

Laminating 101

"What you should know about the Roll Laminating Process"

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Laminating Basics

Laminating film consists of two layers, a base layer, most commonly consisting of polyester and an inner adhesive resin layer that becomes liquid when it reaches an activating temperature. The material to be laminated is placed between two sheets of laminating film. The laminating machine melts the adhesive resin layer, which then spreads over the document, hardening as it cools and creating a bond between the material and film. Roll Laminating is designed to run as a continuous roll of film (or web) for larger sizes and volumes of work. Spiral offers a wide variety of thermal roll laminating machines as well as supplies. Over the past couple years with changes in printing technologies, laminating films have also evolved. Spiral now offers 6 different types of laminating films

Standard Laminating Rolls: This laminating film is sometimes referred to as "school film" and is available in 1.5 mil or 3 mil thickness. Standard film is a mono polymer film, which means there is one type of adhesive coating the base material. These films tend to have a high operating temperature and are the least expensive films. You might also hear this film referred to as "nap-lam I" which is a trade name for GBC.

Premium Laminating Film: this is a co-polymer film, which has a more aggressive adhesive than mono polymer film. It also operates at a lower melting temperature. GBC's brand name for this is "nap-lam II". Normally available in 1.8, 3, 5 and 10 mil thickness.

Color-Bond Laminating film: This is a specialty film formulated for toner based color copier output. Color copiers have fuser oils that allow the toner to adhere to the paper. The Standard mono-polymer and Premium co-polymer films we currently carry will not always work with color copier output. The problem is magnified when customers have applications with heavy toner coverage and very dark colors that lay down a lot of toner on the paper.

Wide Format Thermal Laminating Film: This film has been designed for laminating paper based output from wide format inkjet printers. The inkjet printers come in sizes from 24" wide to 72" wide and the laminating film is sized to match hence the term wide format laminating. These prints have specific needs in laminating film. The most important aspect is special low-melt adhesive. These films have adhesive that operates at a melting temperature of 185 degrees. This is important to prevent out gassing of the inks that will cause de-lamination. Also these films have UV inhibitors. Inkjet prints suffer from color loss over time and the UV inhibitors help to prevent that from happening.

Wide Format Pressure Sensitive (cold) Laminating Film: This film has been designed for laminating vinyl based output from wide format inkjet printers. Generally these are used in the sign industry where most prints are done on vinyl based material rather than paper based. Although PSA film can be used with paper and other substrates the high cost makes its use in those applications as less desirable.

D & K Super Stick Wide Format Laminating Film: This film is a patented product that is a unique product that offers the benefits of both Thermal and PSA films. Super-Stick film is a liner-less vinyl based film that works well with both vinyl and paper based inkjet output. These laminates allow for greater flexibility on sensitive prints due to the very low activation temperatures (150 - 200 F). It comes in a variety of finishes including: gloss, luster, matte, textured and canvas. No release liners for reduced scrap, UV inhibitors prevent color shift, less setup time and ease of use compared with pressure sensitive adhesives with better overall clarity and appearance.

Types of Laminating Film Finish

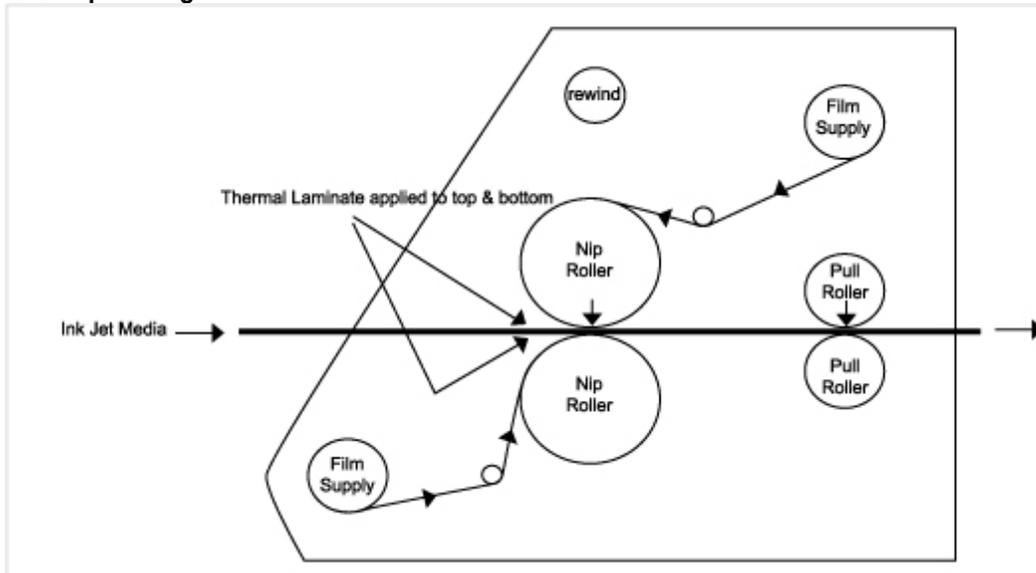
Gloss: The most popular, best for bright colors, adds definition, radiance

