



PREWET CARTRIDGE AND DISPOSABLE FILTERS

Installation and use manual

Introduction

Torrento® and QuickChange® nondewetting and other prewet hydrophobic membrane filters made from Teflon® materials provide excellent filtration of aqueous-based chemicals used in semiconductor wet etching and cleaning applications. These filters are shipped water-wet and require no IPA prewetting procedures. Without an IPA prewetting requirement, these filters prevent alcohol/chemical interaction, avoid potential sources of contamination and eliminate the cost and inconvenience of hazardous waste disposal.

Safety

! WARNING: CHEMICAL HAZARDS
DOUBLE-CONTAINMENT is required when used with toxic and hazardous chemicals. All filter housings, filters and other pressurized vessels must be double-contained to prevent serious personal injury.



SAFETY CLOTHING, eye protection and safety apparatus appropriate for the liquids in use must be worn during component changeout and startup. Perform all operations with standard liquid handling procedures in accordance with all local codes for safety and ventilation.

! DANGER! EXPLOSION HAZARD
All-polymeric components are not intended for use with flammable solvents. Due to the potential of static discharge, stainless steel housings are recommended for flammable solvents.



Installation and Use

Step 1: Unpack, Drain and Install the Filter

Components are wrapped in multiple bags for cleanroom use. Handle components according to the installation facility's cleanroom procedures.

NOTE: Minimize handling and use Nitrile gloves to ensure product cleanliness during installation of the filters.



Chemlock® Cartridge Filters (installation into a Chemlock Housing):

1. Carefully slice the top of the bag; then invert the cartridge (still in the bag) to drain all the ultrapure DI water from the cartridge and cartridge core.

! CAUTION: DO NOT allow the filter to dry out.

- Carefully cut the bottom off the bag.
- To ensure product cleanliness, hold the cartridge by the bag and insert the filter into the bowl (Figure 1a).
- Lock the cartridge in place by turning the cartridge clockwise. Attach and tighten the bowl to the housing head (Figure 1b).

NOTE: Refer to the Chemlock housing manual for additional installation details:

http://www.entegris.com/Resources/assets/chemlock_p91012e.pdf



Figure 1a. Insert filter into bowl.



Figure 1b. Twist filter 1/4 turn to lock.

Standard Cartridge Filters (Installation into a standard housing):

- Carefully slice the top of the bag; then invert the cartridge (still in the bag) to drain all the ultrapure DI water from the cartridge and cartridge core.

CAUTION: DO NOT allow the filter to dry out.

- To ensure product cleanliness, hold the cartridge by the bag and insert the filter into the housing head.
- Ensure that the cartridge is properly aligned when inserting the cartridge into the housing head. A misaligned cartridge can result in damage to the o-ring (Figure 2).
- Push straight into the housing to avoid damage to the o-ring and seal (Figure 3).
- Attach and tighten the bowl to the housing head.

NOTE: Refer to the manufacturer's housing manual for additional installation details and safety considerations.

Disposable filters:

- The filter is shipped wet packaged with ultrapure DI water. Move the filter to an appropriate location and, if provided, remove shipping caps and place them in a safe place. They can be used at a later date for removal of the filter.
- Drain all the ultrapure water from the filter.

CAUTION: DO NOT allow the filter to dry out.

- Determine the filter orientation: The arrow on the housing indicates the direction of flow and the position of the inlet and outlet.

Step 2: Connect Fittings

Vent: The vents should always be oriented on the top.

- The upstream vent is essential for removing gas from the housing during the initial startup and during operation and chemical changeouts
- The downstream core vent improves filter flow performance during normal operations
- The vents facilitate the draining of the housing

Drain: The drain facilitates the drainage of chemicals when changing chemicals in the bath or replacing the filter.

Vertical bottom feed: Provides the most efficient venting.

