Encapsulation with Polyester Films

By Chris A Paschke, CPF

Last month I explained the physical characteristics and differences between surface, or single-sided, lamination and permanent, two-sided lamination called encapsulation. Recall that encapsulation may be created as either a totally reversible, conservation-based method using mylar sheets, or permanently heat set using polyester of vinyl laminating films.

Menus, placemats, catalogue pages, drivers licenses and ID cards are all part of the genre that make up projects well suited to heat encapsulation. It has been written that both vinyl and polyester laminates are adaptable to encapsulation in mounting presses, but if you attempt to achieve a visually acceptable end product using polyester films, as featured in this article, often the result is disappointing.

Differences In Films

Surface laminates are mostly made of vinyl materials with a release paper liner that covers a tacky, repositionable., heat activated adhesive (photo 1). They are available in textures and finishes; matte and gloss are best suited for projects that must be readable once encapsulated (photo 2). Vinyl films are only available in one base thickness and remain soft after encapsulating.

Encapsulation laminates are made of polyester materials with no release liner and a heat-activated adhesive; they are designed for use in roller laminator machines. They have an adhesive side which is best identified by its dull appearance (photo 3), are not tacky to the touch, do not have a release paper backing and therefore do not fall into the "repositionable" category as vinyl films.

Investigating Polyester Films

The polyester films developed for encapsulation come in a variety of thicknesses and were designed for use in the framing industry. They were originally developed in the early 60's for the protection of paper rather than for making paper look good. Films are available in a number of varying thicknesses; the 1.5 mil film differs in composition from the 2, 5, 10, and 15 mil thicknesses in adhesive, application, and designated use. Basically, the thinner 1.5 mil polyester is the more inexpensive, economical grade of film designed to be used specifically with paper and ink. The low density polyethylene adhesive requires a relatively high mounting temperature of 230F to 275F. Since the adhesive will not fuse to photographic emulsion, it is restricted to use on nonphotographic papers only. It can be written on, is water repellent, durable, and comes in gloss and matte finishes.

The thicker films (2, 5, 10, 15 mil) are considered commercial grade and are designed for use with photographs, toner copiers and other special applications. The adhesive is a modified copolymer which sets at a lower mounting temperature of 220F to 240F, which makes it more photo friendly.

Two-sided encapsulation will double

the film thicknesses when mounted, so the actual encapsulation thickness measurement increases to 4, 10, 20 and 30 mil. Thicker film works well for free standing displays and ID cards.

The Right Equipment

There are numerous affordable, small scale office laminators or portable desktop machines that use rollers to heat-seal thin polyester films (photo 4). When fed through the machine, the films are permanently mounted to either side of a document at the same time for long term durability - not preservation.

Office model machines are available to seal anything from luggage tags and ID cards to 8 1/2"x11" papers. They were developed mostly for specialized use within schools, libraries, print shops, graphics and reprographics houses. If you elected to expand your market to include mounting plastic coated menus and larger poster sized signs, a more commercial roller machine would be required.

Why Roller Laminators

I set out to test the mounting of polyester films when used for encapsulation in a heat mounting mechanical or vacuum press. The permanent, heat set encapsulation processes involves the use of non-breathable polyester films; this introducesreates the problem of trapped air between two non-breathables.

These films do not breathe because they were originally designed for use with large roller laminators which squeeze the air from between the layers as the heated rollers activate the adhesive. They apply pressure and fuse the film sheets together simultaneously, forcing any air out the back of the rollers like an old fashioned wringer washing machine squashing out excess water.

Heat Presses And Polyesters

Although manufacturers state it can be done, I have not been able to create an acceptable encapsulated product within the confines of traditional mounting presses. The process is often frustrating and the encapsulation may be of less than commercial quality (photo 5). Still, I do wish to explain the basic procedure and showcase the best possible visual results. Is it smooth? Somewhat. Acceptable? No (photo 6).

