



Technical Information: Cleaning Optical Components

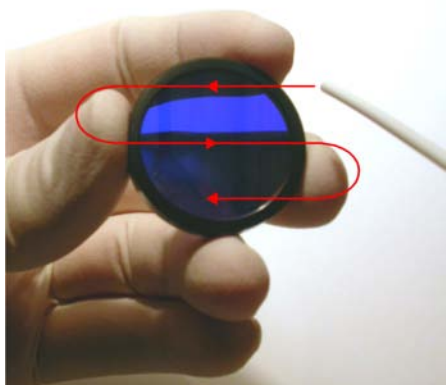
Semrock manufactures the most durable optical filters available. However, it is important to note that all optical components are delicate and should be handled with care. It is wise to always avoid or minimize direct contact with any optic. If you are not handling a Semrock filter, check with your filter vendor to ensure that the use of cleaning chemicals and solvents will not damage the filter. Because Semrock supplies only hard-coated filters, all of Semrock's filters may be cleaned using the following recommended method.

Materials: The following materials are recommended to properly clean your filters:

- **Laboratory gloves** – these prevent finger oils from contaminating the optical glass and keep chemicals and solvents from contacting skin
- **Eye protection** – approved laboratory safety glasses or goggles should be used to avoid getting any solvent in your eyes;
- **Compressed air** – clean, filtered laboratory compressed nitrogen or air is ideal, but “canned” compressed air or even a rubber “bulb blower” in a relatively clean environment are acceptable;
- **Lint-free swab** – cotton-based swabs work best;
- **Lens cleaning tissue** – lint-free tissue paper is also acceptable;
- **Cleaning solvent** – we recommend Isopropyl Alcohol (IPA) and/or Acetone (see below).

Procedure:

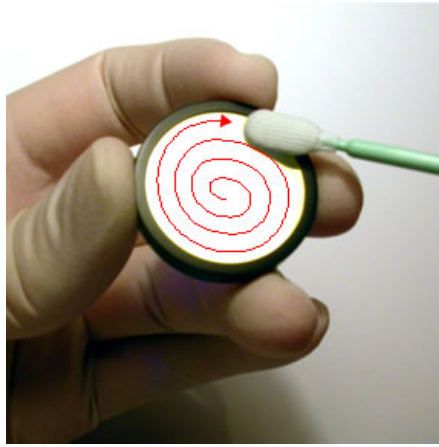
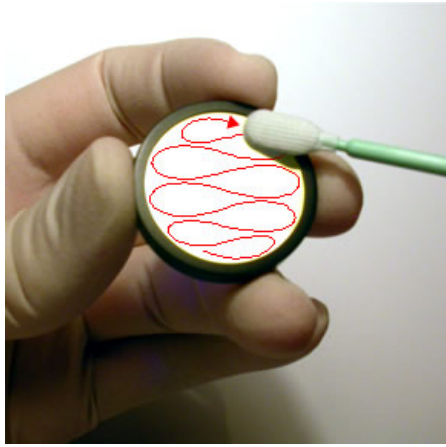
1) Blow off containments. Many contaminants are loosely attached to the surface and can be blown-off. Using laboratory gloves, hold the filter in one hand, and at first aim the air stream away from the filter. While aimed away, start the air stream using a moderate air flow. Maintain an oblique angle to the part – never blow straight on the filter surface. Now bring the air stream to the filter, and slowly move it across the surface. Return the stream back across the surface. Repeat until no more loose particles are disappearing. Flip the filter over and repeat on the other side.



2) Clean filter. If dust or debris remains, it is probably “stuck” to the surface and must be removed with mechanical force and/or chemical action. Create a firm but “pointy” tip with the lint-free wipe or lens tissue by folding it multiple times into a triangular shape or wrapping it around a swab. Lint-free swabs may also be used directly in place of a folded wipe. Moisten the wipe or swab with either IPA or Acetone, but avoid too much excess solvent. If the wipe or swab is fully saturated, it should be gently shaken to remove excess drops of solvent.

Note: IPA and Acetone each have pros and cons, so choose the solvent that works best for you after trying both. Generally the more active the solvent the better, to attack a broader range of contaminants more quickly. However, it is critical to ensure that the solvent is wiped into a very thin film before it evaporates. IPA strikes a good balance between cleaning action and level of skill required. It is not very aggressive, and thus may require more cleaning attempts or greater mechanical pressure, but it dries relatively slowly, thus allowing more time to ensure that every part of the surface is wiped. Acetone has excellent cleaning action and attacks a wide range of contaminants quickly, but it dries very quickly and is thus much more susceptible to leaving behind residue on the surface of the optic where it was not wiped. Furthermore, care should be taken when using Acetone around certain plastics and most adhesives, as these can also be dissolved rather quickly.

The key to cleaning the optic is to maintain one continuous motion at as constant a speed as possible. Some people prefer to clean using a “figure 8” pattern (shown below, left) while others choose to start in the center of the part and wipe outward in a spiral pattern (shown below, right). Each time the wiping motion comes to a stop, it is likely that residue will remain on the surface at that point; therefore, whichever method is selected, keep the wipe moving at a constant speed.



Loosely holding the wipe (or swab), clean the optic by using the “figure 8” or “center-out” method. Lift the wipe as it approaches the edge of the clear aperture (or the optic’s mount), but don’t stop the wiping motion until the tip is well off the surface of the optic.

Note: The optimal wiping speed is determined by the solvent and environmental conditions – the faster the solvent evaporates, the faster you should wipe (hence Acetone requires a faster wiping speed than IPA, for example). When wiping at just the right speed, you should see signs of the solvent evaporating on the surface only a few millimeters behind the moving wipe tip.

3) Inspect filter. Use a room light or any bright light source to inspect the optic to ensure that it is clean. Tip, tilt, and rotate the optic while viewing it as close to your eye as you can focus. If contamination remains, start with a brand new wipe or swab and repeat step 2 above. For every new cleaning attempt, ALWAYS use a new wipe!

4) Repeat steps 1 – 3 for the other side of the filter if contamination exists.