



TECHNICAL BULLETIN

APPLICATION INSTRUCTIONS

PRINTING. **VinylEFX™** films can be printed using vinyl screen print inks, thermal transfer systems, solvent-based ink jet printers and hot foil stamp devices. Prior to production, the fabricator needs to determine the suitability of the raw materials and the printing or decorating technique. Always follow the manufacturer's recommendations with respect to fabrication.

SCREEN PRINTING. R Tape **VinylEFX™** film is an ideal base film to use in manufacturing screen printed OEM emblems, decals, nameplates and fleet graphics. These films can be screen printed and thermal die cut. And, when **VinylEFX™** films are printed and domed, their illusionary effects are magnified, which makes the graphics especially dazzling.

Since many variables affect screen printing, the outcome, that one printer has, can differ greatly from that of another plant operation. Based on years of experience with screen printers, though, we have learned what does and does not work. The following are few suggestions, with respect to recommended ink and clear coats, and curing and die cutting practices.

Before using any ink or clear coat in production, the best course of action is: "Test, Don't Guess". Some acrylic and solvent-based inks and some solvent-based ink jet inks can adversely react with the PVC facestock of the **VinylEFX™** films. These reactions can cause the film to shrink, curl or cack. Providing an unprinted contour around the printed image can minimize the likelihood of these problems occurring.

Some of the inks that printers have used successfully are Sericol TMI II, Nazdar 3500 UV inks and 3M 9700 UV inks. Both Nazdar 3500 series and 3M 9700 UV inks print exceptionally well through a 355 or 380 mesh. Sericol TMI II is a solvent-based vinyl ink. This ink can be either air dried or jet dried. The advantage of jet drying and curing in a batch oven is to accelerate the production process. Excessive heat, though, can cause R Tape's **VinylEFX™** film to shrink.

To circumvent potential problems, our recommendation is to flash dry each color at 180°F for 20 seconds. After the final color is printed, batch cure the graphics at 185°F for 30 minutes. After clear coating with a product, such as Sericol UTMI clear coat, cure the graphics for 2 hrs. @ 185°F.

UV curing also subjects **VinylEFX™** film to intense energy, which can cause film shrinkage, as much as 1/32". This problem is not insurmountable. To minimize shrinkage, as well as to prevent puckering of the film on the release liner, always condition the material before printing. By conditioning, we mean sheeting the **VinylEFX™** film one day prior to production, and racking the sheets face-to-face. This "pre-seasoning" process allows the material to shrink on the release liner, so that the material can stabilize. The result is that better control of registration. Providing an unprinted contour around the print can also minimize heat shrinkage.

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While UV lamps emit intense energy that can cause shrinkage, the results can be minimized significantly by reducing the energy level and speeding up the conveyor belt. Several of our customers adjust the setting of the UV curing lamps to 300 watts and run the belt speed at 50 feet per minute. By making these adjustments, the amount of heat, to which the **VinylEFX™** material is exposed, is significantly reduced.

Don't be concerned that the graphic will not receive sufficient energy to cure the ink and clear coat. If you print multiple colors and then clear coat the graphic, the **VinylEFX™** film is exposed to multiple exposures, whose curing effects are cumulative. In addition, after each exposure, the UV inks will continue to cure. This is called "post cure". After each printing pass, you should check the ink for proper curing.

GELS. Gels are inherent in the vinyl extrusion process. 8 gels or fewer per 1.00 sq. mm or 36 square inches are generally regarded as commercially acceptable.

SHIM LINES. To create the embossed texture on the second surface of **VinylEFX™** vinyl, a pattern is etched into a flat metal stamping die called a shim. This shim is wrapped around a cylinder. The point, at which the two ends of the flat plate meet, often creates an impression in the film called a "shim line". This is not a defect, rather an inherent byproduct of the manufacturing process. Take this line into consideration, in designing your graphics.

SPLICES. Occasionally, rolls of R Tape **VinylEFX™** film have splices. To alert our customers of these, we mark the roll with a "flag", or colored marker, just before the splice. In addition, rolls with splices are identified on the outside of the **VinylEFX™** carton with the letter "S". To control the number of these splices, we have established the following specification detailing the allowable number in a roll:

NO SPLICES ARE ALLOWED within a 10 yard roll.

