

FOIL STAMPING

Hot Stamping Foils are decorative products that are widely used to enhance the appearance of graphic arts products. Today a broad range of rich effects can be applied which includes bright golds and silvers, satins, mattes, metallized and opaque colors, tints, pearls, and holographics. Successful applications may be seen on a wide variety of products, including greeting cards, paperback book covers, labels, annual reports, clothing, cosmetic, liquor, and even cereal packaging.

Hot stamping application methods involve the use of an engraved die, and a heated press to transfer foil from a film carrier. An engraved flat bed brass die, or a rotary engraved roller over an impression cylinder, are commonly used. The techniques have seen little change over the past 50 years except for efforts to improve productivity and versatility of use over a variety of substrates. One misconception is that rolled, very thin, aluminum, silver and gold foils are used in the process.

It can be said that foil stamping started as a craft industry and even today it is hampered by a slowness that does not typically support high volume usage. While innovations in hot stamping equipment has allowed gains in productivity, the process still is not able to keep pace with high speed printing and requirements for high volume.

Historically, hot stamping foils were used in simple flat applications, basically on high quality paper stocks. More recently, foils are seen in more challenging applications where they must transfer effectively and adhere to all types of paper substrates, as well as a variety of plastics such as vinyl's, acetates, polyethylene, aluminum foil laminates, a variety of inks, and pigmented and clear top coats. Because of these broad requirements, one variation seen in hot stamping foils is the selection of heat reactive adhesives that are available, and recommended, relative to the substrate to be stamped.

Let's look at and understand the construction that makes a hot stamping foil.

STAMPING FOIL CONSTRUCTION

- *Clear Polyester Film (PET) Carrier*
- *Release Coat*
- *Color Coat*
- *Pattern*
- *Metallizing **
- *Adhesive Coat*

**In a non-metallic construction, such as a pearlescent, the metallizing step is eliminated.*

- The Carrier is a thermally and dimensionally stable plastic film onto which decorative transfer layers are laid down.
- The Release Coat is a thin application of a synthetic or wax used to cleanly release the decorative layers from the carrier.
- The Color Coat is a pigmented polymeric coating applied to the release coated PET carrier by meyer rod, gravure, or reverse roll coater. The two most common binders in use are chlorinated rubber and acrylic nitrocellulose. Chlorinated rubber systems have a broad stamping range, limited flexibility and are excellent for fine line to medium coverage applications. Nitrocellulose systems are more versatile and stamp well at medium to broad coverage, and they can do fine line work too, but they do not cut as clean as chlorinated rubber.
- The useful temperature range is lower, but the system provides greater abrasion resistance. Color is created from a combination of dyes and pigments.
- Patterning is done by gravure printing which produces a series of special effects over metallized and/or color coats.
- The Metallizing layer is what gives a hot stamping foil its realistic metal look. It is produced by a standard vacuum metallizing process wherein pure aluminum wire is melted, vaporized and deposited onto the coated PET carrier in a roll to roll handling format.
- The Adhesive Coat is the last down layer to be applied. The adhesive coat protects the aluminum and in hot foil stamping releases to adhere effectively with heat and pressure to the aluminum, as well as the substrate being stamped. The adhesive formulation will vary depending upon the substrate to be hot stamped. The adhesive coating must be compatible with substrates and/or coatings on substrates. Some substrates demand special adhesive coats. The adhesive is usually a combination of polymers, the most common being acrylic.

OVER

PET film by its nature wants to develop a static electricity charge which can cause handling, and dust contamination problems. The aluminum in metallized foils will dissipate any static charge, however, non-metallic pearl-escents, or other color only foils, will build a static charge that will have to be dissipated using static neutralization equipment.

Overprinting of stamped foils has become hot recently. Care must be given to the selection of press, ink, and coverage. Problems that affect overprinting are: picking of foil from the image area during printing, ink adhesion to the foil, and dust on the print blanket.

Holographics giving three dimensional effects are being used more and more in decorative and functional applications.. A variety of metallized, micro-embossed, designed patterns that change appearance and color with viewing angle are currently popular.

Hot stamping foils are commonly used to decorate various printed substrates, some of which may be aqueous or UV coated. While most hot stamped foils are UV over coated after application, specially formulated UV coatings that are stampable, gluable and imprintable will accept selective adhesive coated foils. Foil manufacturers recommend avoiding wax and silicone containing inks and coatings. Rhodamine red, reflex blue and PMS purple using inks, should be avoided. Inks too should be thoroughly dry and free of spray powder. A minimum measured 38 dyne level indicates a surface that may be expected to accept selected stamping foils effectively.

New Cold Transfer Foil Processes

Manufacturers of stamping foils are continuously striving to develop new products to advance the technology. Recently, Cold Transfer processes have been introduced in an effort to improve productivity. This in-line technology involves the use of an adhesive print station to selectively water base adhesive coat a substrate. The adhesive is applied from a standard flexo plate in registration with printing, and is dried as aqueous coatings are dried. A web of foil is then brought into contact with the dry adhesive under pressure nip rollers at a combining station, which bonds the decorative foil to the substrate. The waste foil/film web is then rewound for disposal leaving the stamped substrate to be further processed. Currently there are sheetfed offset and narrow web printing presses available to utilize these techniques of high speed

foil decorating. The process is reported to work best on smooth substrates that allow consistent adhesive coating and subsequent high quality clean foil transfer. Cold foil products are said to provide benefits in increased abrasion resistance, brilliance, reflectivity, improved quality in edge definition, as well as top coat and overprint performance. Cold foil transfer should prove to be a viable alternative to the newer sheetfed offset printing press', acrylic metallic coating techniques, as well as other metallic inks.

LOOK TO CORK! Request a copy of Cork's Foil Stamping and Embossing Guidelines. Remember, always **TEST, & RECORD** results!

LOOK TO CORK!..... for your coating and varnish needs, for both **aqueous & UV/EB** coatings/ and varnishes.