

Caring for your Laser Optics

Dust and stains on an optic can cause scattering, and impurities on the optic surface can react with incident laser light to damage optical coatings. With proper handling and cleaning of your optics, you can prevent damage and ensure their continued performance.

General Tips

If it's not dirty, don't clean it! Handling optics increases their chances of getting dirty or damaged, so you should clean optics only when necessary. You should handle optics in a clean, low-dust environment while wearing powder-free acetone-impenetrable gloves or finger cots. Since oil and debris from your hands or from used lens tissue can stain or damage optical coatings, you should not touch any transmissive or reflective surface of your optic and never reuse a lens tissue. Remember that lens tissues are inexpensive compared to the price of an optic. Inspect an optic for dust and stains by holding it near a bright visible-light source. Viewing the optic at different angles allows you to see scattering from dust and stains.

Step 1. Use a clean-air duster

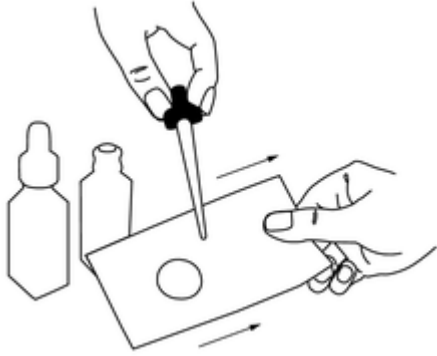
- Dusting is always the first step in cleaning your optics.
- Wiping a dusty optic is like cleaning it with sandpaper. So always dust with compressed and filtered air or nitrogen before wiping any optic. If the dusted optic has no visible stains after you dust it, then remember:
- "If it's not dirty, don't clean it." If it's still not clean, proper use of solvents and lens tissue can often do the trick.

Step 2. Use solvent and lens tissue

- The way to use them depends on the optic, but always wipe slowly and clean the edges first.
- Glass-cleaning solvents will streak, and tissue paper or a t-shirt will scratch, so always clean optics with reagent- or spectrophotometric-grade solvent and a low-lint tissue manufactured for cleaning optics. Always use lens tissue with a solvent, because dry lens tissue can scratch optical surfaces.
- A good solvent to use is a mix of 60% acetone[†] and 40% methanol. (Acetone alone dries too quickly to dissolve all of the debris. The methanol slows the evaporation time, and also dissolves debris that acetone alone would not clean.) Isopropyl alcohol is safe and effective, but its relatively slow evaporation can leave drying marks on the optic. Cleaning your optic's edges before cleaning its faces prevents dirt from being drawn up onto the face. Wiping slowly allows the solvent to evaporate without streaking. Remember, slow and steady cleans the optic.
- *†NOTE: Always use acetone-impenetrable gloves when using acetone.*

The "Drop and Drag" Technique

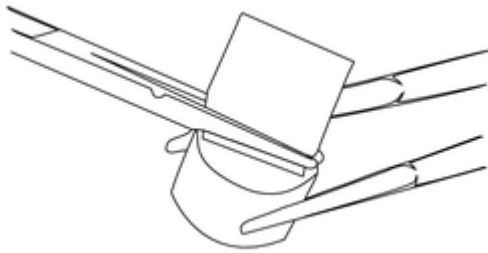
- The "drop and drag" technique is ideal for light cleaning of unmounted optics.
- Place your optic on a clean, non-abrasive surface, such as a clean-room wiper. After blowing off the dust using compressed air or nitrogen, lay a piece of unfolded lens tissue over the optic, drop on some solvent, and slowly drag the soaked tissue across the optic's face.



Drop solvent onto your lens paper and drag the soaked tissue slowly across the optic's face. Remember to clean the edges of your optic before you clean the face.

The "Brush" Technique

- Use the "brush" technique for small optics, polarizers and wave plates.
- Wipe slowly straight across from one edge of the optic to the other.
- Make a lens-tissue brush by folding the lens tissue so that the fold is as wide as the optic to be cleaned. Do not touch any part of the tissue that will touch the optic. With a hemostat or tweezers, grip the folded tissue parallel to and near the fold. Wet the "brush" with acetone and shake off any excess liquid.
- Blow off the dust. Place the brush on the optic surface, apply slight pressure with the hemostat, and slowly wipe straight across, from one edge of the optic surface to another.



Wipe slowly straight across from one edge of the optic to the other.

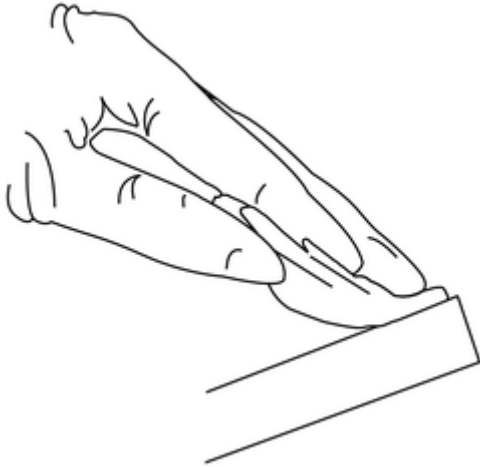
The "Brush" Technique for Small-Diameter or Mounted Optics

- You can use a modified "brush" technique for small-diameter or mounted optics.
- For these optics with hard-to-reach edges, make a small brush by wrapping an optic tissue around the soft tip of a synthetic low-lint swab. In one motion, "paint" the optic perimeter and sweep across the center of the optic. Wiping in a continuous motion prevents drying marks.

The "Wipe" Technique

(Not recommended for metallic coatings)

- This method is useful for heavier cleaning of stubborn stains. Fold the lens tissue as described in the "brush" technique above, and grip it with your fingers instead of the hemostat.
- Applying a uniform pressure on the optic edge, slowly wipe across the optic's face.



Use the "wipe" technique to remove stubborn stains on more durable coatings.

Once You Have Cleaned Your Optic

- Place the optic in the mount it will be used in or wrap it in lens tissue and place it in its container right away.