Preservation Practices

by Hugh Phibbs

Frame Sealing: Made Faster, Easier, Safer

What does framing something entail? What happens when a work on paper, a painting on a stretcher, or an art object is fitted into a picture frame?

The first thing one may notice is the fact that that item is kept in a vertical position, sometimes for years. Doing that safely requires an extensive knowledge of support and hinging techniques. A second consequence of framing is the fact that the item will be exposed to light for many years. This exposure can be mitigated if the frame is hung in a setting that receives low light levels and if the glazing in the frame filters out ultraviolet wavelengths.

Another challenging aspect of framing is the environment that surrounds the frame. Frames are hung on walls, at eye level, in various types of rooms and buildings. Hanging on the wall has both advantages and disadvantages. For example: It keeps the framed item up, away from potential flood damage. However, in the event of fire, the fact that the frame is roughly halfway up the wall means that it is likely to suffer more smoke damage and more heating than it would at a lower level. The aromatic hydrocarbons which comprise smoke have an amazing ability to permeate a huge variety of materials and to invade the most sheltered of spaces, as anyone who has been through a smoky fire can attest.

Water—more specifically, water vapor—is another critical factor in the environment of the frame. The relative humidity that an occupant of a room may feel on his or her skin may be far different than the relative humidity that a framed item on some walls would be subject to. Exterior walls, walls that have openings that communicate with spaces above or below the living area of the house, and masonry walls all have the potential of donating significant amounts of water vapor to the back of a frame.

All glazing materials will trap that moisture within the frame, but glass is especially effective in this regard. A plastic backing board will briefly slow the infusion of moisture into the frame, but the tendency of water molecules to move from a location of higher concentration to a drier space should not be underestimated. A dust cover made of plastic and aluminum laminate foil can provide a complete barrier to the entry of water vapor and pollution from the back of the frame; however, the space between the frame's lip and the glazing still represents an entry point for water, pollution, and pests.

As we consider the potential of a traditional frame to protect its contents, we can begin with the proposition that atmospheric pollution is injurious to the preservation of anything but gold. The glazing in a frame forms a useful barrier in front of the framed material, while back mats that

contain chemical buffers and adsorbers, and backing boards that contain plastic, give some protection to the back surface of the contents of the frame. The edges of the glazing/mat/backing board package can be taped to keep moisture and pollution out; but the adhesive in pressure-sensitive tape is, itself, problematical and will tend to loose its hold if left in place for a number of years, or if it is exposed to extremes of heat or cold. Such extremes are not likely to be encountered while the frame is hanging on the wall. However, when it is stored or in transit, these problems may be expected.

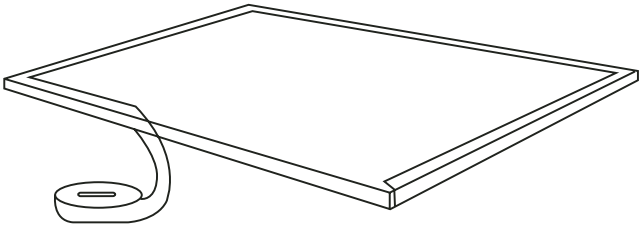

Figure 1: When applying a 1/4" wide ATG tape for sealing, place approximately half of the width along the edges of the glazing. The remaining width is bent over to the front of the glazing and applied to that surface.

When a frame is in storage for a long period, it is kept out of the light, but during that time the frame is not likely to be examined and pests or molds may invade. Clothes moths may be attracted to protein fabrics (such as wools or silks) that have been framed or used in the matting. Silverfish may seek out animal-based glues or films (such as photo emulsions) that may be found in the framed item. The larvae of wood boring beetles can infest wood or cotton products in the frame, and the wood of the frame itself. Mold spores are ubiquitous and can be expected to begin to grow when the relative humidity exceeds 65 percent at 70°F or 20°C for extended periods. All of these forms of biological danger prefer darkness, which is one reason that they are most likely to be encountered during storage.

What Can Be Done?

To this host of ills there is a single, simple solution: a well-conditioned, highly sealed package within the frame. Such packages have been in service in museums, libraries, and archives in North America and Europe for decades and have a distinguished record of providing excellent protection to their contents. Various designs have been employed, beginning with large, cumbersome, rigid containers of glass and metal. They have evolved into simple wrappers of aluminum/plastic sealing foil, such as Marvelseal 360 or aluminized polyester, that fit into most frames with minimal modification. These latter packages have been sealed with one of two materials: double-sided tape or electrical grade, hot melt adhesive.

