and can be used to gauge the completeness of a filter's wettability. Follow these instructions to properly perform a diffusive test on your membrane filter.

This test requires a precision Mass Flow meter capable of reading in the expected range of diffusion values. Alternatively, an automated integrity test set up for measuring forward flow air diffusion can be used. If using an automated system, make sure the test parameters are properly set up for the filter to be tested. NOTE: These parameters are not necessarily the same for all membrane filters from different manufacturers.

If necessary, contact
CustomerService@criticalprocess.com for
appropriate parameters for your system.

Diffusive Flow Test Procedure

1. Install and rinse cartridge as per Cartridge Wetting instructions.
2. If necessary, remove the cartridge from the wetting housing and carefully install it in the integrity test housing. Take care that the cartridge is not allowed to dry out during this transfer.
3. Typical setups for diffusion testing using a mass flow meter are shown in Figures 1A and 1B (the only difference being where the gas inlet is connected).
4. Start with all valves in the closed position.
5. Open valve V0.
6. Set the pressure regulator to the required test pressure.
7. Open Valve V1 to pressurize the system and Valve V4 to purge any remaining liquid from the upstream side.
8. When all upstream liquid has been purged, close V4 and open V3. Downstream must be open to ambient pressure during the test.
9. If necessary, adjust the pressure regulator to the test pressure specified on the cartridge data sheet.
10. Allow the system to equilibrate. The Mass Flow Meter will initially indicate a high value as the system pressurizes, then slowly come down to a stable reading.
11. Record the diffusional airflow.

For diffusion testing using an automated integrity test system, the setup is the same as indicated in the figures below, except replace the mass flow meter with the automated test unit. Make sure the correct parameters are entered for the filter being tested. Follow the integrity system manufacturer's instructions for conducting the integrity test.

A diffusional flow (diffusion rate) reading higher than the specification indicates that the system is not integral.

Procedure Note

If the cartridge appears to fail the initial diffusion test, repeat the Cartridge Wetting procedure and increase the rinse time to twice the initial amount to assure that the media has been properly wetted, then retest. If necessary, check the cartridge seal in the housing.

Any Questions?

For help determining the test values or additional information, contact

customerservice@criticalprocess.com or call us at (603) 880-4420.

Critical Process Filtration, Inc. is an ISO-9001 certified manufacturer of process filters. We have been helping customers for over 25 years to build and improve process filtration systems. Our comprehensive testing, analysis, and validation services support your team whenever needed. Partnering with you and your process team is how we deliver your company's solution right the first time.

Last Updated: November 13, 2025

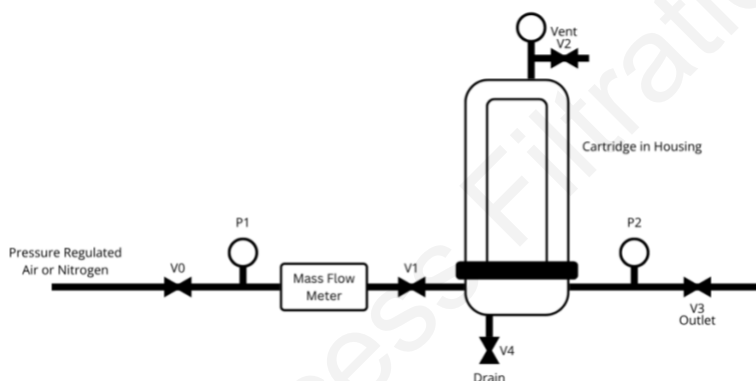


Figure 1A: Cartridge Diffusion Test Attachment to Housing Inlet

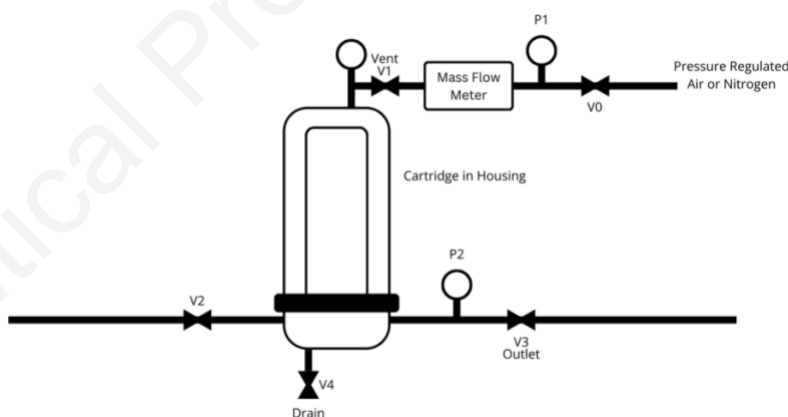


Figure 1B: Cartridge Diffusion Test Attachment to Housing Vent



One Chestnut Street
Nashua, NH 03060
603.880.4420
FAX: 603.880.4536

CriticalProcess.com

The information contained herein is subject to change without notice. The Critical Process Filtration logo is a trademark of Critical Process Filtration, Inc. Viton is a trademark of DuPont Performance Elastomers L.L.C.
© 2025 Critical Process Filtration, Inc. • All Rights Reserved

Product Instructions • Hydrophilic Cartridge Diffusive Flow Test Rev -