Mastering Mounting

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Laminating Nonbreathables: Perforate or Suffocate

Laminating is the heat application of a protective vinyl film to the surface of paper art or photograph as a glazing substitute. It is also referred to as single-sided, over-, or surface laminating. It is washable, durable, permanent, lightweight, nonbreakable, and most importantly for this discussion... nonporous. When an item is nonporous, or nonbreathable, no air can pass through it during the bonding process to ensure all air is compressed from between all layers for an ideal union between laminate, photo, adhesive, and substrate (see Photo 1).

Laminating films come in an assortment of finishes and textures and all but one are made of vinyl materials. The very essence of creating a texture requires the film to be slightly thicker than the smooth finishes, which may demand slightly longer dwell times during heat bonding. There is one high gloss finish made of polyester in which the technical mounting procedure varies slightly due to the variation in material composition.

The Porosity Issue

For years I have stressed the four basic elements for successful mounting being TTPM: time, temperature, pressure, and moisture. When contemplating the element of *pressure*, it is imperative for the mounting package to be placed under proper weight during the bonding period to ensure maximum bond. This is regardless of whether wet, spray, pressure-sensitive, or dry mounting is being used. Maximum bond is only attained when no air remains between any of the layers being bonded together.

In the process of laminating, there are also the elements of TTPM, with *pressure* being the one that compresses all air from between and through all laminating layers when bonding. When the image being laminated is porous, or absolutely breathable, the air is allowed to escape around and through the layers though it may not pass through the laminate itself (see Diagram 1A).

Photo 1: Masthead of nonbreathables and laminates—Laminates from Hunt Corporation (Seal), Drytac, and Hot Press are shown in this photo, along with traditionally nonporous RC photographs ready to laminate.

In any mounting or laminating package, only one layer within the sandwich between the release materials on top and bottom may be nonporous. If two are nonporous, (such as a photo and adhesive, or photo and nonperforated laminate), existing air may remain trapped between the layers in the completed mounting and leave small air pockets (see Diagram 1B). In other words, when a project cannot breathe, it will suffocate. Suffocation will kill any mounting or laminating project.

Perforating

Only one layer in any mounting or laminating package may be nonporous; all others must be allowed to breathe. There will be times a nonporous photo may need to be laminated by a nonporous laminate. In this case, the laminate needs to be made temporarily breathable. The technique of perforating a nonporous laminate temporarily allows it the porosity necessary to be used over a nonbreathable photo. This prevents two-layer suffocation (see Diagram 1C).

Laminating photographs differs from laminating prints in that a resin-coated photograph cannot breathe, making it more difficult to remove all the air from between the laminating film and the photo. In some cases, paper art or posters with heavy nonporous inks will also fall into this category. The solution in either case is to begin with a perforated film. The trick behind perforation is to allow all the air to be squished out through the tiny holes from between the two nonbreathable surfaces prior to fusion during the mounting process.

If your film is nonperforated, you will need to punch the tiny perforation holes prior to laminating the project. A perforator or piercing tool is a hand held five-wheel roller designed to punch tiny holes in the laminating vinyl to allow for air or steam to escape prior to and during final laminating (see Diagram 2).

Manual Perforation

Lay the vinyl film face up on a mat board or self-healing mat. *Do not perforate on the foam board or the substrate to be used.* Foam is too soft and perforations will damage the substrate, allowing the texture of the holes to transfer to the mounted image, and glass is too hard and will not allow for penetration.

Manual perforation must always be done with the film face up to prevent any paper fuzz from being forced into the lightly tacky film. All perforation holes need to be about ¼" apart for adequate air to escape. Any closer is overkill, farther apart might allow for trapped air.

Roll the tool freely in all directions rather than geometrically (horizontally and vertically). Being overly geometrical and mathematical takes a lot of extra time, and often the holes end up too far apart (see Diagram 3). The base weight of the American perforator is generally adequate to make large enough holes for the air to escape while small enough to easily reseal during mounting (see Photo 2).

Films may be purchased either preperforated or nonperforated in both pre-cut sheets and rolls. There may be times nonperforated films might be preferred, as when creatively using laminates.

Vinyl vs. Polyester Films

Laminating films are available in both vinyl and polyester. The reason vinyls may be perforated for air escape is that they are soft and will melt back together sealing the tiny perforation holes during the bonding process.

There is, however, one high gloss heat-set surface laminate made of polyester. This is an important detail when dealing with nonporous images because polyester films may not be perforated like the vinyl films.

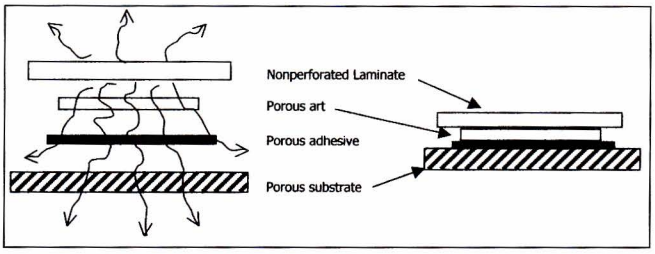

Diagram 1A: A porous image allows air to escape via the layers of the package, though it may not pass through the laminate.

