



INSTALLATION PROCEDURE
WETTING PROCEDURE
INTEGRITY TEST GUIDE
BUBBLE POINT
DIFFUSIVE FLOW



CLARIFLOW[®] CARTRIDGES

PLEATED POLYETHERSULFONE (PES) MEMBRANE
ALL-POLYPROPYLENE SUPPORTS AND STRUCTURE

PRODUCT LINES

Clariflow-Biological Grade
Clariflow-Electronics Grade
Clariflow-XP (0.45/0.2 μ m)
Clariflow-XL (0.65/0.2 μ m)

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1. INSTALLATION PROCEDURE

O-Ring Cartridges

1. Wipe the plastic bag clean, then cut it open at the end nearest the O-Rings and inspect them for damage.
2. Lubricate the O-Rings and housing bore with service fluid or other appropriate liquid.
3. Insert the O-Ring fitting into the housing bore with a slight twisting motion. (Leave the bag on the filter cartridge for protection and grasp it as near as possible to the O-Ring fitting.) *CAUTION: Excessive twisting of or pushing on the pleated section of the filter cartridge may cause damage.*
4. Once the filter cartridge is seated in the housing bore, gently rotate the cartridge a few degrees in either direction to relax the O-Rings.
5. Remove the plastic bag from the filter cartridge and reassemble the housing.

Flat Gasket Cartridges

1. Wipe the plastic bag clean and cut it open at both ends.
2. Install a gasket on each end of the cartridge ensuring that each lies flush against the face of the flat end cap.
3. Slide the cartridge over the post in the housing and align it with the sealing surfaces.
4. Remove the plastic bag from the cartridge and reassemble the housing.

2. WETTING PROCEDURE

Wetting is a required procedure for certain filtration applications and is critical for those that require integrity testing.

GENERAL INFORMATION

Clariflow® filter cartridges contain an inherently hydrophilic polyethersulfone membrane filtration medium which wet readily in water or other aqueous fluids. Because the supportive components are of polypropylene construction, they can potentially behave as a mild hydrophobic barrier between the wetting fluid and the hydrophilic membrane medium. For this reason, it is important to flow the wetting fluid through the filter cartridge to ensure complete membrane saturation. A typical microporous membrane contains 10,000,000 pores per cm² of filter medium, and a single unwetted pore can cause integrity test failure. The wetting procedures described in this guide will allow reliable product usage and integrity evaluation. Unusual circumstances may require specialized wetting procedures. Please contact Parker Support for individualized assistance at bwf.oxn.support@support.parker.com.

NOTE: The filter cartridge should be protected from exposure to gas while in liquid service as this may serve to dry portions of the membrane. To prevent this occurrence, the filter housing should be properly vented prior to use and remain filled with liquid throughout the filtration process.

WETTING PROCEDURE

There are two methods prescribed by Parker Hannifin Process Advanced Filtration for wetting the Clariflow filter cartridge. Alternative methods may be used, although we have found the following to be the most effective and convenient. Method 1 is preferred when the wetting solution is abundant and systemic pressure regulation is not possible or practical. Method 2 is preferred when the availability of wetting solution is limited, and systemic pressure regulation is possible. Pre-filtered, deionized water (at approximately 20°C) is the preferred solution, although most aqueous fluids will reliably wet the filter cartridge.

METHOD 1:

1. Fill the housing with pre-filtered, deionized water (at ~20°C) keeping the down-stream valve closed.
2. Vent air from the housing by allowing a stream of fluid to flow through the housing vent. After the entrapped air is completely evacuated, close the vent.
3. Flush the filter cartridge for a 10-minute period maintaining 6-10gpm (23-38lpm) flow per ten-inch (25-cm) equivalent [3-5gpm (11-19lpm) per five-inch (13-cm) filter].
4. Drain the residual fluid from the housing, perform an integrity test, or begin process fluid filtration.

METHOD 2:

1. Fill the housing with pre-filtered deionized water (at ~ 20°C) keeping the down-stream valve closed.
2. Vent air from the housing by allowing a stream of fluid to flow through the housing vent. After the entrapped air is completely evacuated, close the vent.



3. Flush the filter cartridge for a 5-minute period maintaining a 2gpm (7.6lpm) flow per ten-inch (25-cm) equivalent [1gpm (3.8lpm) per five-inch (13-cm) filter]. During this period regulate the downstream valve to provide 20psig (1.4bar) of systemic backpressure while maintaining this recommended flow rate. Upstream and downstream pressure gauges are required for this procedure.
4. Drain the residual fluid from the housing, perform an integrity test, or begin process fluid filtration.

3. INTEGRITY TEST GUIDE

NOTE: Acceptable Integrity Test values reported here apply to filter cartridges wetted with clean filtered deionized water (at ~20°C). It is also acceptable to use another compatible liquid (with surface tension less than 72dyne/cm), although the Bubble Point, Diffusion, and Pressure Hold values must be corrected for surface tension and air permeability differences. Please contact Parker Hannifin (805) 604-3488 for guidance on using wetting fluids other than deionized water to perform integrity testing.

