

# Bubble Point Test

## *Hydrophilic Capsule*

### 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 capsules 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

Bubble point tests are one means of integrity testing. It works by degassing the pressure required to force liquid held by capillary force in a wetted membrane. The pressure at which bulk flow begins is correlated to the largest pore in the filter, which in turn is correlated to filter retention properties. This test detects minor defects and out-of-size pores, correlating with the amount of bacteria passage through your filter. Pressure is gradually increased on the membrane until a steady stream of bubbles emerges from the largest pore in the membrane. Follow these instructions to properly complete a bubble point test on your membrane capsule filters.

**IMPORTANT NOTE:** Capsules where the membrane water bubble point is expected to exceed 50 psi must NOT be bubble point tested using water, as this will exceed the pressure differential limit for the device. Bubble point determination for these capsules will need to be performed using a lower surface tension fluid, such as 60/40 or 70/30 IPA water.

### Bubble Point Test

This test can be conducted manually, with a visual end point to detect a steady stream of gas flowing through

the filter (Figure 1). It can also be conducted using an automated bubble point detector (Figure 2).

Instructions for manual test refer to Figure 1:

1. Install and rinse cartridge as per Capsule Wetting instructions.
2. Starting with all valves in the closed position, open the downstream valve V2.
3. Open V1 and set the pressure to approximately 2 - 3 psi.
4. Open the drain valve to purge any upstream fluid.
5. Close the drain valve V4 and open outlet valve V3.
6. Make sure the outlet of the hose attached to V3 is below the liquid level in the container as shown.
7. Increase the air pressure in increments of 2 psig, holding for 5 seconds at each step until a steady stream of air is noted coming from the end of the hose. Note that during pressure
8. increase there may be intermittent bubbles released from the hose. Care must be taken to ensure that there is a steady stream of bubbles, indicating the bubble point has been reached.
9. A bubble point value lower than that specified indicates that the system is not integral.

Bubble Point determination can also be done using a mass flow meter or automated bubble point detector (Figure 2). This works by monitoring air flow vs pressure as the pressure is increased. Below the bubble point diffusive flow is measured, which will show a linear increase with pressure. Once the bubble point is reached there is a significant increase in flow and the curve is no longer linear.

Note: using a mass flow meter requires manual increases in the pressure and monitoring the air flow; an automated system will perform the test without operator intervention.

## Procedure Notes

If the capsule appears to fail the initial bubble point test, repeat the Capsule 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 capsule connections to make sure there are no leaks.

## Any Questions?

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

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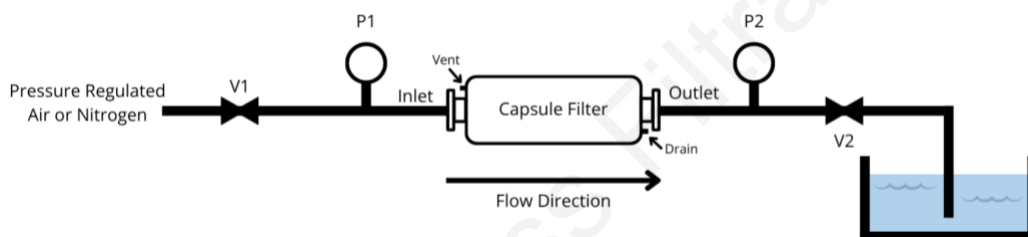


Figure 1: Capsule Bubble Point Testing

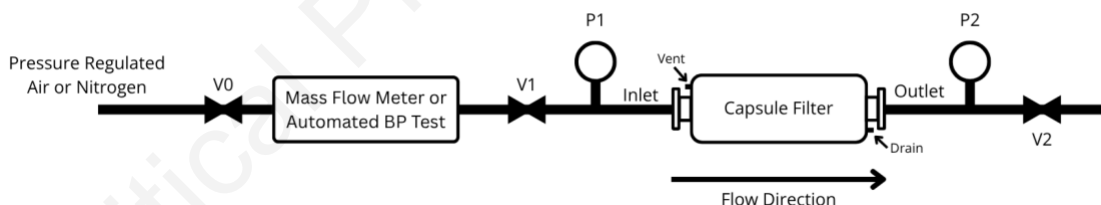


Figure 2: Capsule Bubble Point Testing Using an Automated System



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