Matte: Non-reflective, slightly granular finish. Available in most types of film much more expensive than gloss films so used only on special applications.

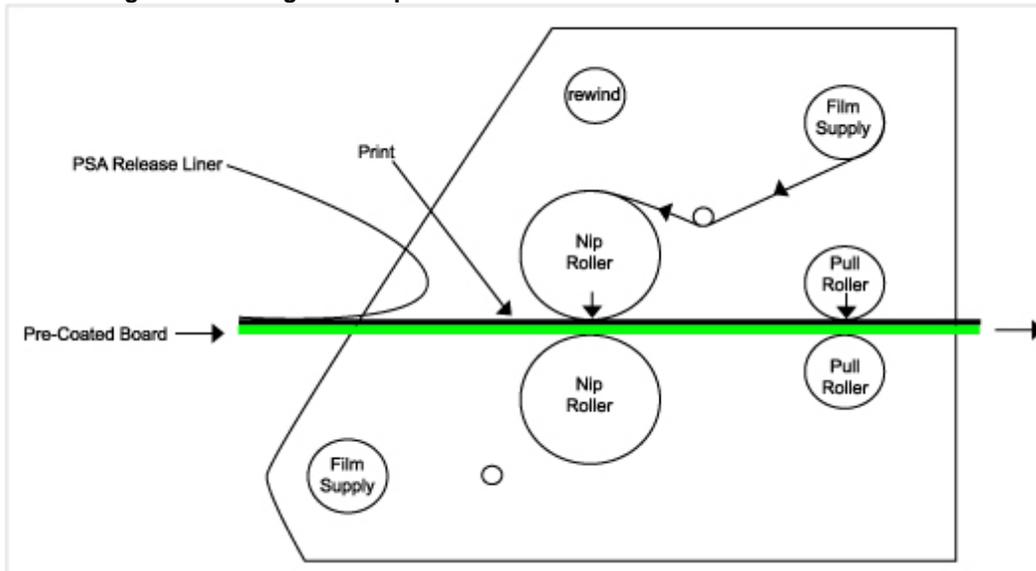
Satin / Lustre: Provides a reduced level of glare, and has a soft sheen. The term satin or luster is interchangeable between the two. Both films are virtually the same and some manufacturers call their film satin while others term it luster.

