Installation of Magic Ink Jet Vinyl

Magic
Display Paper & Film

TOOLS

Plastic Squeegee (harder plastic will last longer and trap less air bubbles than a softer one)
Rivet Brush
Large straight pins or "Wartenberg" Pinwheel
Utility Knife or "Xacto" knife
Industrial heat gun (hair dryers do not generate enough heat)
Propane torch
Tape measure
Metal straight edge
Low friction sleeves for squeegees
1" and 2" masking tape
3M Edge Sealer 3950
Marking pen of "Stabilo" pencils
Lint-free paper towels or rags
Isopropyl alcohol
Non-abrasive detergent

SUBSTRATE PREPARATION

Before installing any graphics, a clean substrate is critical. Recommendations for final cleaning are the following:

SUBSTRATE	CLEANER
Painted metals	Isopropyl Alcohol (IPA)
Glass	IPA or vinegar/water mixture
Acrylic & Polycarbonate	Acrylic cleaner and anti-static rag to remove electric charge and remaining particles of dust
Expanded PVC	Vinegar followed by a quick wipe with toluene

Caution. Certain plastics, such as fiberglass, polycarbonate, styrene and polystyrene can outgas. In certain instances, outgassing can occur for an extended period of time. When this occurs, applied graphics can bubble. Outgassing can be predicted by accelerating the aging process. A sample of the substrate with applied vinyl is placed in an oven at 150°F for as long as 24 hours. If bubbling occurs during the test, it will likely occur on the sign.

Polycarbonates absorb and outgas moisture. That is why polycarbonates must be dried prior to vinyl application. (Consult the polycarbonate manufacturer's recommendations for drying). Vinyl applied over undried polycarbonate can trap outgassing moisture, resulting in bubbles.

Under no circumstances are styrene or polystyrene recommended for outdoor applications.

VEHICLE GRAPHICS PREPARATION.

With respect to the application of vehicle graphics, the units should be cleaned the day prior to the installation. This will ensure that the vehicle surface is completely dry, and that no water is trapped behind rivet heads and at panel seams.

Vehicle surfaces should be cleaned using a soft bristle brush, then thoroughly rinsed with water. Residual grease, soot or tar should be further cleaned with a solvent such as DuPont's 3919S Prep Sol.

Complete the vehicle cleaning with denatured alcohol or IPA, drying the surface with lint-free paper towels before the solvent evaporates. To avoid adhesion problems, be sure that the surface is completely dry.

NOTES: Female-molded, gel-coated fiberglass typically has a waxy film caused by the mold release agent used in the manufacturing process. This waxy film must be removed before graphics installation.

All gelcoats and urethane paints require a cure time. This cure time varies depending on product type, temperature, humidity and amount of catalyst or hardener. During curing, the paint or gelcoat will outgas. This outgassing must be completed prior to vinyl application or problems such as bubbling will likely occur.

APPLICATION TEMPERATURE

Optimum application temperature range of the vinyl is typically between 60°F (16°C) and 90°F (32°C). At temperature extremes, you can expect additional difficulty.

Cold Weather Application Tip: Before pulling a unit into the shop, remove any accumulated snow from the trailer roof. This will eliminate the nuisance of water dripping off the roof edge onto you and your work. To expedite the warming of the trailer surface, open all trailer doors. To further speed the heating process, you can also direct portable heaters toward the inside of the trailer.

PLANNING YOUR INSTALLATION

Carefully study your installation diagram. Measure the location of each graphic element and tape them into position. Taking this step will ensure that all of the elements fit properly within the design space.

For vehicle graphics, multiple panel graphics with vertical overlaps must be wind-lapped with the front panel overlapping the rear one. Graphic panels with horizontal overlaps must be rain-lapped with the top section overlapping the bottom one. Each overlap should be between ¼" and ½".

In planning the installation sequence of vehicle graphics, you will usually work from the rear to the front, from the bottom to the top.

APPLICATION TO FLAT SURFACES

1. Tape the graphic into position with small pieces of masking tape. After rechecking your measurements, draw registration marks from the application tape to the sign substrate.

   To facilitate the installation of large markings, use a "top hinge". To make a top hinge, simply apply masking tape along the top edge of the graphic. With this method, you can remove the liner from the graphic in one piece before proceeding with the application.

   In a variation of the top hinge technique, you can cut between large individual letters so that each letter is independently hinged. Remove the sections of liner and install letter by letter.

   To make a center hinge, apply masking tape across the middle of the graphic. Using this technique, remove the liner from one half of the graphic, cutting the liner near the tape hinge. After you squeegee this section of the graphic, working from the hinge to the outer edge, remove the hinge and the remaining liner. Complete the application, starting at the initial squeegee stroke and working to the outer edge.

