

**CLEANING PROCEDURE FOR MELLES GRIOT OPTICS.**

Optics can be contaminated in many ways. Contamination can be kept to a minimum by returning the optics to their case or by covering the optics for protection from the outside environment. However, even with all these precautions, the optic will eventually accumulate dust, stains or some other form of contamination.

**Inspection of Optical Surfaces.**

During inspection, all optics must be handled in the cleanest area available (preferably a clean room or within a laminar flow bench). Proper equipment, like powder free clean room gloves or finger cots must be worn at all times to avoid grease and oils from being transferred to the optic. Lens tissue paper, dust free blowers, hemostats, cotton swabs, cotton tips, and reagent grade acetone and methanol, will all be needed for cleaning optics. The acetone and methanol must be fairly fresh to avoid leaving any marks on the optics. Reagent Grade Isopropyl alcohol can also be used instead of acetone.

There are two ways in which an optic can be evaluated:

- i.) If the optic is being used in a laser based system, contamination on the optic might cause the optic to scatter the laser light, thus reducing power and making the optic “glow”.
- ii.) An optic can also be visually inspected by holding it below a bright light source and carefully viewing it at different angles. This will cause the light to scatter off the contamination enabling the viewer to see the various stains and dust particles.

### Cleaning Methods

#### ***Blowing Method:***

Avoid touching the surface of the optic with unprotected fingers! Always wear powder-free gloves or finger cots.

The first step in cleaning any kind of optic is to remove dust or loosely held particles by blowing them off the surface of the mirror or lens using a dust free blower (a dry nitrogen or CO<sub>2</sub> blower will work fine for this). This reduces the chance of scratching the optic during the actual cleaning.

**NOTE:** This is the only cleaning method allowed for bare metal, soft coatings, and pellicles. These types of surfaces should never be touched.

#### ***Drop and Drag Method:***

For this procedure the optic will have to be removed from any mount it is in, and placed in a clean room environment.

1. Use the Blowing Method first.
2. Place a drop of methanol on the side of a lens tissue paper. With the other hand, hold the optic by its edges.
3. Gently place the wet area of the tissue onto the optic.
4. Once the lens tissue is on the optic, slowly drag it across the surface until the lens tissue is dry.

***CAUTION:*** Be careful not to drag a piece of dirt across the surface. This could scratch the surface. This procedure should be practiced a couple of times so that streaks are kept to a minimum.

#### ***Wipe Method:***

If the optic cannot be taken out of its held position or if stronger cleaning is required, then the next step will be to wipe using lens tissue paper along with methanol and acetone.

1. Use the Blowing Method first.
2. Fold a piece of lens tissue paper to create a folded edge that is a little longer than the size of the optic. A hemostat is particularly suited to securely hold the folded tissue
3. Wet the folded edge of the tissue with acetone.
4. Wipe the optic with the lens tissue paper with one continuous motion. Apply some pressure on the wipe to remove stubborn stains.

**NOTE:** Repeat this process, always with new lens tissue paper to eliminate depositing any contamination on the optic. A final wipe with methanol is recommended since methanol does not leave streaks on the surface like acetone. Isopropyl alcohol is also effective, but it too can leave streaks like acetone. If the size of the optic is very small cotton tips can be used instead of lens tissue paper, and the procedure is still the same.

***Bath Method:***

Small optics or optics that require milder cleaning than the wipe method can be cleaned by the immersion method.

1. In this method a Petri dish is lined with lens tissue paper and filled with methanol.
2. Once in the Petri dish, clean the optic gently with a piece of soaked cotton ball.
3. Once wiped, agitate the Petri dish for a few minutes.
4. Repeat steps 1 through 3 with acetone instead of methanol.
5. Next, remove the optic from the Petri dish and blow dry.
6. If stains occur because of the blow-drying use the drop and drag method described above.

**CAUTION:** Do not use this method with cemented or mounted optics.

***Soap Solution Method:***

If the optic contains contamination in the form of grease (fingerprints, etc), methanol and acetone will tend to simply re-distribute the grease. In this case, the optic will need to be cleaned with a soap solution. The soap solution should be a non-abrasive, mild solution without any additives (green soap works well for this).

1. Use the Blowing Method first.
2. Use a soap solution and clean with either the Wipe Method or the Bath Method.
3. Rinse thoroughly with de-ionized water in a Petri dish.
4. Cleaning with methanol and acetone (Wipe Method or Bath Method) should then be next.
5. After rinsing, blow dry with a dust free blower to remove all water.

***Ultrasonic Cleaning Method:***

One other cleaning option is to use an ultrasonic bath. This method is the same as the Bath Method, except all the Petri dishes are placed in an ultrasonic bath for about one minute. Please note, that even with dielectric coatings, the use of the ultrasonic bath may cause the coating to flake at the sides where it has the weakest bond.

**Cleaning of Melles Griot optics**

Melles Griot Inc. supplies various types of substrates and coatings to our customers. Below is a list of these types, along with the recommend type of cleaning.

