High Speed Foil Fusing Q&A

What is traditional foil fusing and what are its limitations?

Traditional foil fusing technology uses a series of heated rollers to fuse foil to toner image areas on certain papers and plastics. While this technology has important applications, it also has several limitations. These include: slow speed, excessive foil waste, restrictions in suitable papers and finishes, and the inability to selectively apply foil within surrounding toner image areas.

What is HSFF and what advantages does it offer over traditional

foil fusing? THERM-O-TYPE has introduced a new foil fusing technology called High Speed Foil Fusing (HSFF). The HSFF process significantly increases the utility of foil fusing and offers solutions to each of the traditional foil fusing limitations. HSFF technology can be easily and inexpensively adapted to most platen foil stamping equipment.

Unlike traditional hot stamping foils that stick to paper, HSFF foils are manufactured to adhere to toner. As a result, traditional hot stamping foils can NOT be used with the HSFF process. Because the HSFF process differs from traditional foil fusing, many foils that work with traditional foil fusing do not work with the HSFF process. In spite of the special characteristics of HSFF foil, a wide selection of metallic colors, pigments (including white), metallic glitters, metallic and transparent holographic patterns, and even security foils are available for HSFF. An interesting side note on HSFF foils is that these foils CAN be used with metal dies to apply foil over solid toner backgrounds. This is a hybrid process combining a traditional die with HSFF foils.

Thermal Transfer Plate (TTP)

HSFF, like traditional foil stamping with metal dies, requires heat and pressure to create a foil image. With traditional foil stamping, the image area is defined by the metal die. Using the HSFF process, no die is required and a toner image defines where the foil will be applied. The Thermal Transfer Plate (TTP) is the surface used to apply heat to the foil, toner and paper. This plate is approximately .25" thick and replaces the die on the chase. TTP material is a composite with a metal backer with a high temperature, compressible, synthetic coating facing the foil/paper. Thermal Transfer Plates can be purchased to match customers image area requirements. To maximize HSFF production, we recommend that the TTP be mounted on a chase configured with mounting holes. Honeycomb style chases are NOT recommended for HSFF due to the lower heat density/transfer through this type of chase. The TTP thickness and mounting method allows most foil stamping presses to easily switch between traditional foil stamping, with metal dies, and HSFF, without dies, in just a few minutes. The TTP has several important characteristics required for successfully using the HSFF process on the widest range of stocks at the highest speed with the longest durability.

Bottom Makeready Material (BMM)

The most confusing issue with HSFF is that even though the TTP and foil may cover many different toner image areas on a sheet, the HSFF process allows foil to be selectively applied to certain image areas without affecting the surrounding toner image areas. The solution to selectively fusing foil is a simple makeready procedure and the use of Bottom Makeready Material (BMM). As already stated, fusing foil to toner requires heat and pressure. Heat is provided through the TTP. Pressure is generated by the platen press. BMM provides the means to localize where pressure is applied to the paper and foil against the TTP. By cutting and applying the self adhesive BMM to align only with the toner image areas where foil is to be fused, pressure can be selectively applied to these image areas. Preparing a HSFF makeready is very easy and can usually be completed in a few minutes. We recommend that HSFF makeready be mounted on Acetate, as this allows a makeready to be used over and over again. Pre-configured acetate makeready sheets can be mounted on the press with masking tape in less than a minute.

Thermal Insulating Material (TIM)

Under certain circumstances, HSFF foil may adhere to toner outside the areas defined by the BMM. This can be caused by various factors including: paper flexing during the HSFF mpression cycle or if toner image areas are very close to where foil is being fused. Applying TIM to the TTP creates a thermal barrier that eliminates foil fusing in these areas

Thermal Insulating Material (TIM) is a thin, self adhesive, high temperature insulation that can be cut with scissors and applied to the Thermal Transfer Plate to stop foil from fusing to toner outside the areas defined by the HSFF makeready. In many applications, such as greeting card personalization, Thermal Insulating Material is not needed.

What is ThermoEmbossing?