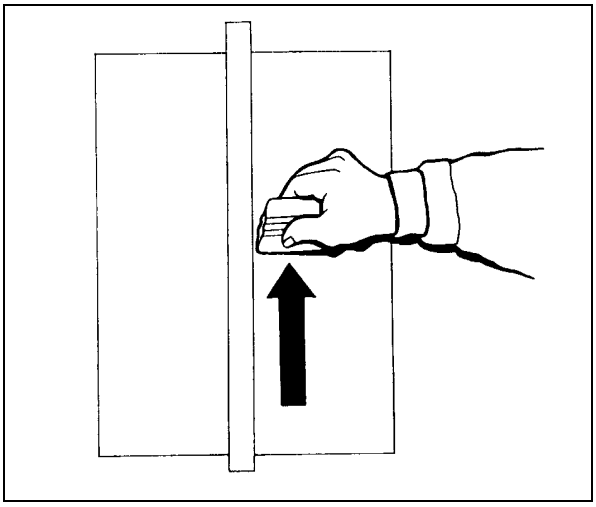

ILLUSTRATION #1

2. Typically, your first squeegee stroke begins at the center of the graphic. This first movement is straight up and down. To produce the necessary squeegee pressure for successful application, remember to push with your thumb on the bottom of the up stroke.
   (See illustration #1).

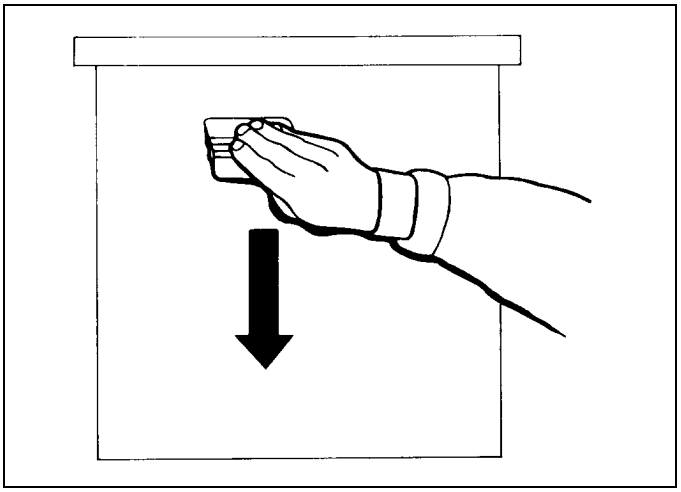

ILLUSTRATION #2

On the down stroke, push with your fingers on the top. (See illustration #2). Failure to maintain firm pressure often results in wrinkles and bubbles. (Minute bubbles are usually the result of inadequate squeegee pressure, a squeegee that is too soft or doesn't have a flat edge.)

All subsequent up and down strokes work off the initial center stroke. Each stroke must overlap the previous one. Angle your squeegee 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.

3. To reposition the vinyl graphic on the substrate, give the material a sharp jerk with a snap of your wrist. This movement should be perpendicular to the substrate.

Never use a slow pulling movement to reposition the graphic. This will stretch the material causing more problems.

4. To remove the application tape from the graphic, pull the tape against itself at a 180 degree angle. After removing the application tape, be sure to re-squeegee all your edges and overlaps.

For certain applications, it is a good idea to edge seal your markings. Some commercial edge sealers are available at your sign supply distributor. To achieve a neat finished appearance without drips, use a fine-tipped brush to apply your edge sealer.

CAUTION: Never varnish coat your applied vinyl graphics. Varnishes contain very hot solvents that will attack the vinyl facestock and the adhesive system. Varnished graphics will typically peel away from the sign substrate.

APPLICATION TO FLEXIBLE SIGNFACE SUBSTRATES AND ACRYLIC AND POLYCARBONATE SHEETING

Panel to panel seams should be matched to ensure color consistency for daytime appearance and night illumination. Common edges on the roll should be overlapped, if possible, during application to avoid potential color shift. NOTE: In addition to checking the appearance of seams, it is also a prudent practice to check light transmissions in the shop before sign installation. You will need to back up some colors with a white diffuser film or a sprayed background.

1. Initially use light strokes squeegeeing the film into position.

2. Starting at the center of the marking, re-squeegee the film using firm strokes. Firm strokes and a stiff squeegee will force the application fluid from underneath the film.

3. Fifteen minutes after application., spray the application tape with application fluid, then remove in no more than 5 minutes. This technique will aid application removal and prevent minute air bubbles from forming during this process. Remove the application tape by pulling it 180° against itself. Re-squeegee all edges after application tape removal to ensure good adhesion and prevent edge lifting. (A rivet brush may also be used in this part of the installation sequence to achieve a good film/substrate bond. Different sizes of rivet brushes are available on the market. Proper technique with any of these will produce desired results).

4. To eliminate air bubbles, puncture the bubble at one end and press it flat with your thumb, starting at the other end. (Always use a pin; never use a knife. A pin hole will close around itself. A knife cut will open up.)

5. After 24 hours, re-squeegee the vinyl. Failure to take this step could result in poor ultimate adhesion and edge lifting.

Overlaps

1. To overlap sections, the overlap should be at least 1/32". To cut a uniform overlap, you will first need to tape a cutting strip onto the substrate. (You can use a 1" piece of 16 gauge steel as a cutting strip.)

