Cleaning Procedures for the Cassegrain ADC Prisms

David Hilyard
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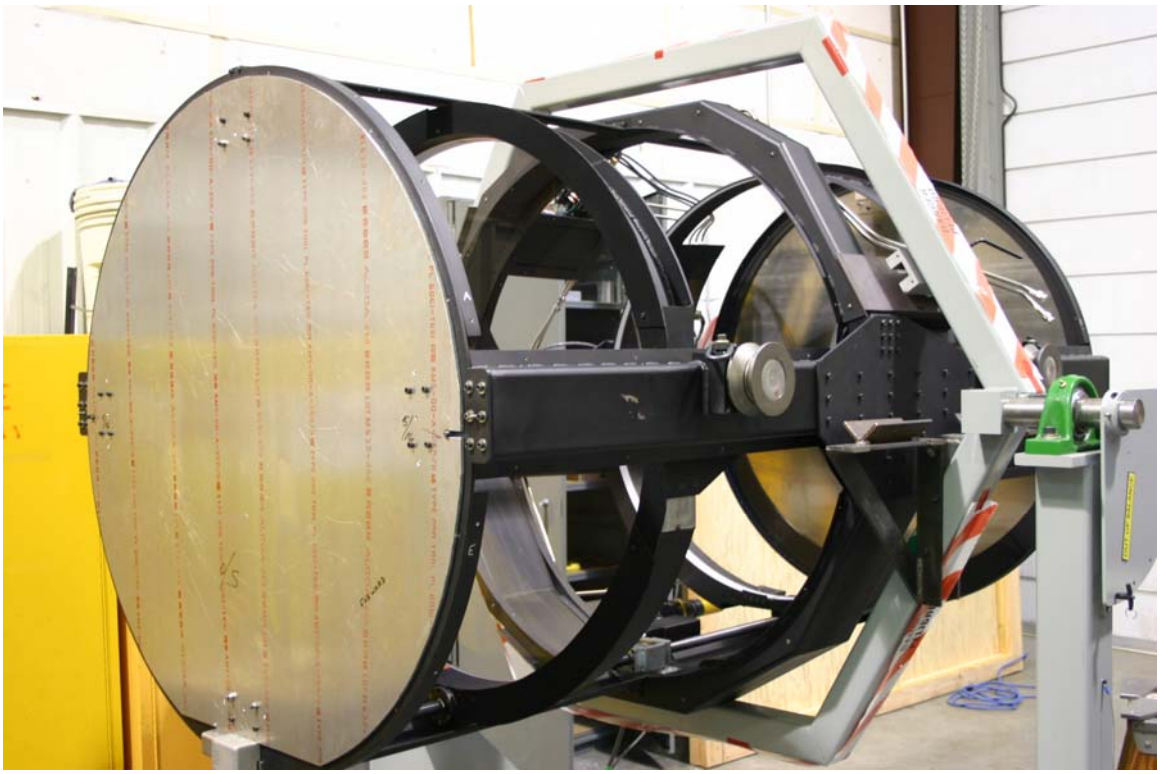


The Cassegrain ADC Prisms are made of Corning High Purity Fused Silica Standard Grade 3D. They were wedge cut from a single boule by Corning and sent to Zygo Corp. for final shaping, grinding, polishing and figuring. They were coated with a three-layer coating on each surface at Lick Observatory. The three layers were (in design): 55 nm MgF2; 9 nm Al2O3; and 104 nm of silica sol-gel. The first two layers were applied in a vacuum chamber via thermal (e-beam) deposition. The sol-gel was applied by spin coating at 125 rpm. The sol-gel coatings were hardened in an ammonia vapor chamber and then hydrophobic treated to resist water damage. These coatings have been tested for cleanability and show they can be cleaned without damage using some light and careful cleaning techniques. These techniques are described in this document.

I. Blow-Off Method of Removing Dust Particles and Other Surface Debris

This procedure should be the most frequent maintenance of the exterior surfaces of the prisms; they may not require further cleaning.

Procedure Note: Always use jumpsuit, gloves, and face mask during this procedure.

Materials:

High-intensity lamp

Ultra-high-purity dry nitrogen

Anti-static unit

Tyvek or other protective jumpsuit
Gloves
Face mask

1. Illuminate the surface with high-intensity lamp. This can be done from the front or as a backlight through the second prism, depending on which gives best visibility.