Webbing Diagrams

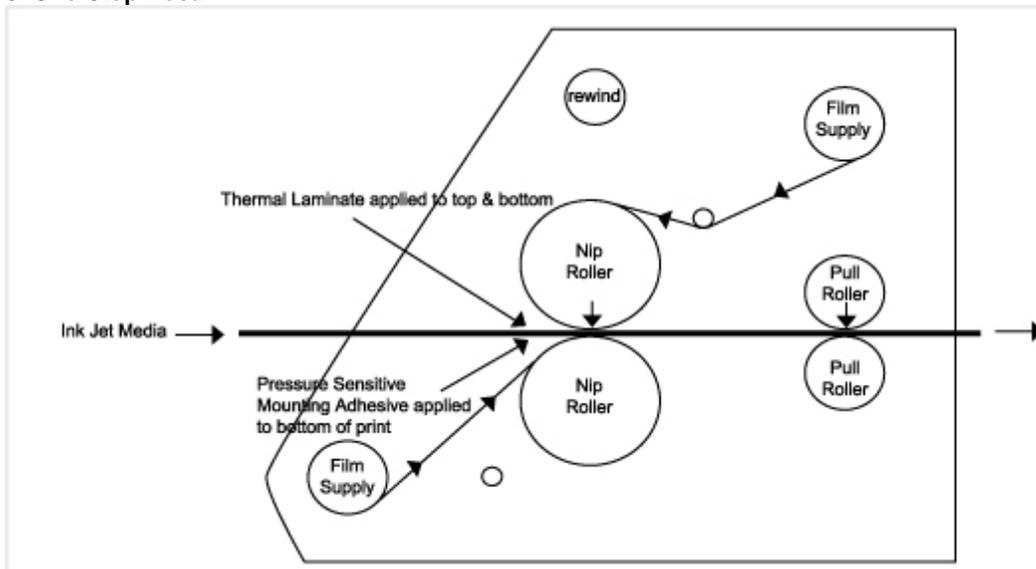
1. Encapsulating



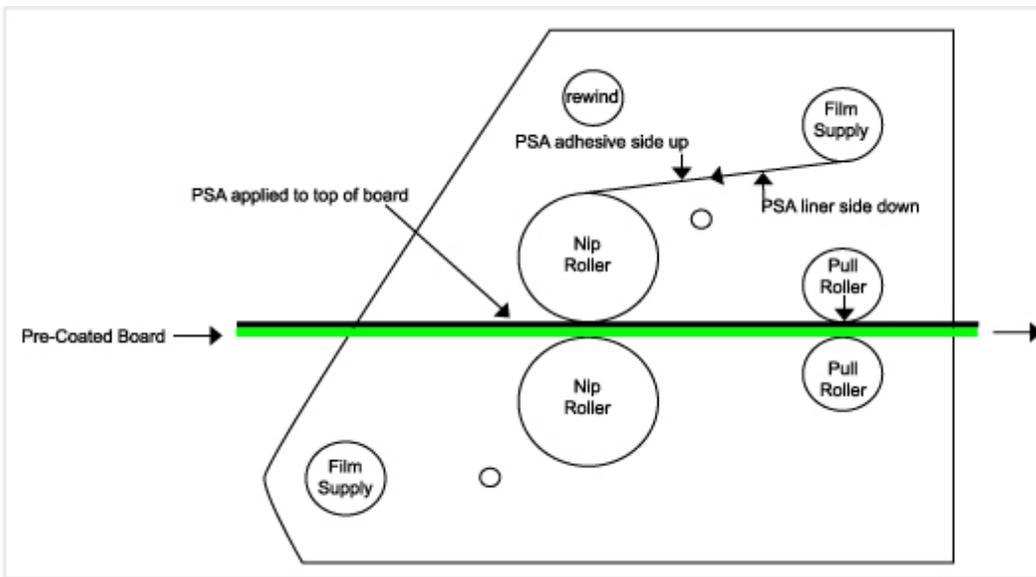
2. Mounting & Laminating Print to pre-coated board