2. Then squeegee both pieces of vinyl over the cutting strip.

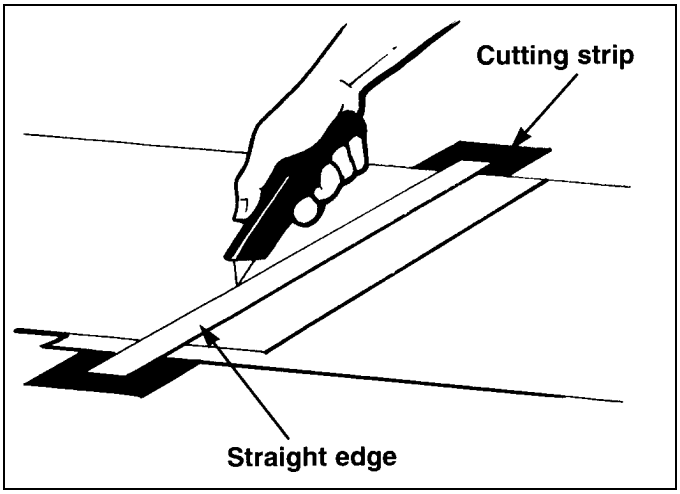

ILLUSTRATION #3

3. Place a metal straight edge where the two pieces of film cover the cutting strip. With a sharp utility knife, cut through both layers of translucent film. (See illustration #3.)

4. Remove the excess film Then remove the cutting strip.

5. Complete the squeegeeing procedure.

APPLICATION OF VINYL TO RIVETED SURFACES

1. Squeegee the vinyl graphic over the riveted surface as described in the section covering flat applications.

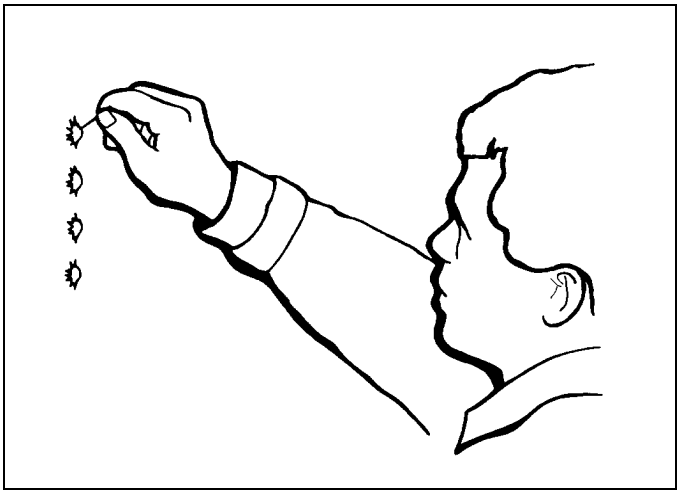

ILLUSTRATION #4

2. Using a pin (See illustration #4), puncture the vinyl in several places around each rivet head.

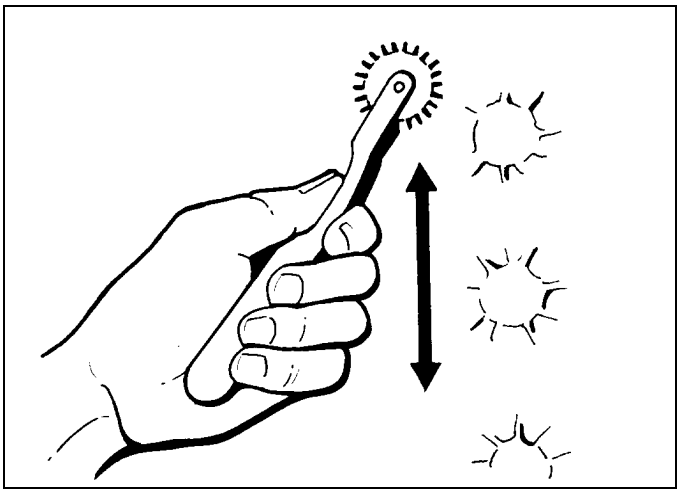

ILLUSTRATION #5

A “Wartenberg” pinwheel will accomplish the same result. Just roll the pinwheel on either side of the rivet row. (See illustration #5).

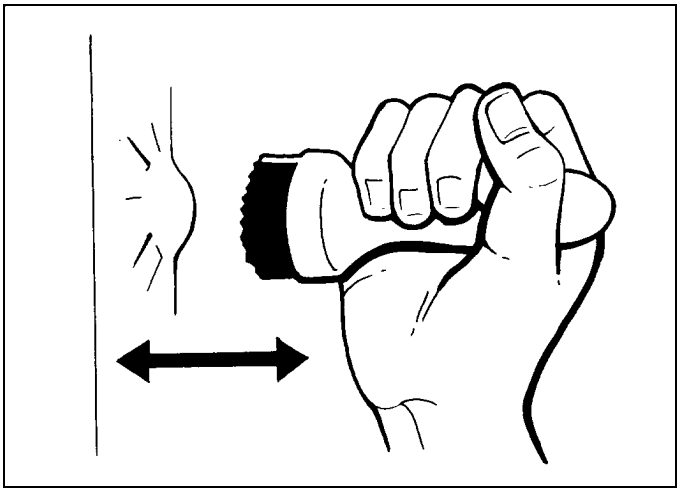

ILLUSTRATION #6

3. Holding the rivet brush in your fist, move the brush horizontally back and forth over the head of the rivet with short, choppy, firm strokes. (See illustration #6.) With this step, what starts as a large pucker will be compressed to a much smaller bubble around the rivet head.