No more than 1 splice within a 50-yard roll.

No more than 3 splices within a 250-yard roll.

USING AN OVERLAMINATE. Printed graphics, which are subjected to petrochemical spillage or abrasion, should be protected with a vinyl overlaminate.

CUTTING. Cutting **VinylEFX™** film is similar to cutting an intermediate vinyl. Optimal cutting pressures vary depending on plotter type and blade sharpness. Typical pressure is between 135 grams and 165 grams. For best cutting results, use a sharp 45° blade at slow cutting speeds with swivel

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INSTALLATION PROCEDURE.

1. Turn the graphic over so the application tape is face down. Then peel the liner from the vinyl, rather than pulling the vinyl off the liner.
2. Holding the top corners of the graphic, lightly tack it into position.
3. In squeegeeing most graphics, begin in the center, and stroke the vinyl with an up and down motion. On the up stroke, your thumb should be at the bottom of the squeegee. On the down stroke, pull with your fingers on the top. This first stroke is your center line. All subsequent strokes work off of the initial center stroke. Each stroke must overlap the previous one. Try to keep the angle between the face of the squeegee and the application surface shallow, as you work. In addition, the squeegee should be angled slightly away from the center line. Imagine that you are pushing the air out from under the vinyl. Never angle the squeegee toward the center line..this produces bubbles. Maintaining good squeegee pressure is critical in forcing all of the air from under the vinyl. Wet application is not recommended. If you use the wet method, use a commercial grade application fluid and only spray a fine mist on the substrate. Do not saturate the substrate or the adhesive side of **VinylEFX™** vinyl.
4. If the application surface has seams, you must cut the vinyl along these seams. After cutting the film, use the edge of your squeegee to tuck the vinyl into the panel seam.
5. To remove the application tape, pull the tape against itself at a 180 degree angle. Resqueegee all of the edges and overlaps to prevent edge lifting. A low-friction sleeve on your squeegee prevents scratching of the vinyl graphics.
6. **EDGE SEALING IS RECOMMENDED.** Using a finetip brush, paint the edges of the **VinylEFX™** film with a commercial-grade product.



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knife plotters. For Gerber plotters, use a 30° blade. When cutting thicker **VinylEFX™** film constructions, such as Double-sided Gold Florentine or Coburn Phosphorescent Glow-In-The-Dark films, or when cutting very smaller letters or fine detail, use a 60° blade.

THERMAL DIE CUTTING. **VinylEFX™** films can be thermal die cut at heat settings between 295° and 300°F, at dwell times between ¼ and ½ second.

WEEDING. Begin weeding in the upper right corner of the material, working from right to left. Use care when weeding small letters or graphics with fine detail.

APPLICATION TAPE. Use a high tack application tape, such as R Tape ApliTape™ (#4075, #4076, #4775), R Tape Conform® Series (#4075RLA, #4076RLA, #4775RLA), or CLEAR CONFORM™ (AT-42, #2576).



Digitally-Printed Graphic

The graphic depicted above was printed on R Tape's **VinylEFX™** Gold Florentine Leaf, using the Gerber Edge. In printing this picture, the setting for cast vinyl was used.

SUBSTRATE PREPARATION.

1. Wash the substrate using warm water and detergent.
2. Remove remaining contamination, by cleaning the substrate a second time with isopropyl alcohol. Saturate a clean rag with alcohol and scrub the area to which the vinyl graphics will be applied. Before the solvent dries, use clean paper towels to wipe the dirt away.
3. Learn as much as you can about the paint system. Each paint formulation is different, with some containing additives such as wax and silicone, both of which can cause adhesion problems. Some formulations of powder-coated paints can also be a problem. As a rule of thumb, allow a paint system to dry for one week, before graphics installation, especially if it's a polyurethane paint. Cure time can vary depending on the ambient temperature, humidity and the amount of hardener used. Application of graphics over a paint system that has not fully cured can result in the formation of bubbles underneath the vinyl, resulting from the paint outgassing.

APPLICATION TEMPERATURE. For optimal results, apply graphics at temperatures of 70° F (21° C) or above.

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