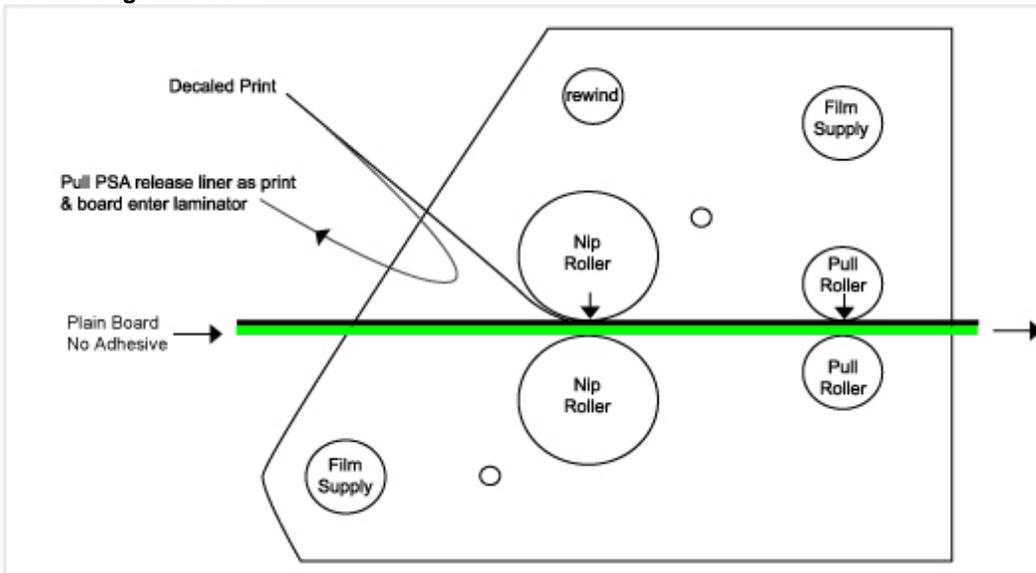
3. One Step Decal



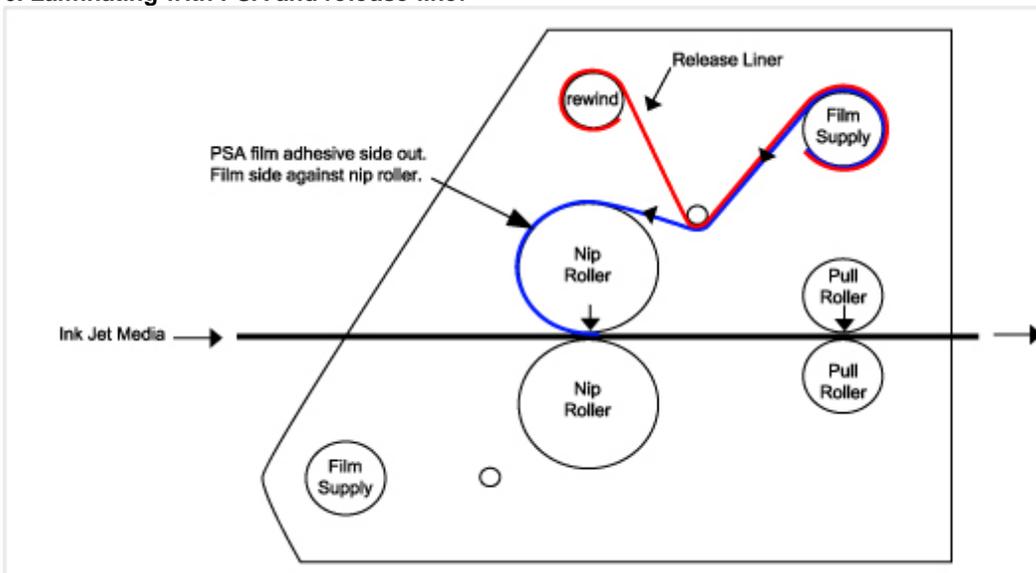
4. Pre-Coating Boards



5. Mounting Decal Print



6. Laminating with PSA and release liner



Note:

Inkjet media must be wider than the PSA lamination used, otherwise a brown kraft "slave sheet" must be used to protect the bottom roller from top laminate adhesive transfer.

Glossary of Laminating and Mounting Terms

ACRYLIC ADHESIVE: A type of pressure-sensitive adhesive most often used on cold films.

BASE or FILM BASE: Laminating film is manufactured by applying an adhesive to a film base. The film base is the layer of film that doesn't melt. It is the material the adhesive is extruded on to during manufacturing. In a thermal film the base is usually polyester but is also available in nylon base for one-sided laminating applications. Pressure sensitive film is generally vinyl based.

CO-POLYMERS: These are agents added to the polyethylene adhesive layer of a thermal film to lower its melt temperature, increase its adhesion, and improve its clarity.

CORE SIZES: This is the size of the cardboard core the film is rolled onto. The mandrels on your laminator will determine the core size film used, 1" 2 ¼" or 3" diameter.

DRY MOUNTING: is a thermal process, which uses a heat-activated adhesive (dry mount tissue) to adhere the back of an image to foam board, mount board or another paper-surface mounting substrate. It may be done with a press or with some types of laminators.

MELT TEMPERATURE: A range or a specific temperature at which a thermal film or a dry mount adhesive is best applied.

MIL: Laminating film thickness is measured in mils or 1/1000 of an inch. ie. 3 mil film is 3/1000 of an inch. The thicker the film, the stiffer and more durable the laminated item will be

THE NIP: The line where the two laminating rollers press together and lamination takes place.

POLY IN or POLY OUT: Films are wound on a core either poly in (adhesive side in) or poly out (adhesive side out) This is simply the way the film comes off the roll.

POLYESTER: The base or outer protective layer of the most thermal laminating film. It does not melt during the thermal laminating process. It is also the base layer of many PSA films.

POLYETHYLENE: The adhesive almost always used in thermal films. During hot lamination it liquefies. The lamination takes place in the nip. Fans or chill rollers in the laminator then help cool the adhesive so it becomes a flexible solid again. PSA - stands for pressure-sensitive adhesive. Pressure-sensitive adhesives will work cold or with some heat. Either acrylic or latex type adhesives are generally used in PSA materials. Pressure-sensitive adhesive is used on clear laminating films, on sign vinyl's, and for mounting images.

