

E. Laminating

1. Description

Laminating is the process of applying a film to either one side or both sides of a printed document. The use of lamination serves several purposes:

- Lamination adds luster or gloss to a printed product.
- It provides stability to the sheet, allowing it to be more durable or stand upright.
- It provides protection to sheets that are handled frequently or may encounter moisture.
- Many laminated documents are waterproof, tear proof, and tamper proof.



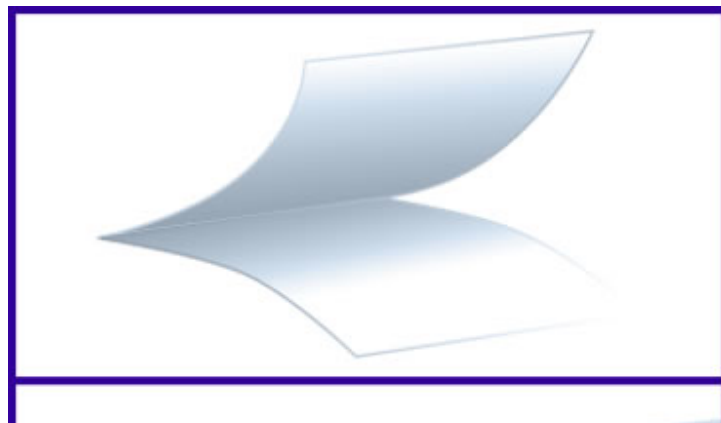
Lamination can be a useful and often necessary addition to various products including posters, maps, membership cards, calendars, food labels, menus, signs, price tags, ID cards, point-of-sale materials, business cards, charts, photographs, placemats, badges, covers, certificates, and many others.

2. Film Classifications

There are two major categories in which nearly all types of laminating are classified: pouch and roll.

Pouch

Pouch lamination films are like envelopes and are sealed on one edge. They come in many sizes to accommodate standard items such as letterheads or business cards or they can be made into any custom size.



Roll

Roll lamination films can consist of a layer of film that is applied to the front side of a document or it can be two layers of film in which the document is sandwiched between the layers and sealed by the use of various processes.

3. Types of Film

Many of the films used for laminating are available in various thicknesses and finishes ranging from clear gloss to delustered. The three main film materials used for lamination processes are:

a. *Polyester* - Polyester is the most widely used film and can be used for almost any type of application, but it is most often used for book covers, dust jackets, folders, and video slipcovers. Polyester film is heat resistant, foldable, scuff and scratch resistant, flexible, and tough. Polyester film will not become brittle with age because it contains no plasticizers.

b. *Polypropylene* - Polypropylene is the clearest and brightest type of film and it is used for such applications as posters, labels, marketing materials, and write on/wipe off calendars. It offers chemical resistance and good optical properties.

c. *Nylon* - Nylon film is another good choice for applications such as book jackets because of scratch resistance and excellent non-curling properties. Nylon laminate is a very stable material. When it is exposed to heat, it will not stretch, and when it is cooled, it will not shrink.

4. Methods of Lamination

a. *Thermal Lamination*

The laminate usually consists of 2 plies with each ply made up of an overlamine film and an adhesive, which is dry and not tacky to the touch. A heat source and pressure are required during the lamination process. The document is placed between the two plies of

the laminate film and then sent through equipment where the dry adhesive is made tacky by heat and is pressed onto the document under high pressure. After cooling, the adhesive solidifies and provides a permanent bond between the document and laminate film.

b. Cold Lamination

Cold lamination is a process in which only one side of a document is laminated. This laminating process is required when the ink and/or paper used for a document is too sensitive to the heat required with thermal lamination. The film used for cold lamination is much more costly than for thermal lamination, but the equipment is less expensive. One method of cold lamination utilizes a process where no dry adhesive is used as in thermal lamination. The surface of a document is flooded with a water-soluble adhesive. It is then sent through a set of rollers with the laminating film rolled onto the top of the document and the adhesive. Pressure is applied which evenly distributes the adhesive and bonds the film to the document. The adhesive takes a bit longer to cure than thermal lamination and lighter stocks can wrinkle or warp because of the water based adhesive. Cold lamination may not be as permanent as thermal lamination.

5. General Tips

- Allow several days for laminated sheets to cure, since the adhesive takes time to fully adhere to the stock.
- Use caution when applying a lamination film to varnished sheets. Use a varnish that dries quickly, contains minimal residual solvent, and contains no wax additives.
- Do not laminate printed materials containing metallic inks since air bubbling/adhesion problems may occur.

Use caution when a significant amount of anti-setoff powder has been sprayed on the sheet during printing because it causes adhesion problems.