LU2: LAB 1-2B: Care and Cleaning of High Grade Optical Components

REFERENCES:

- *Fundamentals of Light & Lasers* (OPTEC), 2nd edition.
- Module 2, Laboratory 1-2B, page 43
- http://optecvideo.opteccrm.org, Video 6
  - Course 1: Fundamentals of Light and Lasers
  - Lab Activity Video
  - Choose Video #

THEORY: Clean optics are very important in laser applications. Dust or dirt on an optic result in reflection, attenuation, scatter and absorption of the laser beam. Some optics and/or their coatings may be damaged by contamination. Proper handling and storage are equally important to prevent damage and retain cleanliness. The following are some general guidelines:

1. Don't clean the optic if it isn't dirty
2. **Do not touch the optic with bare fingers, etc**.
3. Hold the optic by its edges or non-polished sides.
4. **Place the optic on a clean, non-abrasive tissue, not on a hard surface.**
5. Use compressed air to remove dust first.
6. Use appropriate cleaning agent.

OBJECTIVE: Practice optical cleaning techniques for optics in the lab kits.

Read the entire SET-UP, PROCEDURE and watch the VIDEO(s) before doing the lab.

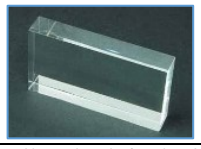
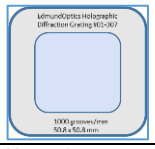
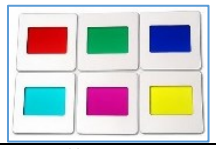
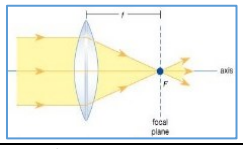
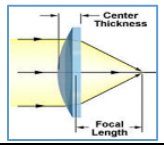
EQUIPMENT:

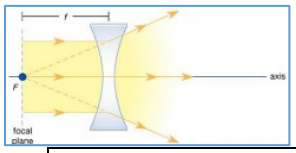
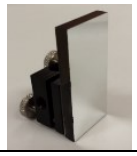
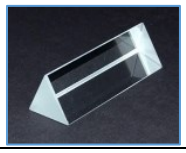
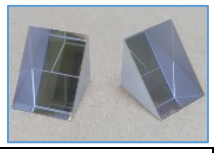
- Various Optics from MPEC Photonics Kit
- MPEC Optical Cleaning Kit (tissues and wipes)

MPEC Photonics Kit Optical Cleaning Kit

Optical Cleaning Kit, MATIN Lens Cleaning Paper, 50 sheets/pack, 1 pack/kit	**1**
	
Optical Cleaning Kit, Zeiss Pre-Moistened Lens Cleaning Wipes, 5 packets/kit	**5**
	

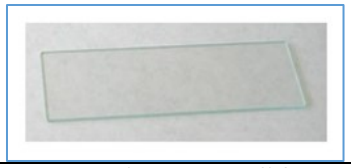
Optics in MPEC Photonics Kit:

				
Acrylic Block/Window	Diffraction Grating	Filter Set	BiConvex Lens	Plano Convex Lens

				
BiConcave Lens	Mounted Mirror	Glass Polarizer	Equilateral Prism	Righ Angle Prism

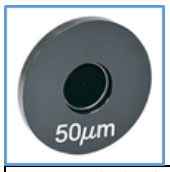
¼ Wave plate

Flashlight Lens



Microscope Slide

Polarizer Slides



50µm Pinhole

100µm Slit

PROCEDURE: Read the entire SET-UP, PROCEDURE and watch the VIDEO(s) before doing the lab.

1. With the intent of re-wrapping the optic identically as packaged, carefully unwrap the optic
   - 1.1. It may be necessary to take notes or pictures as you unwrap the optic so as to know how to re-wrap them
     - 1.1.1. Steps 3.2, 5.2, 7.6
   - 1.2. So as not to add more "gunk" to the optic
     - 1.2.1. Use its wrapping tissue or a new lens cleaning tissue and very carefully hold/touch the optic by the edges
   - 1.3. Place the optic on a clean, dry, soft surface until necessary to hold

2. Inspect each optical component
   - 2.1. Use the flashlight to reflect light off the optic's surface and/or view light through the optic

3. On optics where particulate or smudges are **not** evident
   - 3.1. Group them together, identify, take a photo and **include in Lab Write-Up**
   - 3.2. **Re-wrap** and package and replace in kit in correct location

4. When particulate (dust, etc.) is discovered
   - 4.1. Use tissue to **lightly "brush"** off the particulate.
     - 4.1.1. Do Not Blow it off with your mouth.
   - 4.2. **This is the only method** used for the following:
     - 4.2.1. Diffraction grating, 6 – piece filter set, polarizers, ¼-waveplate, 50µm pinhole and 100µm slit

5. On the optics where particulate was removed and are now clean
   - 5.1. Group them together, identify, take a photo and **include in Lab Write-Up**
   - 5.2. **Re-wrap** and package and replace in kit in correct location

Still not clean as in it has smudges, finger-prints?

6. Clean it with one of the Pre-moistened Lens Cleaning Wipes and Lens Cleaning Paper/Tissues
   - 6.1. These may be used more than once but when smears cannot be removed, use a new Wipe/Tissue
   - 6.2. Open Wipe package but do not remove Wipe until ready to use
   - 6.3. Place Cleaning Tissue pack within easy access

7. Cleaning method with wipes/tissues
   - 7.1. With the Wipe on the end of your finger begin at the optic's center and using small, gentle, circular motions work your way out to the edges
   - 7.2. Do not lift the Wipe; make one continuous motion
   - 7.3. Dry the optic with the Tissue with the same motion
   - 7.4. RE-INSPECT optic noting where it is still dirty
     - 7.4.1. If necessary, re-peat cleaning process
     - 7.4.2. Use a different area of the Wipe/Tissue
   - 7.5. Once clean, group them together, identify, take a photo and **include in Lab Write-Up**
   - 7.6. **Re-wrap** and package and replace in kit in correct location