Laminating each side separately gives a great looking view — but only from the front. Since the air is allowed to escape from the open back, surface laminating is easily and effectively achieved. Applying the non-breathable back of the encapsulation is what creates the trapped air dilemma. If the project is slated to be used as a display rather than a menu the end result could be acceptable.

The Basic Process

To attempt encapsulation, first pre-dry, then mount one side at a time, and most importantly . press flat to cool. Cut the film sheet 1/4" larger for the outer edge sealing (photo 7). This will be trimmed to 1/8" after mounting. Static electricity is created when the hand is stroked repeatedly across the surface of the film with the print beneath it, easily holding it in place (photo 8).

Without the assistance of perforation (see "Encapsulation: Vinyl", PFM June 1996) mounting may only be completed with poly-

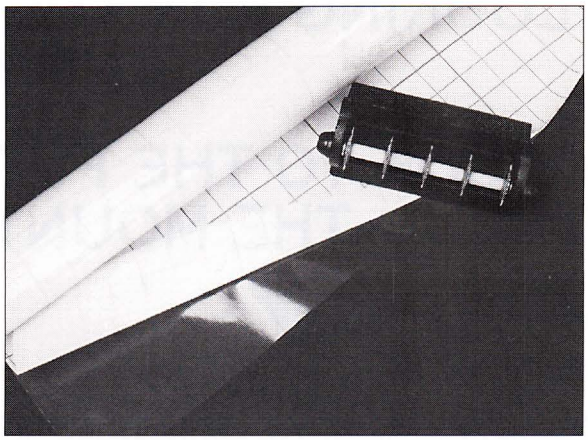

Photo 1 Vinyl films are coated with a repositionable heat set adhesive and a gridded release liner. Because vinyl will heal when heated in a press, it may be perforated to assist in air removal.

Photo 2 This photo illustrates the extremes between the unmounted vinyl films of the matte finish (top) and canvas texture (bottom) below. They are photographed unmounted for better identification between them; once mounted both are clear and more difficult to be seen in a reprinted photo.

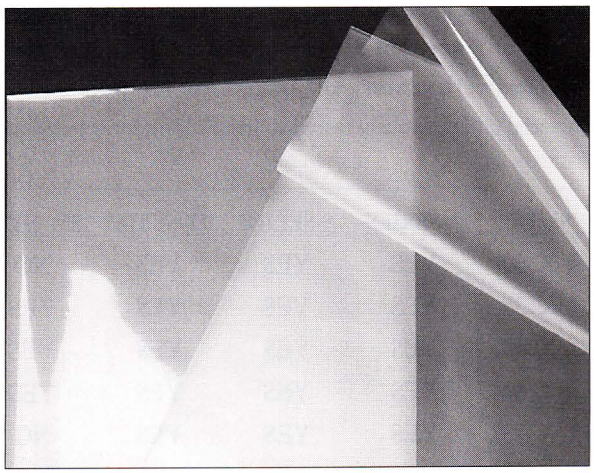

Photo 3 Polyester films are dry to the touch and have no release liner.

ester films as long as all materials selected are breathable. Unlike vinyl films, polyesters willno re-heal once in the press. Place the piece ready for lamination face up in a release envelope and into the press (photo 9). Note there is no overlay foam required for mounting, of polyester laminates! Double layers in preparation for attempted encapsulation may be easily trimmed since the static holds everything in place (photo 10); unfortunately, the resulting mounted encapsulation leaves a lot to be desired (photo 11).

Because there is no substrate, there is a tendency for the item to curl when removed from the press with only the front side laminated(photo 12), making the second step of the encapsulation even tougher; however, the alternative of mounting the two sides simultaneously almost guarantees trapped air.

Photo 4 Commercial office laminators are manufactured by numerous different companies and are available in a variety of standard sizes. Polyester pockets of film are fed through a set of heat rollers inside a release material carrier as pictured.