A. BUBBLE POINT TEST

1. Install the Clariflow filter cartridge into the housing.
2. Open the vent valve and fill the housing with wetting fluid until liquid exits from the vent.
3. Wet the filter as described in the Wetting Procedure (See Section 2).
4. Drain the housing (upstream and downstream of the filter cartridge).
5. Connect the housing inlet to a regulated (0-100psig) source of clean, compressed gas, and connect the housing outlet to a tube extending into a collection vessel (e.g., beaker) partially filled with liquid.
6. Pressurize the filter assembly to 3psig (0.2bar) and hold at this pressure for 30 seconds to displace any residual wetting solution.
7. Increase the gas pressure slowly while observing for bubbles in the collection vessel.
8. Report the Bubble Point as the pressure at which a surge of bubbles appears from the tube in the collection vessel.
9. Acceptable minimum Bubble Point values (*in clean, filtered, deionized water @ ~20°*) are shown in Table 1 on the next panel.

Table 1. Minimum Bubble Point Limits

FILTER RATING	MINIMUM BUBBLE POINT	
	psig	bar
μm		
0.02	NA	NA
0.04	45*	3.1*
0.1	28*	1.9*
0.2	45	3.1
0.45	30	2.1
0.65	17	1.2
0.8	15	1.0
0.45 / 0.2	45	3.1
0.65 / 0.2	45	3.1

*Tested in a solution of 60% IPA / 40% Water

NOTE: Most integrity test failures are due to incomplete wetting of the filter cartridge rather than to a defect in the filter membrane. Therefore, if a failure occurs, rewet the cartridge and repeat the test.

B. DIFFUSIVE FLOW TEST

1. Install the Clariflow filter cartridge into the housing using the procedure described in this guide.
2. Open the vent valve and fill the housing with wetting fluid (e.g., clean, filtered, deionized water) until liquid exits from the vent.
3. Wet the filter as described in the Wetting Procedure (See Section 2).
4. Drain the housing (upstream and down-stream of the filter cartridge).
5. Connect the housing inlet to a regulated (0-100psig) source of clean compressed gas.



6. Pressurize the filter assembly to 3psig (0.2bar) and hold at this pressure for 30 seconds to displace any residual wetting solution. Leave the downstream valve open when running this test.
7. Connect the housing outlet to a mass flow meter or other apparatus suitable for measuring gas flow rates (e.g., liquid-filled, inverted graduated cylinder or sidearm buret).
8. Pressurize the filter cartridge to the test pressure value listed in Table 2 below.
9. Measure the flow rate (cc/min.) of diffusing gas after flow has equilibrated for three minutes.
10. The maximum acceptable Air Diffusive Flow rates for water-wetted Clariflow filter cartridges (@ approximately 20°C) are shown in Table 2.

Table 2. Maximum Diffusive Flow Limits

FILTER RATING (μm)	TEST PRESSURE		MAXIMUM DIFFUSIVE FLOW cc/min
	psig	bar	
10-inch (25-cm) cartridges			
0.02	55	3.8	15
0.04	55	3.8	25
0.1	55	3.8	40
0.2	32	2.2	20
0.45	24	1.7	20
0.65	13	0.9	20
0.8	11	0.8	20
0.45 / 0.2	32	2.2	20
0.65 / 0.2	32	2.2	20
5-inch (13-cm) cartridges			
0.1	55	3.8	24
0.2	32	2.2	12
SELECT 10-inch (25-cm) cartridges			
0.02	55	3.8	25
0.04	55	3.8	50
0.1	55	3.8	50
0.2	32	2.2	35

NOTE: Most integrity test failures are due to incomplete wetting of the filter cartridge rather than to a defect in the filter membrane. Therefore, if a failure occurs, rewet the cartridge and repeat the test.

C. PRESSURE HOLD TEST

1. Install the Clariflow filter cartridge into the housing using the procedure described within this guide.
2. Open the vent valve and fill the housing with wetting fluid until liquid exits from the vent.
3. Wet the filter as described in the Wetting Procedure (See Section 2).
4. Drain the housing (upstream and downstream of the filter cartridge).
5. Connect the housing inlet to a regulated (0-100psig) source of clean compressed gas.
6. Pressurize the filter assembly to 3psig (0.2bar) and hold at this pressure for 30 seconds to displace any residual wetting solution. Leave the downstream valve open when running this test.
7. Pressurize the cartridge to the test pressure listed in Table 2 above, and after the system has equilibrated isolate it by shutting off the pressure supply line.
8. Record the decay in pressure on the upstream side of the filter cartridge over an interval of 5 minutes.
9. The maximum acceptable pressure decay rate depends on the upstream volume of the test housing, the length of the cartridge tested, and the type of test gas and wetting liquid used. Contact Parker Support at bwf.oxn.support@support.parker.com or one of its authorized distributors for the theoretical maximum acceptable pressure decay rate for a specific Clariflow cartridge.