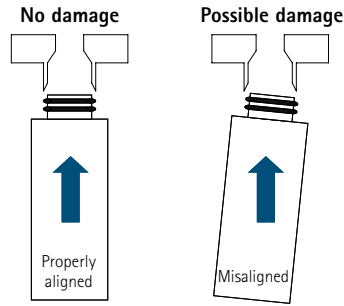


Figure 2: Prevent o-ring damage with proper installation.

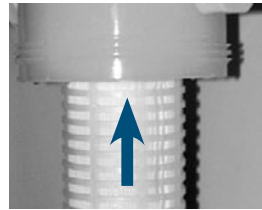


Figure 3a: In bowl-down configuration, push straight up to engage o-rings.

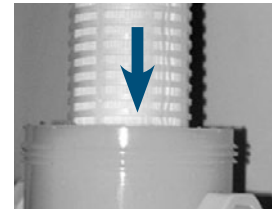
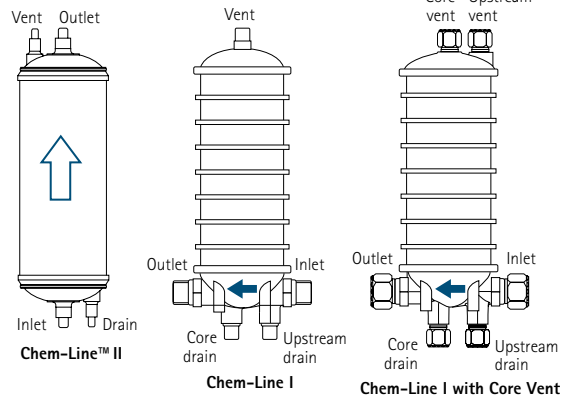
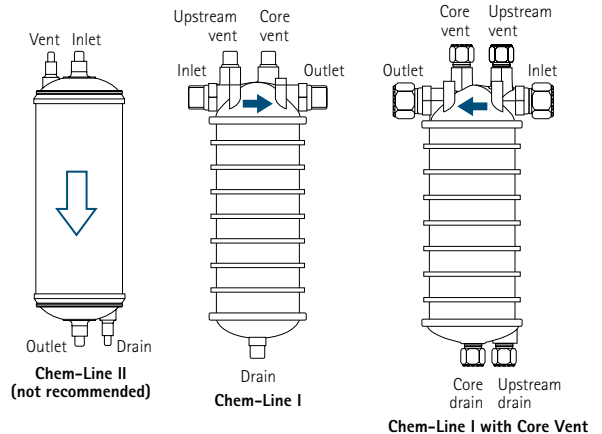


Figure 3b: In bowl-up configuration, push straight down to engage o-rings.

Vertical-Bottom Feed: Highly recommended.



Vertical-Top Feed: Acceptable for Chem-Line I. Not recommended for Chem-Line II.



1. Connect the inlet, outlet, vent and drain fittings. Use appropriate fittings.
2. **Vent and Drain Connections:** Rotate the vent to the topmost position and the drain to the lowest position.

If the filter is being used on a recirculated bath, where gas is generated by the chemical (for example, NH_4F or $\text{H}_2\text{SO}_4/\text{H}_2\text{O}_2$), always keep the vent partially open and returned to the overflow weir of the bath. This will constantly purge the housing of gas and prevent the filter from being blocked by gas. The correct opening can be achieved with a partially open valve or with a length of $\frac{1}{16}$ " ID tubing, which limits flow. For high-flowing Torrento and QuickChange ATE filters, a larger diameter tube may be necessary. Please refer to Application Note entitled, "Practical Use Guide for Using Torrento and QuickChange ATE Filters in Outgassing Applications" at: <http://www.entegris.com/resources/assets/4413-5685.pdf>

and consult Entegris' application engineers for further information. The valve can be mounted either directly on the housing or remotely.

CAUTION: If the valve is mounted directly on the housing, wear protective clothing when adjusting the valve during system operation. Avoid excessively long or curling tubing, which might interfere with the proper operation of the vent.