Bare Substrates (All kinds) Can be cleaned with all the methods described in the Cleaning Procedure:

1. Blow
2. Drop and Drag method
3. Wipe Method
4. Bath Method
5. Soap Solution method
6. Ultrasonic Method.

Single Layer MgF2 coatings (/066, /067) Cleaning methods that can be used are:

1. Blow
2. Drop and Drag method
3. Wipe Method
4. Bath Method
5. Soap Solution method

HEBBAR Coatings (/072, /073, /074, /075, /076, /077, /078, /079, /083, /084) Cleaning methods that can be used are:

1. Blow
2. Drop and Drag method
3. Wipe Method
4. Bath Method
5. Soap Solution Method

V-Coatings (/1xx) Cleaning methods that can be used are:

1. Blow
2. Drop and Drag method
3. Wipe Method
4. Bath Method
5. Soap Solution Method

Bare Aluminum (/016) Cleaning methods that can be used are:

1. Blow

Protected and Enhanced Aluminum coatings (/011, /023, /028, 02 MEF Elliptical mirrors) Cleaning methods that can be used are:

1. Blow
2. Drop and Drag method
3. Wipe Method
4. Bath Method

Internal Silver (/036) Cleaning methods that can be used are:

1. Blow

Bare Gold (/045) Cleaning methods that can be used are:

1. Blow

Protected Silver and Protected Gold coatings (/038, /055) Cleaning Methods that can be used are:

1. Blow
2. Drop and Drag method
3. Wipe Method
4. Bath Method
5. Soap Solution method

MAXBRite Coatings (/001, /003, /007, /009) Cleaning Methods that can be used are:

1. Blow
2. Drop and Drag method
3. Wipe Method.
4. Bath Method
5. Soap Solution method

Laser-Line MAX-R™ Coatings (/2xx) Cleaning Methods that can be used are:

1. Blow
2. Drop and Drag method
3. Wipe Method.
4. Bath Method
5. Soap Solution method

Ultrafast Coating (/091) Cleaning Methods that can be used are:

1. Blow
2. Drop and Drag method
3. Wipe Method
4. Bath Method
5. Soap Solution method

Ellipsoidal and Parabolic Reflectors (02 RPM, 02 REM) Cleaning Methods that can be used are:

1. Blow
2. Drop and Drag method
3. Wipe Method

Beamsplitters (03 BTF, 03 BTL, 03 BDL, 03 BDS) Cleaning Methods that can be used are:

1. Blow
2. Drop and Drag method
3. Wipe Method.
4. Bath Method
5. Soap Solution method

Cube Beamsplitters. (03 BSC) Cleaning Methods that can be used are:

1. Blow
2. Drop and Drag method
3. Wipe Method

Polarizing Prisms (containing Calcite, 03 PTY, 03 PTO, 03 PLS, 03 PWS, 03 PBD) Cleaning Methods that can be used are:

1. Blow
2. Drop and Drag method
3. Wipe Method

Dichroic Sheet and Near Infrared Polarizers (03 FPG, 03 FPI) Cleaning Methods that can be used are:

1. Blow
2. Drop and Drag method
3. Wipe Method

Retardation Plates (02 WRM, 02 WRQ) Cleaning Methods that can be used are:

1. Blow
2. Drop and Drag method
3. Wipe Method

Colored Filters and Heat-Absorbing Filters (03 FCG, 03 FHA) Cleaning Methods that can be used are:

1. Blow
2. Drop and Drag method
3. Wipe Method
4. Bath Method
5. Soap Solution method
6. Ultrasonic Method

Short-Pass Filters, Hot and Cold Mirrors and HeatBuster Mirrors (03 SWP, 03 MHG, 03 MCS) Cleaning Methods that can be used are:

1. Blow
2. Drop and Drag method
3. Wipe Method
4. Bath Method
5. Soap Solution method
6. Ultrasonic Method

Neutral Density Filters (03 FNG, 03 FNQ, 03 FSG, 03FDC, 03 FNA) Cleaning Methods that can be used are:

1. Blow
2. Drop and Drag method
3. Bath Method

*Please note: The Absorptive Neutral-Density Filters (03 FNA) can also be cleaned using the Wipe Method.*

Interference and Long-Pass Filters (03 FL\_, 03 LWP) Cleaning Methods that can be used are:

1. Blow
2. Drop and Drag method
3. Wipe Method.
4. Bath Method
5. Soap Solution method
6. Ultrasonic Method

All High Energy Laser Optics and UV Optics. Cleaning Methods that can be used are:

1. Blow
2. Drop and Drag method
3. Wipe Method
4. Bath Method
5. Soap Solution method
6. Ultrasonic Method

Pellicle Beamsplitters (03 BPL) Cleaning Methods that can be used are:

1. Blow (gently)

**CAUTION:** Pellicle surfaces must not be touched

Spherical Ball Lenses and Gradient Index Lenses (06 LMS, 06 LGS, 06 LGE, 06 LGD, 06 LGT)  
Cleaning Methods that can be used are:

1. Wipe Method (use cotton tips instead of lens tissue paper)