2. Blow off particulates using high-purity dry nitrogen, assisted with anti-static gun.

    a. Use slow, careful movements near the surface at a grazing angle. Be very careful not to bump surface with nozzle.

    b. Start at 80 psi, blow from center out toward the edges.

    c. If necessary, increase to **no higher than 150 psi.**

The two **interior** surfaces of the ADC prisms will likely not require cleaning, but it should be done if necessary.

If there are a few individual spots, stains or spatters that need to be removed after completing the blow-off cleaning procedure, they can be addressed using the following procedure.

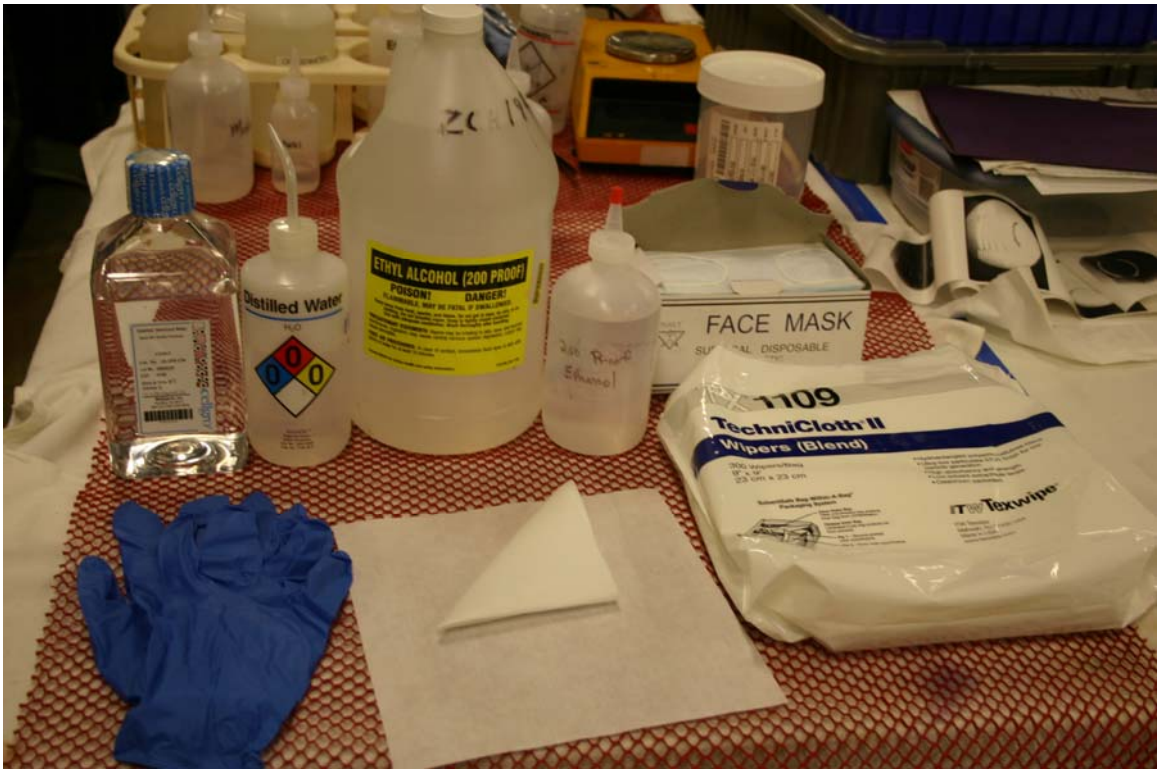
II. Removing Individual Spots or Stains

Procedure Notes:

- ❑ It is important to perform the blow-off procedure above before wiping the surface, so that no surface particulates are dragged on the surface in the process.
- ❑ If the origin of the spot is unknown, it is fine to use both liquids to determine which one works. Neither liquid will harm the prism.
- ❑ Always use jumpsuit, gloves, and face mask during this procedure.

