

# BERO ARCHITECTURE PLLC

ARCHITECTURE SUSTAINABILITY PRESERVATION

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## SOME THOUGHTS ON ULTRAVIOLET AND VISIBLE LIGHT PROTECTION FOR HISTORIC WINDOWS

Sunlight has deteriorating effects. Fading of textiles, finishes, and interiors is caused by UV rays, visible light, and heat. UV is the most active part of light, causing 40% of fading, while visible light and heat each cause approximately 25% of fading. Shading that will reduce light will also reduce heat. There are several ways to protect interiors from deterioration while controlling sunlight. All products discussed below come in varying degrees of visible and ultraviolet light transmittance.

### I. OPAQUE BARRIERS

Awnings, shutters, drapes, shades, and blinds are historically appropriate and very effective, available in a wide range of prices, and easy to replace.

They are effective only when closed and so require tending; and are relatively high maintenance.

### II. GLASS

Glass is durable and is available in different colors and with coatings for light/UV reflectivity, does not fade, and is easy to work with.

Low-e glass blocks 60% of UV rays, laminated glass up to 99%, tinted glass does not block UV; replacing window glass removes historic fabric from the building, and tinted or coated glass costs over twice as much as plexiglass.

### III. PLEXIGLASS (ACRYLIC SHEET)

Plexiglass is available in different colors, tints, and thicknesses, can block up to 97% of UV, is shatter-resistant, lighter weight than glass, relatively color stable, and can be applied to existing windows on site.

It must be carefully cleaned to avoid scratching or clouding the surface (avoid ammonia-based products), mounted to allow for expansion (roughly ¼ inch per foot), and separated from rubber, plastic, or wet paint to avoid chemical reactions.

### IV. FILM

Film is available in different colors and transmittance values, can block up to 99% of UV, costs 25% less than plexiglass, and can be applied on site.

It is hard to apply evenly, may cause cracking of antique glass, has adhesive which condensation breaks down, looks reflective from the exterior, must be carefully cleaned, and needs to be replaced every 5 - 10 years as adhesive deteriorates. (It should be tested annually by museum professionals to determine its screening effectiveness.)

We generally recommend plexiglass for light transmittance protection. We have mounted it on the interior of storm windows to protect it from weather and reduce the need for cleaning. This maintains the original glass and window, and protects the prime window as well as the building interior.