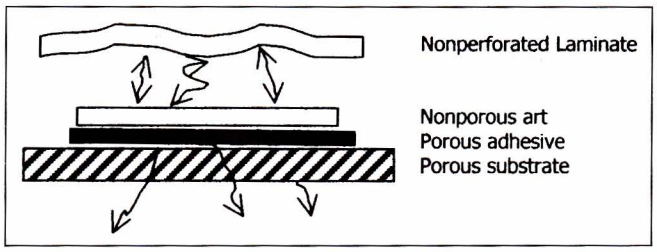

Diagram 1B: If there are two nonporous elements in the package existing air may be trapped, thus suffocating the project.

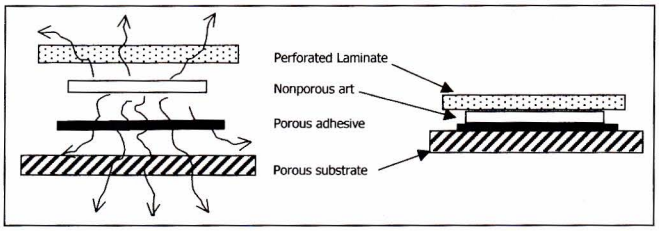

Diagram 1C: Perforating a nonporous laminate before mounting gives it the porosity needed to be used over a nonbreathable photo, thus preventing two-layer suffocation.

Diagram 2: Perforators are equipped with very small, sharp teeth. On left is an American cast aluminum perforator. On right is a Europe piercing tool.

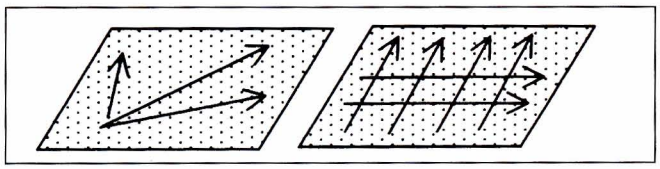

Diagram 3: Perforate the laminate, face-up, in a freeform fashion, as seen on left. Avoid perforating in horizontal and vertical lines, as seen on right.

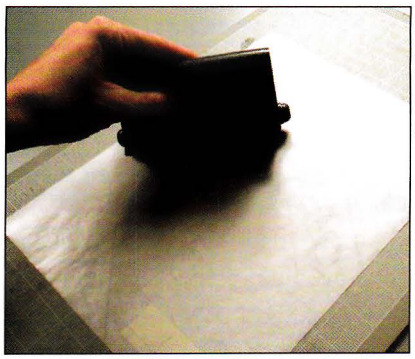

Photo 2: Manual Perforation—The base weight of the perforator is generally adequate to make large enough holes for the air to escape while small enough to easily reseal during mounting.

Photo 3: Posters—(from top to bottom) A thin inexpensive clay coated poster, an inkjet with gloss, and a traditional porous open edition poster. If unsure as to porosity, always use perforated laminate.

Unlike their vinyl counterpart, polyester films *cannot* melt together to conceal the perforations. These films should be reserved for papers where there is no doubt as to their porosity. Though we know paper is porous, some papers are more breathable than others.

Clay coated papers, including magazine pages or inexpensive inkjet posters; images with heavy ink coverage; or images sealed with a gloss finish are often not as likely to breathe as a 300# heavyweight paper open edition reproduction. The bottom line—polyester films should only be used when a super high gloss is required and only on papers that are absolutely 100% porous (see Photo 3).

Overlay Foam and Foam Plastic

As mentioned in last month's article, all vinyl films require a sheet of overlay foam (a.k.a. foam plastic) to be placed on top of the film during the mounting process (see Diagram 4).

This is what actually creates some of the pattern and/or finish of the film.

As also mentioned last month, there are three basic reasons for needing overlay foam during lamination. First, it is designed to create even pressure between the platen and the uneven surface of the films, particularly the textured linen and canvas finishes. Second, it slows down the heating time of the films so that, third, it can better allow for air to escape from the center of the project to the outer edges during bonding.

Do not substitute unfamiliar commercial foams for manufacturers' overlay foam. Some foam may adhere to the laminating films during the mounting process. Standard overlay foam is ¼" thick and varies in color depending upon manufacturer (see Photo 4).