However, each has presented problems. The tape has a carrier which gives it bulk. This limits its gap-filling potential and means that where layers of the tape overlap each other, one is likely to find small air channels along the path of the overlap, which diminish the seal of the package. Such tapes also have limited holding power and they can be expected to loose their grip if the environment gets too wet, hot, or cold. The hot melt glue forms a complete and durable seal, but it is messy to work with and its controlled application requires extensive practice.

There is another type of product that has been considered difficult to use in preservation; however, it is one which eliminates the above problems and simplifies and speeds up the production of such packages. Most ATG adhesive can be considered a stepchild in the process of preservation. Since this adhesive lacks a carrier tape, it is likely to be rubbed off the surfaces to which it has been applied and form small particles that can be expected to re-appear in very distressing parts of the mat package.

High tack, five mil ATG, such as 3M 969, is an adhesive product that can be characterized as having both high cohesion and high adhesion. This means that it does not fall apart, even when it comes off its release paper. When it is affixed to most smooth surfaces, its hold is quite strong. The surfaces to which it cannot be

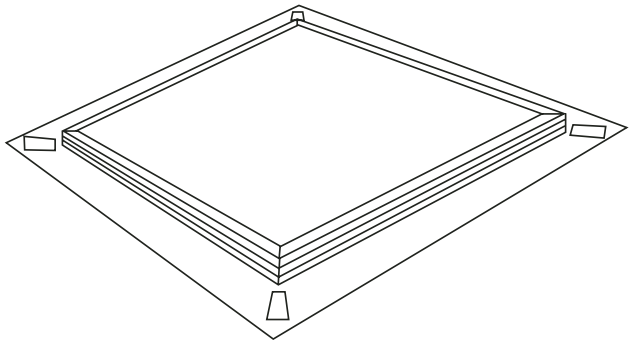

Figure 2: When applying the sealing foil to the package, strips of ATG tape can be used at the four corners, as shown here.

expected to bond well are those that are normally considered to have a release potential, such as Teflon, polyethylene, and polypropylene. Since sealing foils use polyethylene as a heat-activated adhesive on one side of

the foil, that side is not useful for bonding with the ATG. The puncture-resistant, shiny, nylon side of the foil does form a strong bond with the ATG, and this means that a package made to hold a matted item should be designed with the foil orientated opposite to the position it had in previous designs. (I.e. the nylon side will be on the inside and the polyethylene side will be on the outside.)

Such a package will begin with a mat package that is in proper and carefully checked climatic condition. The condition of the mat and its contents can be easily checked if they are placed in a clear plastic bag with a

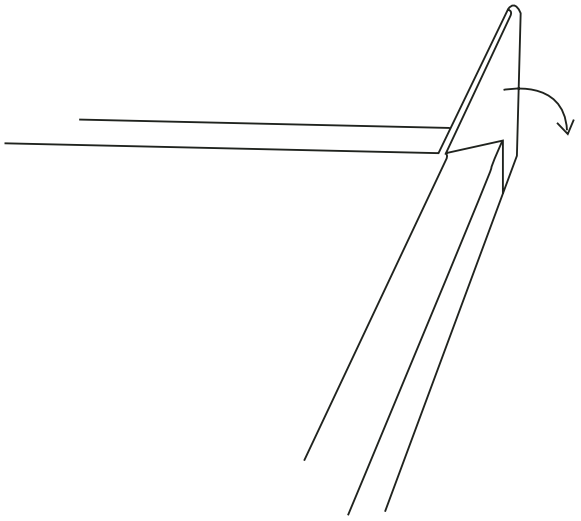

Figure 3: The corners, with the strips of ATG tape applied, are then brought up and pinched to fit to the corners of the package.

cobalt salt card and watched for an hour. If the relative humidity of the contents of the bag is above 50 percent, as revealed by the card, another sheet of board can be dried in a heat press or with a household iron. This board can be inserted in the package, behind the mat, until the condition of the materials in the package reach the desired range.

Before the mat package is taken out of the plastic bag, assembly of the package should begin. This starts with sizing the sealing film and the application of the ATG to the edges of the glazing. ATG that is ¼" wide is the most useful size for adhering film to the glazing in such a package. The tape is first set on the sides of the glazing and then is wrapped onto the front, outer edge of the glazing (see Figure 1).

