

Microscope Cleaning Tips, Techniques, and Timing

— “He that would perfect his work must first sharpen his tools.” —

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DOI: 10.1309/OMCOKDWC2HKMQBU

Clean microscopes and Köhler illumination are interdependent (see next month's issue for an article on Köhler illumination). Each is a necessary but not sufficient requirement for optimal imaging and visually satisfying microscopy. Maintaining a clean microscope and documenting it are required by all regulatory and professional organizations.

Tips

- Clean microscopes perform best. Lenses cleaned least last longest.
- Remove coarse dirt first; fine dirt last. Brush off, blow off, and then wipe off. Let lens cleaner dissolve dirt film before wiping.
- Use proper cleaning techniques to avoid damaging the thin anti-reflection lens coatings. Use only lens tissue.
- Use an inverted eyepiece as a jeweler's loupe to check objective front lens surfaces for dirt before cleaning and to confirm dirt removal after cleaning.
- Do not apply liquid lens cleaner directly to a lens surface. It may seep around the edges and onto the inside surface.
- Do not take any lens system apart.
- Dust busting: To locate imaged dirt particles, rotate the eyepieces and move the slide to see whether the dirt moves. Raise and lower the substage condenser. If the dirt goes out of focus, it is located below the substage condenser—usually in the neighborhood of the blue filter. Un-imaged dirt scatters light and creates glare, which is light that does not contribute to image formation.

Techniques

Eyepieces

- Brush or blow off dust.
- Place a few drops of lens cleaner on twice-folded lens paper. Gently wipe lens in a circular motion. Move to a dry area of paper and wipe until dry, taking special effort to remove lens cleaner around the circumference. Use a dry cotton tip applicator if needed. Do not remove the eyepiece from its sleeve if you can avoid it.

Substage Condenser Top Lens

- Lower the condenser to its lowest point and remove from its mount.

- Brush and blow off loose glass particles.
- Apply 1 or 2 drops of lens cleaner to 1 end of a double thickness of lens paper placed on the top lens. Slowly pull the lens paper across the lens until dry. Repeat as needed.
- Replace the condenser, raise, and recenter.

Objectives

- Remove and replace objectives from the nosepiece with extreme care. Dropping them is easy.
- The front lens surfaces are often recessed or concave, thus requiring cleaning techniques that will reach the dirt. Use lens cleaner for most jobs; xylene for mounting medium and immersion oil.
- Work over a table that is covered with a cushioned surface if possible.
- Check the front lens surface with an inverted eyepiece. If dirty, proceed.
- Apply a drop of lens cleaner to a double thickness of lens paper.
- Using a sharpened bamboo stick, move the moistened paper over the surface. Dry it.
- Check for success again using an inverted eyepiece. Replace the objective in the nosepiece; hold it until certain it is secure.

Timing

Daily

- Brush off each eyepiece's eyelens, the substage condenser's top lens, the blue filter, and the microscope overall.
- Cover unused microscopes.

Weekly

- Blow off glass particles that accumulate around the top lens mount of the substage condenser.

As Needed

- Clean each eyepiece's eyelens.
- Clean the front lens of each objective.
- Clean both sides of the blue filter and blow off dust particles on top surface of the supporting lens. LM