3. Connect the drain line or cap.

NOTE: The filter housing cannot be fully drained through the inlet or outlet fittings. The drain must be used to most efficiently remove liquid from the filter unit.

A valve is recommended for the drain. Pitch the tubing running from the drain to waste to prevent the entrapment of chemicals. A cap can be used in place of a valve if a safe method of removing the cap to drain the housing is employed.

4. Verify that all connections are leak-tight.
5. Optional: Attach a replacement tag to the feed line adjacent to the filter.

Step 3: Start the Chemical Feed

WARNING: Wear chemical-resistant clothing, eye protection and gloves. Take proper precautions when handling hazardous chemicals.



A highly exothermic reaction may result when concentrated acids come in contact with water in the filter.

1. Open the vent valve.
2. Before starting the chemical, please make note of the following safety procedures:

WARNING: Strong acids react exothermically with water. Thoroughly drain all water from the filter before exposing the filter to a strong acid. If the water is thoroughly drained, a transition can be made directly from water to acid. There will be some heating of the fluid, but it should not be excessive.

If water is not drained, increase the acid concentration in incremental steps, until the desired level of concentration is reached. Allow the temperature to stabilize after each incremental step, then drain the filter and housing. There will be much more heat generated, since the amount of heat is related to the amount of water present. Be careful not to exceed the temperature/pressure rating of the filter and its housing.

3. Start the flow of chemical. If possible, it is best to start the flow of chemical slowly and gradually increase the flow rate.
4. Flow the process chemical through the filter until the chemical exits through the vent valve. Once all air bubbles have been vented from the housing, close the valve unless the vent is plumbed to the overflow weir in a recirculation bath.

For best results to avoid contamination of the system during installation, fill process chemical into filter, then drain chemical to waste. Then proceed to introduce chemical into full system.


Alternative for outgassing fluids used in recirculation processes: Attach tubing from the upstream vent to the recirculation bath's overflow. Leave the vent valve open to direct gas out of the filter housing to prevent filter dewetting.


CAUTION: When using a remote drain, purge the drain valve during the start of the chemical flow. If necessary, the initial flow of filtered chemical can be directed to the drain to remove residual water from the unit (10–20 liters of chemical is sufficient for most applications).


Disposal


Flush Hazardous Chemicals from the Filter Before Disposal

The following recommendations are for aqueous-based chemicals. If possible, the unit should be flushed with water while on the process equipment.

 **WARNING:** The contact of water with some chemicals can result in an exothermic reaction.

 **WARNING:** Because chemicals can diffuse into the Teflon fluoropolymer resin, the filter unit may still contain hazardous chemicals even after flushing.

 **WARNING:** Do not exceed the pressure and temperature rating of the filter device during flushing.

 **WARNING:** Wear chemical-resistant clothing, eye protection and gloves. Take proper precautions when handling hazardous chemicals.



1. Relieve chemical pressure. Close valves to assure no chemical flow.
2. Open drain and vent valves. Completely drain chemical from the housing.

3. If possible, flush the filter with water while installed on process equipment. If it is not possible to flush the filter while on the equipment, remove the filter from the piping and flush it in a flushing stand.
4. Open the vent and drain lines. Direct them to a chemical drain. Direct the outlet of the filter to drain.
5. Connect the inlet to a water supply capable of about one GPM. Start the flow of water.
6. After five minutes, close the drain and vent valves. Flush for an additional 15 minutes. If appropriate, check the pH of the filtrate to assure that the chemical has been removed.
7. Turn off the flow of water. Drain the filter device.
8. Remove the filter from the system. If desired, the filter may be dried under an exhaust hood.
9. Cap the inlet, outlet, vent and drain fittings.
10. Dispose of the filter in accordance with local regulations.

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ENTEGRIS, INC.

Corporate Headquarters | 129 Concord Road | Billerica, MA 01821 USA
Customer Service Tel. +1 952 556 4181 | Customer Service Fax +1 952 556 8022
In North America 800 394 4083 | www.entegris.com

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