Materials

High-intensity lamp
200-proof ethanol for **oil-based** spots or stains
Distilled/deionized water (e.g., Cellgro Sterile Dis/DI water) for **water-based** spots or stains
Texwipe TX 1109 TechniCloth II Wipers or other low-lint cleanroom wipe
Tyvek or other protective jumpsuit
Gloves
Face mask



1. Illuminate the surface with high-intensity lamp. This can be done from the front or as a backlight through the second prism, depending on which gives best visibility.

2. Wipe with Texwipe TX-109 TechnicCloth II Wiper as follows.

    a. Fold the wipe into a triangular wedged shape so that the tip acts like an extension of your finger.

    b. Wet the tip enough so the liquid wicks the wipe beyond where your finger contact will be on the prism surface, so **no dry part of the wipe touches the surface**.

    c. Use a **very light pressure**, just enough to contact the wipe to the surface.

    d. Wipe the spot in a **short, even, slow motion,** covering no more of the surface surrounding the spot than necessary.

    e. Allow to dry.

 **WARNING: Do not continue procedure if these techniques do not work. The spot may have etched into the coating and may be permanent.**

III. Drag Wiping the Entire Surface to Remove a General Haze or Dust Layer

Procedure Notes:

- ❑ It is important to perform the blow-off procedure above before wiping the surface, so that no surface particulates are dragged on the surface in the process.
- ❑ This is a two-person procedure.
- ❑ Always use jumpsuit, gloves, and face mask during this procedure.

Materials

High-intensity lamp
200-proof ethanol
Texwipe TX 1109 TechniCloth II Wipers or other low-lint cleanroom wipe
Tyvek or other protective jumpsuit
Gloves
Face mask

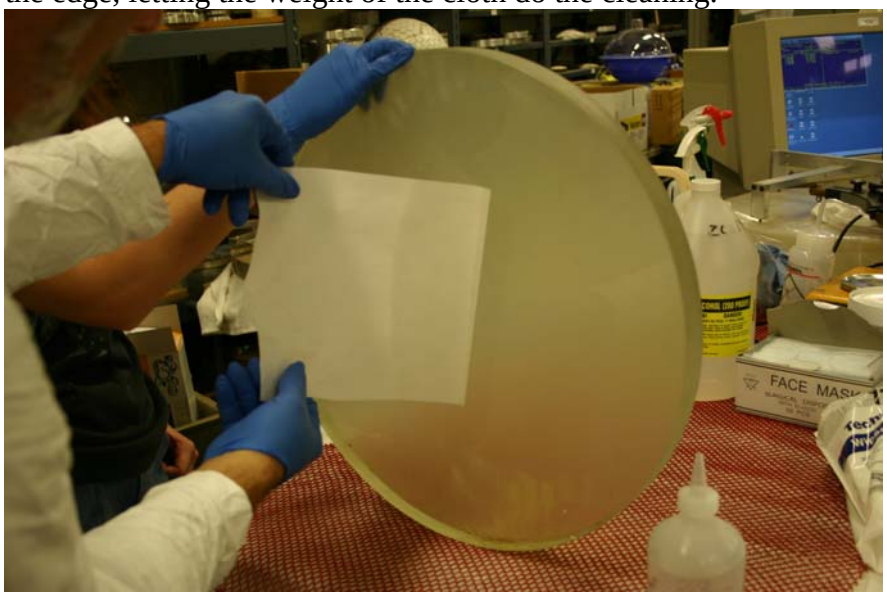
1. Illuminate the surface with high-intensity lamp. This can be done from the front or as a backlight through the second prism, depending on which gives best visibility.

2. Drag wipe using the steps illustrated below.

    a. One person holds the wipe against the surface while the second person wets the wipe edge with ethanol.

    b. The person with the wipe holds two corners of the wipe and allows the lower edge of the wipe to contact the surface. (Similar to putting down contact paper.) A few squirts of ethanol will adhere the wipe to the surface, initially.

c. With the lower 9" long edge of the wipe then wetted well (but not dripping from saturation), the wipe person drags the wipe from the center toward the edge, letting the weight of the cloth do the cleaning.



d. Allow the trail of ethanol to air dry. If a wipe residue is left behind, repeat the process with a less wetted wipe.

3. Repeat this process in overlapping areas until the entire surface has been cleaned. Following the circular edge of the prism with the drag wipe motion is the best way to cover the outer areas.

   NOTE: Use each wipe only once and discard after use.