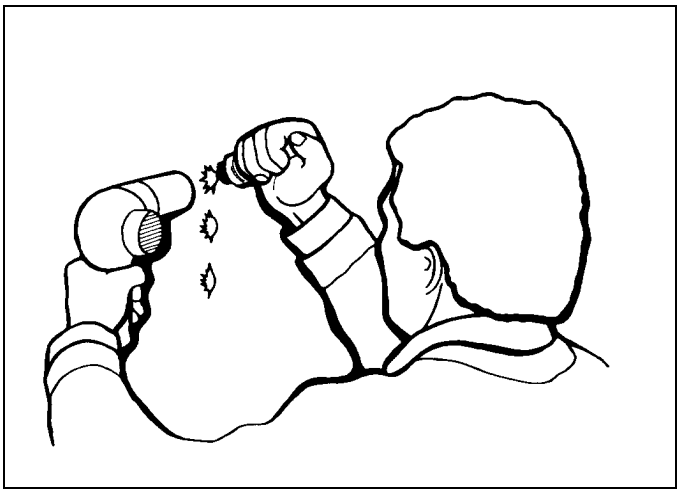

ILLUSTRATION #7

4. With the heat gun or propane torch several inches from the head of the rivet, heat the vinyl (See illustration #7.) Do not burn or melt the material. This heating process breaks the memory of the cast vinyl, allowing it to conform to the rivet head.

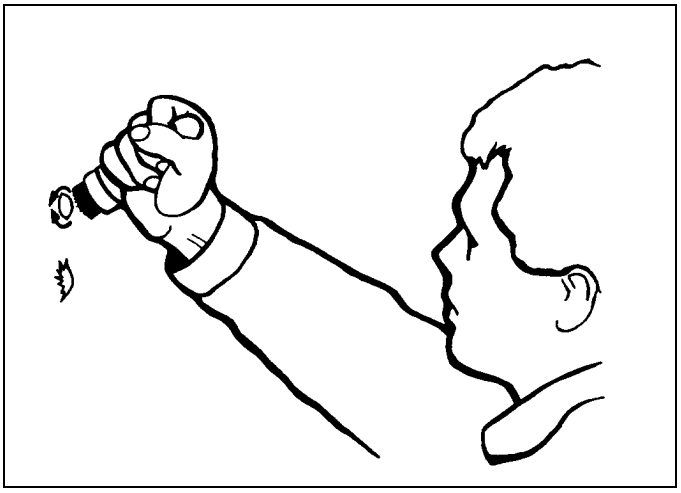

ILLUSTRATION #8

5. After heating the material, burnish the vinyl to the rivet head using a circular motion with the rivet brush. (See illustration #8). Firm pressure with the rivet brush will ensure good ultimate adhesion. The bristles of the rivet brush should be at a 45° angle to the edge of the rivet.

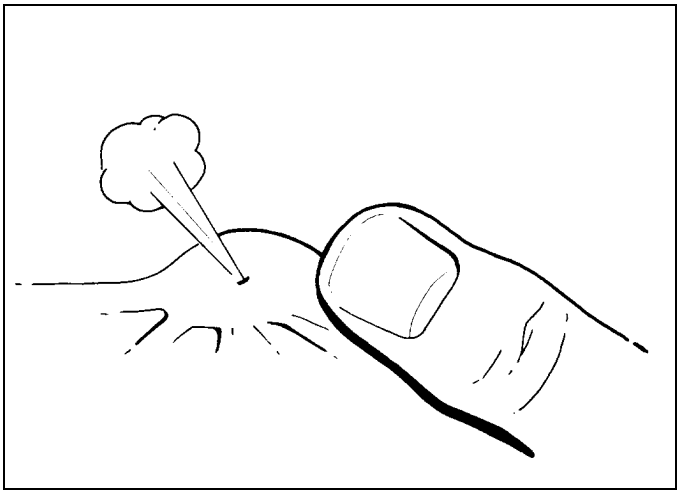

ILLUSTRATION #9

6. The last step in any installation should be a final inspection. Be sure all material conforms tightly to the rivet heads. If the graphic has air bubbles, puncture the bubbles at one end with a pin. Using your fingers, push the air toward the pin hole. (See illustration #9.) Never slit a bubble with a knife.

