TB-028

Pre-wetting Hydrophobic Cartridges

Pre-wetting a hydrophobic PTFE filter cartridge (Citadel or TefTEC) is crucial for ensuring proper filtration, especially when filtering aqueous solutions. PTFE membranes naturally repel water, so a low surface tension fluid is needed to "wet out" the membrane and allow the aqueous solution to pass through. Here are the necessary considerations to pre-wet a hydrophobic PTFE filter cartridges:

- **Choose the Right Wetting Fluid:**
  The most common and effective wetting fluid is isopropanol (IPA). You can use:
  - 100% Isopropanol (IPA)
  - 60% IPA / 40% Deionized (DI) Water solution (This is a common and effective mixture.)
  - Other low surface tension fluids may be used if trace IPA or DI water is unacceptable for your application.
- **Wetting Procedure (Cartridge Filters):**
  Submersion Method
  1. Place the filter cartridge in a suitable, clean container.
  2. Slowly fill the container with your chosen wetting fluid (e.g., 60% IPA/DI water). Allow the fluid to flow from the outside of the filter into the filter core.
  3. Continue filling until the liquid level both inside and outside the core reaches the top of the filter and fully wets the entire membrane.
  4. Gently rotate or tap the filter to help dislodge any trapped air bubbles.
  5. Allow the filter to soak in the wetting fluid for approximately **30 seconds to 30 minutes**, depending on the manufacturer's recommendations and the specific filter's pore size (tighter pores like 0.05 µm may require longer).

In-line Flushing (for filters installed in a housing):

1. Install the filter into the housing.
2. Open any vent valves on the housing.
3. Slowly introduce the wetting fluid into the upstream side of the filter housing.
4. Allow the wetting fluid to fill the housing and flow through the filter, displacing all air. Ensure air escapes through the vent.
5. Once the wetting fluid starts flowing from the outlet and all air is removed, close the vent valve.
6. Continue to flow the wetting fluid for a recommended time (e.g., 30 seconds to several minutes) to ensure complete wetting.

- **Flush with DI Water (Critical Step):**
  After pre-wetting with the low surface tension fluid, it is crucial to flush the filter with purified or DI water (18 megohm-cm for high purity applications) to remove residual wetting fluid.
  1. Open the housing vent or filter vent.
  2. Slowly flow DI water through the filter. Flush from both the vent and drain if possible to ensure complete removal of the wetting fluid from "dead" areas in the housing.
  3. Flush a sufficient volume of DI water (e.g., several liters) until the desired purity is achieved (e.g., resistivity levels stabilize, or TOC levels decrease to acceptable limits).

- **Install and Operate Promptly:**
  1. Once the filter is pre-wetted and flushed, it should be immediately placed in the housing and the intended process fluid started flowing through it.
  2. Do not allow the filter to dry out. If it sits exposed to the atmosphere, the wetting fluid may gravity flow from the membrane, causing it to de-wet partially or completely, compromising performance.
  3. When introducing the process fluid, do so slowly and ensure proper venting to avoid sudden pressure spikes that could force air through the membrane and cause de-wetting.

Key Considerations:

- Pore Size: Filters with smaller pore sizes (e.g., 0.05 µm) are generally more difficult to wet and may require longer soaking or flushing times.
- Pre-wetted Filters: Some manufacturers offer "pre-wetted" PTFE filters that are packaged in sterile UHP DI water. These eliminate the need for on-site pre-wetting with organic solvents, simplifying installation and reducing exposure to hazardous chemicals. If available and suitable for your application, these are often the best choice.
- Integrity Testing: After pre-wetting, the filter is typically ready for integrity testing (e.g., bubble point test) if required for your application. A properly wetted membrane is essential for accurate integrity test results.

By following these steps, you can effectively pre-wet your hydrophobic PTFE filter cartridges and ensure optimal filtration performance.