Foam plastic is the term used for the ½" thick foam used in some vacuum presses, and is often white to pale yellow. This thicker foam

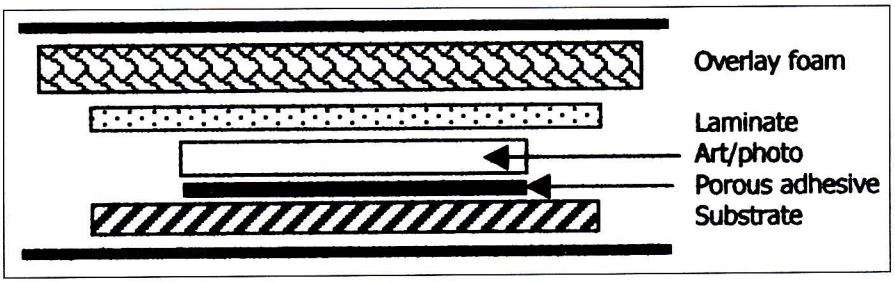

Diagram 4: A sheet of overlay foam needs to be placed on top of a vinyl laminating film before mounting is performed.

vacuum presses, the time and tem- really only five to seven minutes, the

allows the air and moisture additional time to be evacuated before bonding occurs. Using ½" foam plastic with perforated films could eliminate the need for the two-step temperature process of laminating in vacuum presses with rubber impregnated diaphragms that draw quicker vacuums.

Mechanical Presses

The basic materials required for mounting a nonbreathable photograph or print include: the substrate of choice; breathable, permanent, tissue adhesive; surface vinyl laminating film and perforator or commercial preperforated laminating film; overlay foam or foam plastic; tacking iron; and release materials.

Begin the process by tacking and mounting the photo. Align the perforated laminate over the cooled mounted photo, cover with sponge overlay foam, and place between release papers into the press.

The temperature setting for mechanical dry mount (also called soft bed) presses will be 185°F-225°F depending upon the manufacturer. (Refer to each individual manufacturer's mounting specifications based upon your press to modify photo laminating with perforated films.) Since mechanical presses establish maximum pressure (2 to 4 psi) as soon as the arm is clamped closed, excess air is immediately compressed from between the nonbreathable photo and film through the holes and the fusion process begins. Within five to seven minutes the completed lamination emerges with air holes resealed; a smooth laminated photo is now ready for fitting.

Vacuum Presses

Because of the specific operating differences between mechanical and vacuum presses, the time and temperature settings will be directly

Photo 4: The overlay foam products stacked upper right are white 1/2" foam plastic (bottom), and two manufacturers' 1/4" overlay foam in grey and blue. The clear sheet is Mylar release film from Hot Press.

affected by the type of press used during this procedure. The major difference with a vacuum press is the 20 seconds to two minutes it takes to pull the vacuum for maximum pressure (12 to 14 psi) for mounting.

If a perforated film/photo package is placed into the press at the standard laminating temperature of 215°F, the film could begin to permanently set prior to the vacuum having been pulled. This could result in trapped air between the perforations as well as the film setting prior to the holes melting together, leaving more visible pin pricks in the end product.

The simple solution is to preheat to a lower temperature (180°F), turn on the vacuum, turn up the temperature (220°F), and extend the total time the package remains within the vacuum press (10 to 15 minutes). This is most definitely a slower process than laminating a breathable in a vacuum system or a mechanical press, but it is much more foolproof.

The theory is simple. While the vacuum press temperature is pulling up from 185°F to 220°F the vacuum is pulled, the air is compressed from between the nonbreathable sheets through the holes, and as the press reaches laminating temperature the holes reseal and the film is mounted. Though the actual laminating time is really only five to seven minutes, the entire temperature adjustment and

mounting time will average 10 to 15 minutes.

This two-step vacuum mounting technique will produce foolproof laminates when using higher temperature or longer draw vacuum presses. Lower temperature laminates (185°F) when used with thicker ½" foam plastic and shallower drops (distances between diaphragm and platen) may not require two-stepping. Check with suggested manufacturers' procedures for each individual press and the materials selected.

Silvering

Silvering is the result of a laminate that is not totally bonded to its substrate. It appears as small white (or silver looking) blotches that are particularly noticeable in dark areas. It means the mounting was removed from the press too soon and may indeed be placed back into the press. If the result shows that 10 minutes is too little time, the laminating may be placed back into the press again for the initial 10 minutes plus any additional time.

So how long do you leave a mounting package for laminating photographs with perforated films in the press? Long enough! Average times can run from five to 20 minutes depending upon your materials and equipment.

Perforator Tracking

The teeth on a perforator are very tiny and very sharp. They need to be so they can punch the tiny holes that will reseal when mounted. If the tool is stored teeth down in the metal tray of a vacuum press they can become damaged over time. Excessive pressure on hard surfaces or dropping it can bend the tiny points over creating tiny crochet hooks. These can then pull out little bits of laminate during perforation that will never heal during bonding.

If there are visible tracks remaining after bonding it could either be too short a time in the press or a damaged perforator. If the holes can be felt as you lightly run your fingers across their surface it is perforator tracking. If the holes cannot be felt, it is most likely in need of a longer dwell time.

Final Frame

It sounds like there are very many warnings associated with laminating over nonporous, nonbreathable images. But as with any mounting technique, it is simply a matter of learning the steps and remembering to leave items in the press long enough.

Laminating is a natural expansion for using heat mounting systems. The difference between laminating porous and nonporous items is simple. All you need to remember is to perforate or suffocate. ■