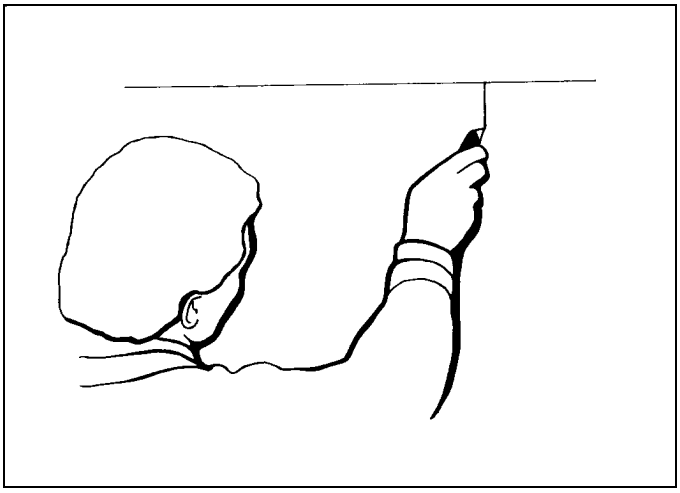

ILLUSTRATION #10

If the substrate is comprised of panels, the vinyl must be cut along the seams. (See illustration #10). The seams of roll-up truck doors must be double-cut at a 45° angle along both edges of the joining door panels. All cuts must be re-squeegeed to ensure proper adhesion. We also recommend that you edge seal the graphic at the door panel seam.

APPLICATION OF CAST VINYL TO CORRUGATIONS

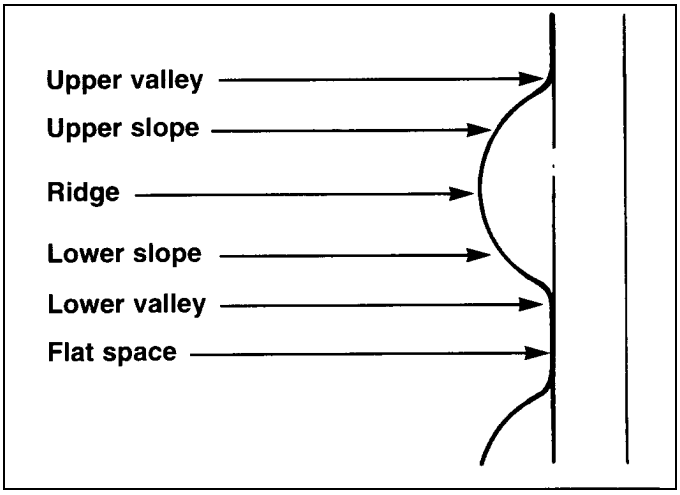

ILLUSTRATION #11

Before proceeding with the application sequence, take a moment to carefully study the illustration of a corrugation. (See illustration 11.) As you can see, a corrugation typically consists of two slopes, two valleys, the ridge and the flat space between the corrugations. Proper application of the vinyl requires that you apply firm squeegee pressure to all of these areas to attain good mechanical contact and, consequently, good ultimate adhesion.

1. After removing the liner paper, firmly hold the graphic at the upper corners and initially tack it into position using finger pressure. If you are installing a large graphic, do not remove all of the liner paper at once. Only remove as much liner paper from the film as you can comfortably handle.

2. Squeegee strokes will begin one-quarter to one-half the way down from the top in the center of the emblem. From this center starting point, your stoke will move horizontally to the outer edge. The subsequent stroke returns to the center and moves in the opposite horizontal direction. Alternating the direction of the strokes is very important in the application sequence in maintaining registration.

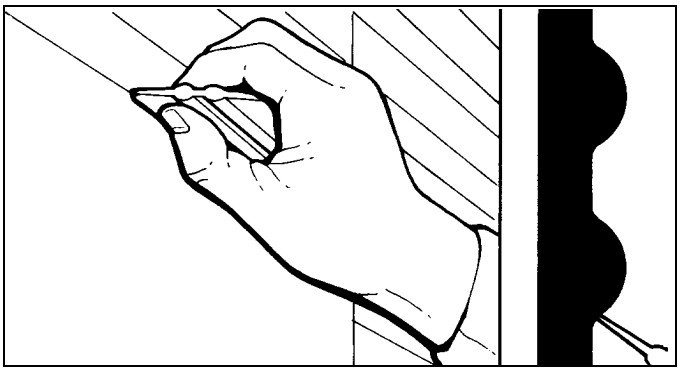

ILLUSTRATION #12

3. Continuing downward, begin application at a lower valley of a corrugation by running the edge of the squeegee into the valley, (See illustration #12.)