SUBSTRATE: Literally means under-layer. It can refer to material we print on, or the board we use to mount an image

VINYL: Used as the base of some clear PSA laminating films. It is also used in colored sign materials.

A WEB: The unwinding width of plastic coming off a supply roll, or the continuous flow of laminate coming out the back of the laminator.

Common Laminating Problems and Fixes

How can I avoid laminator film wrap-up?

By allowing 2"-3" of lamination film to hang out of the laminator as you start your lamination job and by making sure the back of the laminator is not up against a wall, cabinet or other obstruction, you should assure wrap-free operation.

Why is my lamination turning out bubbly?

If you are using a thermal (heat) laminator, then the heat setting may be too high for the item being laminated. If the machine has a control to adjust the heat, try lowering the temperature. Also, if using a thermal pouch laminator, make sure that you are using the correct carrier for the pouch.

What causes silvering?

Silvering is caused when the adhesive not "wetting out" properly, this problem is solved by either increasing the temperature setting or slowing down the speed setting. Sometimes you may need to do both. This will promote a better adhesive flow. The same principles apply to cold laminates. A temperature setting of 110F will help wet out the adhesive and accelerate the initial bond.

Why is my lamination cloudy?

Cloudy lamination is usually the result of insufficient heat. If the machine has a control to adjust the heat, try increasing the temperature. You can also reduce the speed of the laminator, this will create longer dwell time on the heat shoes or rollers increasing the heat being transferred to the film.

Why is lamination so important on ink jet prints

Many inkjet prints (up to 75% by some estimates) are laminated. In addition to adding rigidity and protection, lamination adds to the perceived

value of the print. Different films change the look of the print - intensifying colors or adding satin, textured, or high-gloss finishes. Lamination also extends the range of products that can be created from a single large format inkjet printer. For instance, without changing inks and media, you can use different finishing materials to produce floor graphics, presentation graphics, indoor signage, P-O-P displays, and tradeshow graphics. Although lamination adds to production time and requires skilled operators, many print-for-pay inkjet shops regard finishing as an important profit center.

How long will my inkjet image last if I protect it with a UV over-laminate?

Generally speaking, over-laminates with UV inhibitors will extend the life of your image by 3-4 times. Dye-based inks, when subjected to high levels of UV radiation, can fade in as little as a few days. This means that even with a protective over-laminate, your dye-based image can be damaged in as little as 2 weeks. Pigmented inks last significantly longer than dye-based. Laminated images printed with pigmented inks can expect at least a six to twelve month outdoor lifespan without experiencing significant UV fading.

Why is laminating inkjet prints so tricky?

Many newcomers to large format inkjet printing find themselves reprinting jobs ruined when the laminating film peels away from the print (de-lamination). This is typically caused by the wrong choice of materials, or attempting to laminate inkjet prints that are not fully dry. Sometimes prints that feel dry to the touch but may not be adequately dry, due to the presence of glycol, an oily-type solvent used in nearly all water-based inks. Choosing the right film for your specific application is a key element in quality lamination. Spiral Binding sales specialists have the expertise to help you determine the right combination of products to use.

Why won't my thermal film stick to my inkjet output?

Providing the laminator temperature and speed settings are correct, the most likely culprit is your image. Inkjet prints that are not completely dry can be very difficult to laminate even with thermal films designed for inkjet print applications. Inks contain Glycol to prevent nozzle clogging. Glycol is an oily-type solvent that is not compatible with thermal adhesives.

To improve adhesion:

- Ink limiting will reduce your drying time. Make sure you are using the proper ink limit setting in your RIP.
- Choose the proper media to print on. High gloss materials are difficult to laminate because most of the ink rests on the receptive coating of the material. Matte materials absorb more moisture and are therefore easier to laminate.
- Make sure your prints are completely dry before laminating. Highly saturated prints will take longer to dry.

Premium thermal films, such as D & K Super-Stick film, have unique properties that will virtually eliminate de-lamination issues. An independent testing lab has extensively tested Super-Stick film with data submitted to the US Patent office. These test confirm that Super Stick film adheres:

- 15 times better than regular thermal film
- 10 times better on inkjet prints
- 50% better on e-stat prints
- 4-5 times better on wet ink