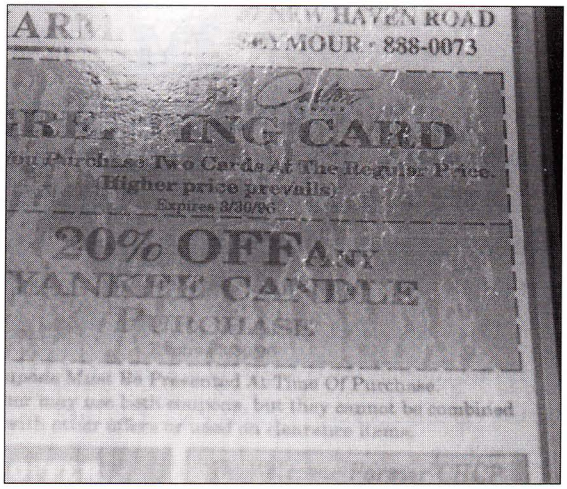

Photo 6 This is the back side of a polyester encapsulation which was pre-dried, mounted one side at a time, at proper TTPM suggestions, and cooled under a weight ... this is as good as it gets.

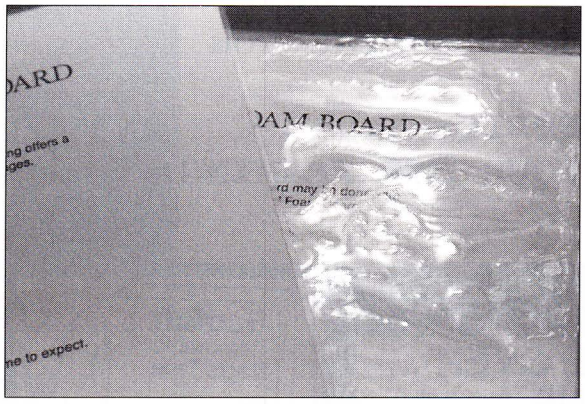

Photo 5 The left sample is a vinyl encapsulated sheet, which although more flexible appears smooth and is protected. The right sample was mounted as per manufacturer Is specifications and is full of trapped air within the film. The sample was not cooled under a weight,. also causing the excessive rippling of the film.

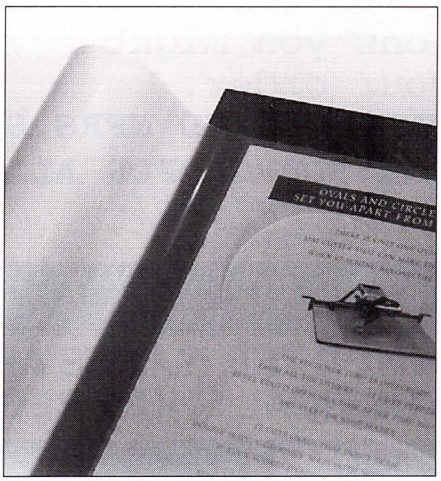

Photo 7 Cut the film 1/4" larger around than the project.

Final Recap And Recommendations

Vinyl films make up the bulk of the laminating films designed for use in heat mounting presses. The engineering for removing air from between mounting layers precludes airtight presentations (without rollers).

Vacuum presses, with their delayed pressure application (due to draw of the vacuum), are only asking for cloudy, air trapped encapsulations (photo 13). My recommendation: kids, don't try this at home!

Although there are high gloss polyester laminates with release liners specifically slated for surface lamination as a glossy glass substitute, most polyester laminating films have been designed for use with heat set roller laminator machines. The machines are engineered to force the air from between the mounting layers and film out the back, as the film layers are sent between the rollers through the machine.

If encapsulation becomes a market you truly wish to target, there are small commercial 25" machines to accommodate items from ID cards to

Photo 8 The static electricity created when stoking the hand gently across the film surface nicely holds the film in place.