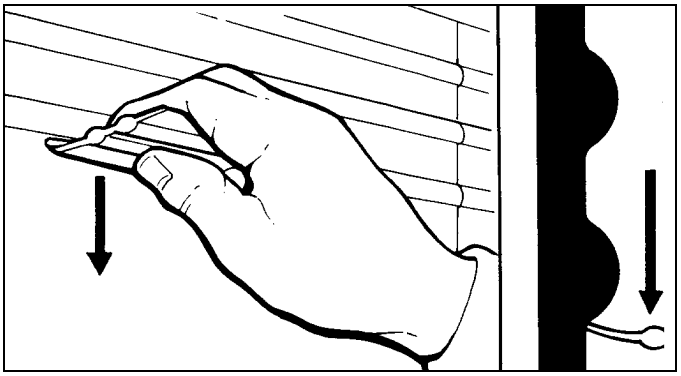

ILLUSTRATION #13

4. Starting at the upper valley, squeegee the flat area between the two valleys. (See illustration #13.)

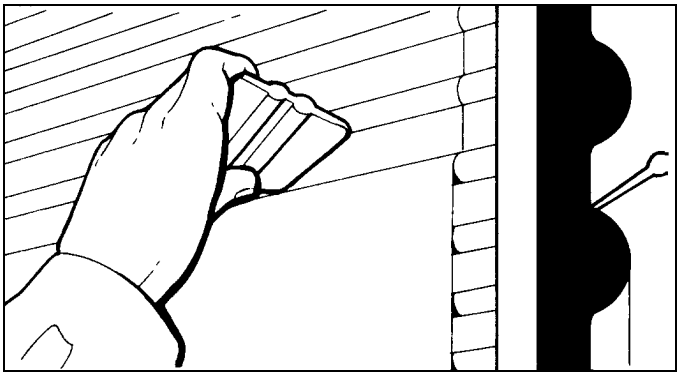

ILLUSTRATION #14

5. Starting at the center of the graphic, run the edge of the squeegee into the upper valley of the corrugation. (See illustration #14.)

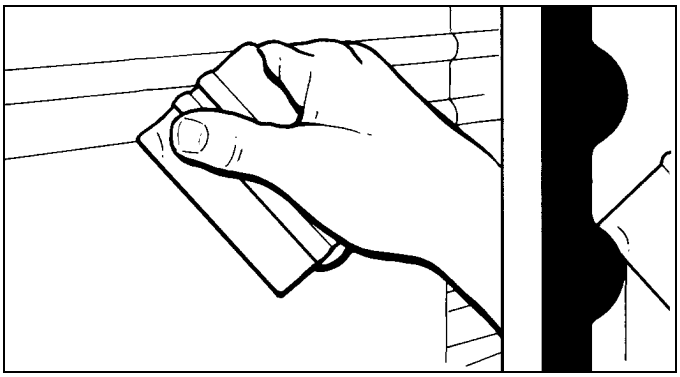

ILLUSTRATION #15

6. Return to the center of the graphic. Using the corner of the squeegee, apply the film to the upper slope. (See illustration #15.)

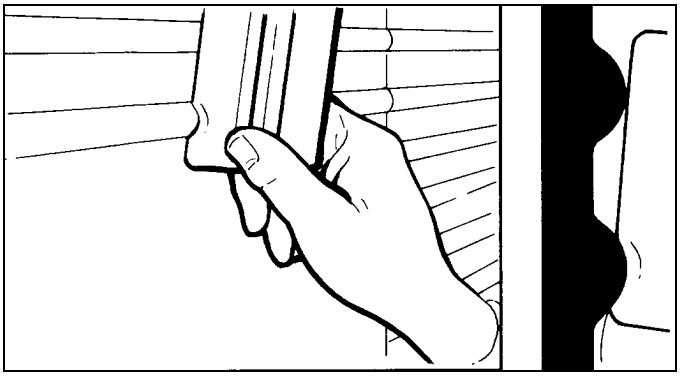

ILLUSTRATION #16

7. Return to the center. With the corner of the squeegee, apply film to the ridge of the corrugation. (See illustration #16).

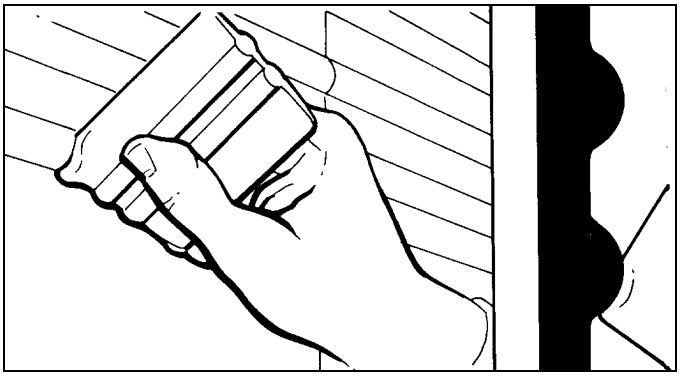

ILLUSTRATION #17

8. Return To the center. Using the corner of the squeegee, apply film to the bottom slope. (See illustration #17).

9. Repeat the procedure.

10. Working upward, start at the center of the graphic. Using the edge of the squeegee, apply the film to the lower slope. (See illustration #17.)

