Product Instructions

Water Intrusion Test

Hydrophobic Cartridge

Preface

Integrity testing of hydrophobic filters is different from testing hydrophilic filters. The filters do not wet with water, and many applications require the filter to be dry before use. The most common integrity test for hydrophobic filters is the Water Intrusion Test. Before starting the procedure ensure your system is set up properly. If you need guidance we have instructions here.

Introduction

The Water Intrusion Test relies on the hydrophobic nature of the membrane being tested. Water will not spontaneously wet the filter but can be driven into (and through) the membrane under pressure. The Water Intrusion Test measures the quantity and/or flow rate of water through a hydrophobic filter at a pre-determined test pressure. This test can precisely detect defects that may cause passage through the filter and can be used to gauge the filter's integrity. Follow these instructions to properly perform a Water Intrusion test on your hydrophobic membrane filter.

This test can be performed manually without a precision Mass Flow meter by measuring volume of water passing through the filter at a given pressure for a given time. Alternatively, a mass flow meter can be used to measure the air flow rate as water passes through the filter, or an automated integrity test set up for measuring Water Intrusion 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.

Water Intrusion Test Procedure

For performing the Water Intrusion Test manually, refer to Figures 1a and 1b.

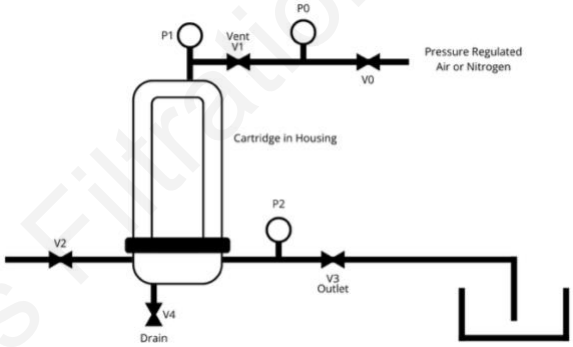

Figure 1a: Cartridge Water Intrusion Test

1. Make sure the housing to be used and outlet receptacle are clean and dry.
2. Keep the tubing from V3 to the receptacle as short as possible.
3. Install the cartridge into the housing making sure O-rings are properly sealed.
4. 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).
5. Start with all valves in the closed position.
6. Open valve V1 and V2 to slowly fill the housing with water. Continue filling until water has been running out of the vent (V1) for 1 minute or until no air is noted in the stream.
7. Close V1 and V2.
8. Attach a regulated air or nitrogen source to the vent line (Figure 1b).

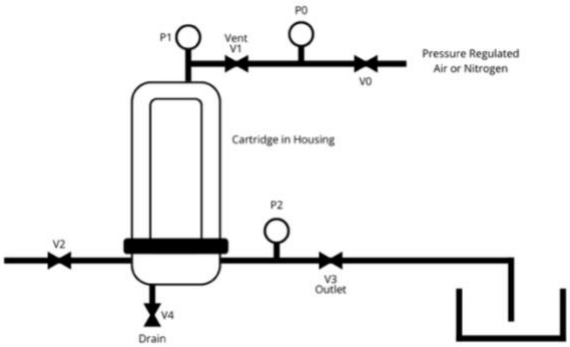

Figure 1b: Manual Cartridge Water Intrusion Test

9. Open Valve V0 and set the pressure regulator to the required test pressure.
10. Open Valve V1 to pressurize the system and Valve V3 to allow any water passing through the membrane to collect in the receptacle.
11. If necessary, adjust the pressure regulator to maintain the test pressure specified on the cartridge data sheet.
12. Allow the system to equilibrate. At this point no liquid should be noted in the receptacle.
13. Start a timer and measure 10 minutes.
14. At the end of ten minutes measure the volume of water that has flowed into the receptacle.
15. Compare this value to the specification shown on the data sheet.
16. Reduce the pressure at the regulator to 5 psi.
17. Open Valve V4 to purge water from the filter housing. Allow air to flow for at least two minutes after water stops flowing from V4.
18. If the filter is to be used in the test housing, a longer air purge may be required.
19. If absolute dryness of the filter is required, it can be removed from the housing and dried in an oven at 50°C.

For Water Intrusion Testing using a Mass Flow Meter, follow steps 1) through 7) above to fill the housing with water. Then:

1. Attach regulate air or nitrogen and mass flow meter to the vent line (Figure 1c).

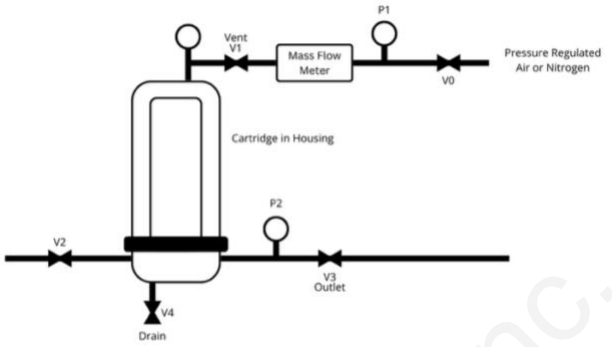

Figure 1c: Cartridge Water Intrusion Test Using a Mass Flow Meter

2. Open Valve V0 and set the pressure regulator to the required test pressure.
3. Open Valve V1 to pressurize the system and Valve V3 to vent the outlet to atmospheric pressure.
4. If necessary, adjust the pressure regulator to maintain the test pressure specified on the cartridge data sheet.
5. Allow the system to equilibrate.
6. The mass flow meter should level off to a stable reading after a few minutes.
7. Compare the mass flow meter reading to the specification shown on the data sheet.
8. Reduce the pressure at the regulator to 5 psi.
9. Open Valve V4 to purge water from the filter housing. Allow air to flow for at least two minutes after water stops flowing from V4.
10. If the filter is to be used in the test housing, a longer air purge may be required.
11. If absolute dryness of the filter is required, it can be removed from the housing and dried in an oven at 50 °C.

An automated integrity tester may also be used to measure water intrusion. The exact set up for water and air sources may vary from system to system. Consult the vendors instructions for set up and testing and make sure the test parameters are properly entered for the filter to be tested. NOTE: The required test parameters may vary among filter manufacturers.

A Water Intrusion value higher than the specification indicates that the system is not integral.

Procedure Note

If the cartridge appears to fail the initial Water Intrusion test, remove the cartridge from the housing and reinstall making sure the O-rings are properly seated. Check all housing and test connections for leaks. Then retest.

Any Questions?

For help determining the test values or additional information, contact customerservice@criticalprocess.com or call us at (603) 880-4420.

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CRITICAL PROCESS FILTRATION, INC.

One Chestnut Street
Nashua, NH 03060
603.880.4420
FAX: 603.880.4536

CriticalProcess.com