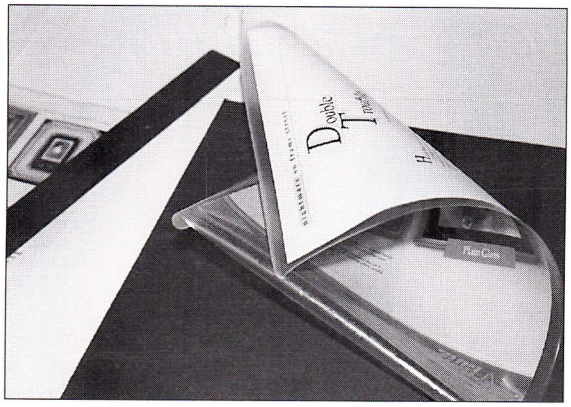

Photo 1 1 The front left sample was never cool beneath a weight and remains very stiffly buckled. This will never be flattened now, even with reheating. The center sample is the front side of an encapsulation of breathable newspaper, cooled under a weight. The detail at far right though cooled under a weight (as the breathable newspaper) is a non-breathable sheet and clearly illustrates trapped air even on side one.

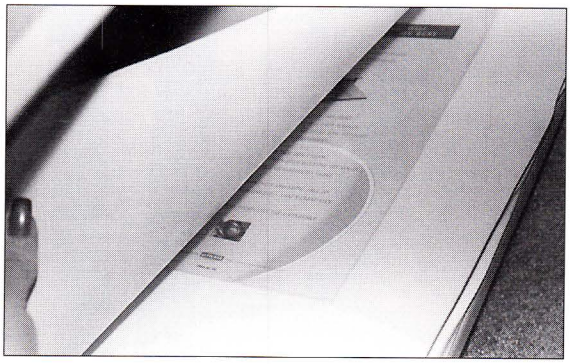

Photo 9 Polyester films were not developed for use with overlay foams when mounting.

Photo 12 Curling after step one mounting can make alignment and mounting of side two very difficult.

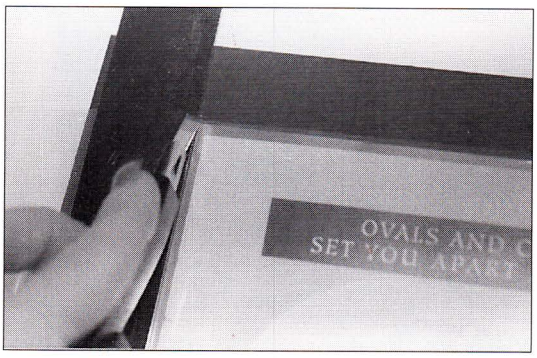

Photo 10 If attempting to encapsulate with polyester films, cut both sheets prior to mounting for exacting sizing and more control.

Photo 13 This is it. All the right things done, as directed...and still unacceptable. Clouded trapped tunnels of air and polyester rippling.

24x36" posters,charts, ...even Michael Jordan (if only 24" wide) which run between $1500-$2000. This service is generally found in the sign and printing market, for machines are made up to 48" wide to handle 4'x8' boards in advertising and large photo labs.

The wisest bit of advise would be to use the equipment geared to the materials and your targeted market. Just as your professional level mat cutter is best suited to accurate, volume framing, so is a roller laminator to polyester encapsulation. Vinyl encapsulation for framers is always a viable option for waterproof. soft sided projects (such as placemats) and is easily achieved within standard heat mounting equipment. The beauty of perforating vinyl allows for these two non-breathable sheets to be permanently encapsulated perfectly every time. ■

Chris A. Paschke, CPF, owns Designs Ink, Oxford, Connecticut, featuring commercial and custom framing, product consultation, design and education. Specializing in mounting, matting and design creativity she works with numerous industry leaders including Bienfang., Crescent Cardboard, Fletcher-Terry Larson-Juhl, PFM, PPFA, and Seal Products.