11. Returning to the center, using the edge of the squeegee, apply the film to the ridge. (See illustration #16.)

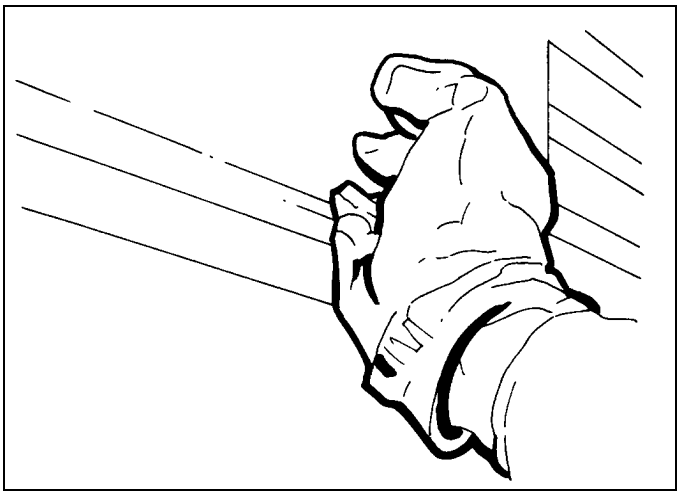

ILLUSTRATION #18

12. Return to the center. Using your thumb (a gloved hand works best), apply the film to the upper slope. (See illustration #18)

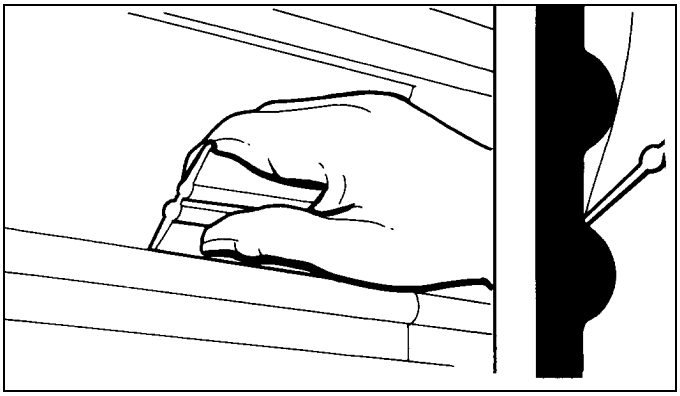

ILLUSTRATION #19

13. Starting at the center, run the edge of your squeegee along the upper valley. (See illustration #19.)

14. Repeat the procedure.

EDGE SEALING – (for vehicle applications)

Once the material has been successfully installed, a sealant such as 3M's Edge sealer 3950 must be applied to all edges of the graphic, including the seams of paneled graphics.

REMOVAL OF TRUCK GRAPHICS

Many factors make removal of vinyl film difficult. As vinyl ages, it becomes brittle. In the removal process, brittle film often cracks into small pieces. This can make film removal tedious and frustrating. In addition, the adhesive frequently delaminates from the facestock. Removing the adhesive can be time consuming and messy. What follows are guidelines and tips on film and adhesive removal.

Basic Tools To soften the film and the adhesive, you will need a heat source. A propane torch or an industrial heat gun will suffice for removing small letters and graphics. For removal of large truck graphics, you will need a big torch such as a weed burn.

We also recommend that you have an assortment of adhesive removers handy such as isopropyl alcohol, Pres Sol@, lacquer thinner, xylene, and a citron-based remover. Before using any chemicals, read and follow the manufacturer's safety precautions. For scraping the softened adhesive off the substrate, you will need squeegees. Old rivet brushes are also handy for scrubbing adhesive off rivet heads.

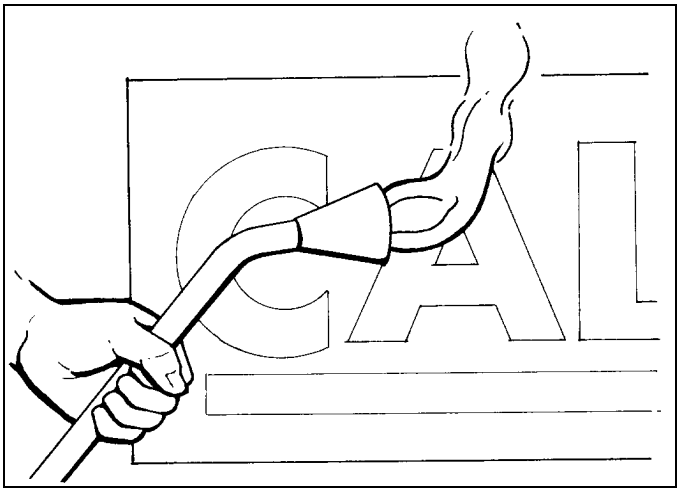

ILLUSTRATION #20

Film Removal Procedure. The first step is to warm up the vinyl with your heat source. A weed burner allows you to heat a large area quickly…and the surface stays warmer, longer. (See illustration #20.) Be sure to keep the flame moving to prevent burning the vinyl or the substrate. This heating process softens the film and the adhesive.

