Preservation Practices

by Hugh Phibbs

Laminated Glass

Most frames can be successfully fit with either glass or acrylic sheet. Acrylic has the advantage of being virtually shatterproof in a frame and can be found in a wide variety of thickness and sizes, with or without ultraviolet absorber. Glass has more modest cost, low static potential, and can act as a vapor barrier, which makes it valuable for the creation of sealed packages. Acrylic is hygroscopic and can transmit water vapor. It can warp if the two sides of the sheet are exposed to differing levels of relative humidity.

While non-glare acrylic is available, its light scattering surface blurs the image of art that is spaced away from it, which make it aesthetically unacceptable for use with fine art. The creation of anti-reflective acrylic is a technical problem since the methods used to create such coatings depend on heat, which is high enough to deform the acrylic. For anti-reflectivity and stability in sealed packages that are expected to resist climate change, glass is the only option, with its heat resistance and vapor barrier potential. The critical problem with glass is its fragility.

Lamination of two lites of glass with a flexible core material is the obvious answer. The fact that most thin, flat glass is strengthened with iron creates an aesthetic problem, since the presence of iron in the glass imparts a green tint, and when this tint is multiplied through lamination, the resulting color seriously affects its color rendering. Glass with low iron content, commonly used for dinnerware and thick architectural glazing, is less commonly made in thin, flat sheets due to its lowered strength. It is beginning to become available to framers, with and without anti-reflective coating. Low iron, anti-reflective, laminated glass has enjoyed widespread usage in museums, but its high cost and limited availability has kept it from use in general framing. An understanding of the creation of this type of glazing explains its cost and supply issues.

Anti-reflective coatings can be made of layers of silicates and titanium dioxide deposited on the surface of the sheet. These sheets are made in thicknesses designed to make the outgoing reflection opposite in phase to the incoming light so they cancel each other and all but eliminate the reflection.

The process developed by Schott A.G. in Germany and used by Denglas Technologies employs repeated dipping of the sheet into a vat of the coating material and baking the deposited coating between each trip to the vat. Deposition with an ionic sputter coater creates the films used by Tru Vue and Glastroshe of Switzerland.

These complicated procedures entail high rejection rates, so that for each lite of anti-reflective glass that reaches the customer, one has been rejected. This means that creation of a laminated sheet using this sort of coated glass will require four pieces of glass for one sheet of laminate. The resulting product costs between $60 and $80 per square foot with significant added costs for shipping and crating.

The combination of no reflections, utter clarity, ultraviolet control, effective vapor barrier potential, and shatter resistance add up to the ultimate in glazing products—virtual invisibility with profound protection. However, its cost will likely keep it in the highest end of the framing market. If the anti-reflective coatings are left out, the resulting product would have all but one of those attributes and should be available at a much lower cost.

Such low iron, UV absorbing, laminated glass could be made without the high rejection rates which characterize the production of AR glass. This glass could be used in framing valuable works, ensuring their safety and the clear rendering of their colors. It could be use in the creation of highly sealed packages that would not lose their initial conditioning over time. The only impediments to introduction of such a product are the need for more two-millimeter, low iron glass and the skill needed for sizing laminated glass.

Trimming lites of laminated glass to specific sizes entails scores being made on the sheet at the appropriate point on both. The scores must be run, or cracked open with a combination of tapping along them with a screwdriver and very gentle pressure. The tapping and pressure will open the score that is on the lite of glass that is on the bottom. When both scores have been run and this fact has been confirmed through careful examination with a raking light, the sheet can be gently flexed along the open scores to expose the plastic laminate for cutting. Once the excess has been removed, the edges of the glass can be dulled with an edge seamer. As this material comes into wider circulation, glass distributors are likely to offer it as a chop or cut to size item.

Preservation, like any important undertaking, must focus on constant improvement. Techniques we have today, such as highly sealed packages that fit inside frames, can offer stable climatic conditions to protect their contents. UV absorbers can filter the most damaging portion of the light falling on the art. However, without a shatterproof vapor barrier glazing, such packages will eventually equilibrate with their environment. If acrylic is used, it can warp if exterior conditions are too dry. Anti-reflectivity and low iron clarity may be luxuries, but laminated glass is necessary for the preservation of valuable works that will be framed for long periods in settings with less than optimal environmental conditions. ■