While HSFF is normally used to produce a flat foil image, a process called ThermoEmbossing has been developed by THERM-O-TYPE that allows a foil embossed image to be created without dies. At this time, the Kodak NexPress is the only printer that can apply the toner lay down required for this process. To create a ThermoEmbossed image, background (flat foil) and foreground (embossed) layers must be created in pre-press. The background layer is designated to print as a 75% black toner image. The foreground layer is designated to print as a rich black (with or without Kodak Clear Dimensional DryInk toner image. Background and foreground toner is applied to the sheet in a single pass through the NexPress. When foil is fused to the background and foreground toner, the rich black areas appear embossed.

ThermoEmbossed image produced with toner and the Kodak NexPress

What is ThermoFusing?

The HSFF process can also be used to create a spot varnish effect on toner image areas. This process is called ThermoFusing, and is also known as toner glossing or post fusing. When ThermoFusing toner image areas, a special fusing film is used to keep toner from offsetting to the Thermal Transfer Plate during the fusing process. In addition to glossing the toner image area, ThermoFusing also improves toner adhesion and durability.

Are there special considerations while using the HSFF process?

There must always be some gap between toner image areas when one image area is to be foil fused and the adjacent image area is not. This gap will vary depending on the registration accuracy of the printer applying the toner to the sheet. It is important to understand the capabilities of your laser printer when foil fusing select toner image areas on a sheet. An air blast foil separation system is recommended for HSFF. Fusing foils do not come in different release formulations. In spite of this fact, solid areas and fine line type can usually be foil fused with excellent quality provided temperature, impression pressure, foil tension and air blast controls are adjusted correctly. While the HSFF process dramatically increases the range of papers that can be foil fused, there are still some restriction, mainly due to incompatible coatings on certain papers. Paper surface finish, which is a huge issue with heated roller fusers, is not an issue when using the HSFF process. In fact, papers with very deep textures can be foil fused with the HSFF process, provided the laser printer can apply toner within the textured surface. As with heated roller foil fusing, HSFF is NOT compatible with all toners. Customers who wish to see if their printers are compatible with the HSFF process can send sample sheets to THERM-O-TYPE for testing. Using a foil press that can support multiple foil rolls, it is possible to combine HSFF and ThermoFusing in a single press pass. One application for this capability would be to foil fuse one panel of a greeting card verse insert while ThermoFusing a full color toner graphic on the opposite panel. Another multiple foil roll application can include fusing transparent holographic foil over a full color toner image while fusing one or more metallic colored foils to other toner image areas on the sheet. This is a format which has been demonstrated to produce graduation announcements with three foils fused to different image areas in one press pass. The utility of the HSFF is normally based on product quantity. It is obvious that the cost of a metal die, and the ability to run faster on a NSF press, would negate the advantages of the HSFF process as quantities increase. However, small quantity orders are currently a strong growth market and this is where the HSFF process excels. Imagine personalizing a thousand invitations, with a different name on each (variable data), and then running these through the HSFF process, at up to 4,000 iph with foil fused to each personalized invitation. Because HSFF does NOT use a metal die, any texture in the paper will NOT be crushed flat by the foil fusing process. As a result, the texture of the paper will show through the foil. This HSFF characteristic allows some unique visual effects to be created.

Are there additional benefits of HSFF, ThermoFusing and ThermoEmbossing?

High Speed Foil Fusing and ThermoEmbossing processes enhance and encapsulate toner in foil. These processes also provide significant protection to the toner image. Even the ThermoFusing process, which does NOT deposit a coating over the toner, enhances and improves the durability of the toner during the “post fusing” process. As with any other printing process, high speed foil fusing is not a perfect solution for all situations. However, HSFF offers a completely new set of capabilities that have obvious applications in most foil stamping markets. Graduation name cards, announcements and invitations, business cards, and greeting card personalization are just a few examples of applications that can benefit from the high speed foil fusing process.

For additional information on the HSFF process, makeready material, set up procedures, fusing foils and films contact THERM-O-TYPE at 800-237-9630 or visit www.thermotype.com. Patent claims have been submitted by THERM-O-TYPE to the United States Patent Office covering the High Speed Foil Fusing and ThermoEmbossing technologies.