Care must be taken to ensure that the ATG does not stick to some part of the glazing other than its intended area. The strong adhesive potential of this material makes it very difficult to remove. One can place the roll of ATG on a thumb or finger so that it rolls easily, yet with enough tension that it can be guided into the proper position. The band of adhesive along the edges of the glazing will be ⅛" to 3⁄16" wide, depending on the thickness of the glazing material. This will leave roughly ⅛" of ATG that wraps onto the front of the glazing. That dimension should be narrow enough to fit under the lip or rabbet width of most frames.

A sheet of sealing foil should be cut so that it extends beyond the edges of the glazing/mat package by 1" on each side. Since the sealing foil will have its heat sealing surface on the outside (and its shiny, nylon side on the inside), its corners cannot be heat bonded as they were in previous designs. ATG must be applied to the corner areas to create a seal on the inside of the package. Here, one needs sections of tape that are roughly ½" wide by ¾" long, positioned so that one of their ends is near the corners of the mat and they extend out on a line that bisects the corner of the mat (see Figure 2). These should not be set in place until the conditioned mat is set on the foil and the glazing is fitted to the front of the mat.

At this point the release paper can pulled off of the ATG along the sides and the foil can be pulled up and onto the exposed adhesive. When the foil is pulled up and onto the ATG on the sides of the package, it is burnished to the ATG with a bone folder. The bonding should end near the corners to leave enough play in the foil that one retains easy access to the tape in the corners so that the release paper can be pulled off. When that

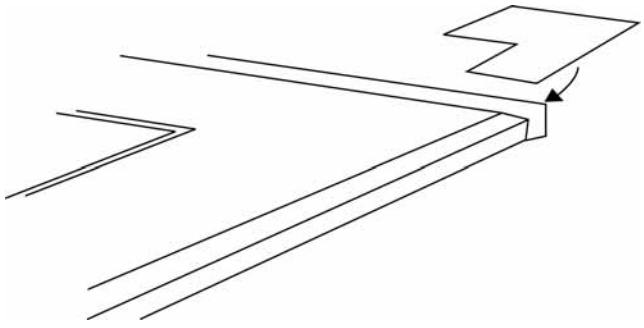

Figure 4: If there is an excess of sealing foil at the corners, a small amount of additional foil can be fashioned (as seen here) and heat-bonded to the corners to create a smooth finish.

paper is removed, the foil can be pressed onto the ATG on the front surface of glazing, and the corners can be pinched shut and burnished (see Figure 3). At this point, the seal has been affected but the edges must still be trimmed and the corners must be attended to.

The edges can be trimmed with a blade, guided by one's finger, as in the dust cover trimming procedure. The corners can be trimmed with a scissors to remove the bulk of the material that has accumulated there when the two sides were pinched together. The corner material can be pulled around to the back of the package and trimmed at the face so that none of the foil will show beyond the site edge of the frame. The corner material that has been pulled to the back of the package can be secured with pressure-sensitive tape to the back of the package.

The one problem with this method is the bulk of sealing foil left at the corners. This will have enough mass that it can affect the fit of the package into the frame. One can take a small piece of sealing foil and heat-bond it to the corners. If a bit of sealing foil, roughly an inch square, is folded diagonally and cut perpendicularly to the fold, the resulting piece will have a square notch taken out of one corner (see Figure 4). The notch can be aligned so that it fits into the corner in the front of the package, where it can be heat bonded to the foil that forms the corner with a tacking iron. It can the be folded around the sides and back of the package, being heat bonded as it goes. When the corners are complete, the package can be set in the frame and the backing board added and secured.

This package has several advantages over previous designs. It can be created more quickly, with less mess, and with less heat. The only part of the creation of the package that requires especial care is the application of the ATG to the edges of the glazing. Once this skill is mastered, these packages can be made to fit most frames, without any modification of the rabbet dimensions of the frame.

Care must be taken to ensure the condition of the matting and art, but that can be done in most shops. Such a package, made with glass and properly sealed should keep its contents free from pollution, pests and dangerous extremes of relative humidity for years. This capacity is a major addition to preservation framing and a significant enhancement to the level of work that the shop can offer. ■

Hugh Phibbs, Preservation Editor, is the coordinator of graphics conservation services in the Department of Exhibitions and Loans, Conservation Division, National Gallery of Art, Washington, D.C. He has taught workshops for the National Conference, the AIC, PPFA, the conservation programs at Winterthur/University of Delaware, and the Smithsonian Resident Associates Program. He also compiled the matting and framing section of *The Book and Paper Group Outline*.