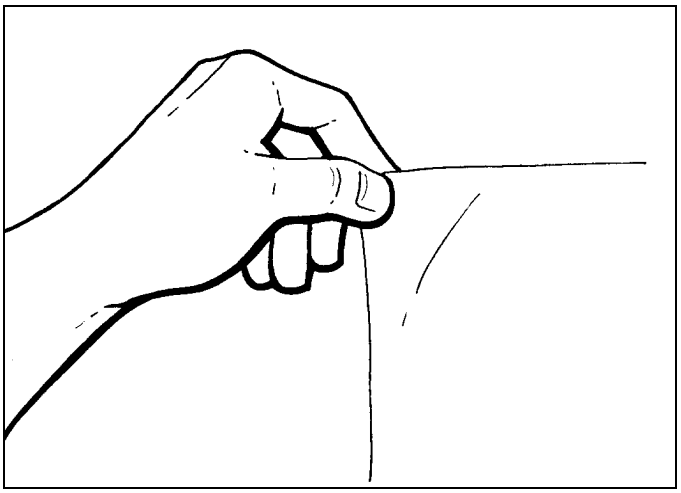

ILLUSTRATION #21

Then, pick at an edge and pull the film from the surface. (See illustration 21.) If the temperature is just right, the adhesive often will come off with the film. (this is a trial and error process.) If the temperature is too hot, the film will stretch too easily and snap.

Adhesive Removal Procedure. When we develop our pressure-sensitive products, our goal is to achieve good adhesive anchorage. This means that the adhesive is designed to adhere better to the facestock than to the substrate. In many cases, the film and adhesive will come off perfectly with heat. In other instances, as the environment acts on the laminate and substrate bond continues to build, you could be left with adhesive residue.

Removing adhesive involves the use of chemicals. When using chemicals, always exercise caution. Read and follow the manufacturer's instructions. The first step in using an adhesive remover is to test the remover on an inconspicuous spot on the truck to see if the remover reacts with the paint.

Next, test the adhesive remover on the adhesive. What worked on the last removal may not work this time. Start with the mildest adhesive remover…if that does not work, try a stronger one.

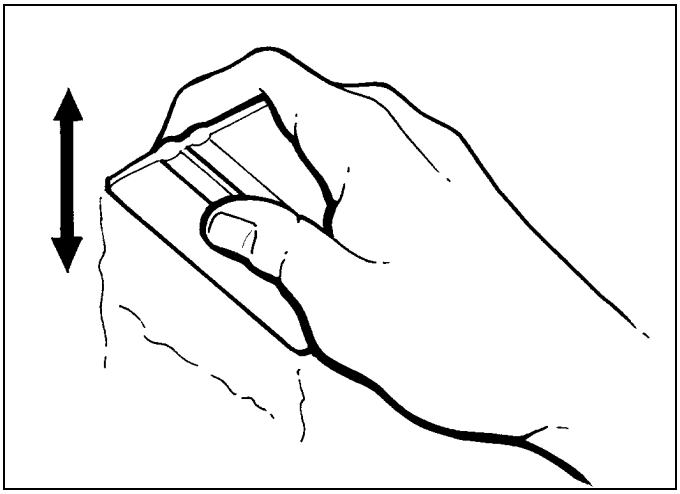

ILLUSTRATION #22

After selecting a remover, saturate the adhesive with it. Apply the remover by using a rag, a spray bottle or a pressurized sprayer. Let the remover soften the adhesive to a jelly-like state. Then scrape the gel from the surface with a squeegee. (See illustration 22.)

Use your old rivet brushes to scrub the adhesive off the rivet heads. At this point, paper towels are suggested for complete removal.

CARE AND CLEANING

Proper care of these graphics, however, is critical to achieving the ultimate life and appearance.

In cleaning vinyl graphics, always use a wet non-abrasive cleaner. The cleaner selected should also be free of strong solvents such as MEK, alcohol's, acetone and perchloroethane. The cleaner should also be free of highly acidic and alkaline chemicals.

When you prepare the cleaning solution, always follow the manufacturer's instructions for proper dilution and safe use.

CLEANING PROCEDURE (for overlaminated vinyl):

1. Using clean water, wash the graphics to remove loose dirt. If you are using a pressure wash system, use special care. The nozzle must be at least 12" away from and no shallower than 60° from perpendicular to the graphic. Water temperature should not exceed 140° F, and water pressure should not exceed 1300 PSI. Improper use of a pressure wash system can cause edge lifting of the vinyl.

2. Using a mild detergent, wash the graphic with a soft brush, rag or sponge. Never use a hard bristle brush.

3. Rinse the graphic with clean water. Allow to air dry.

4. If tar or oil remains on the graphic, clean the stains with a rag moistened with mineral spirits, kerosene or a household cleaner such as "Formula 409". Wash again with detergent and water to remove the solvent, then rinse with water.

5. To remove mold and fungus, use a solution of one part bleach and 30 parts water. After cleaning, rinse the graphic with clean water.

Caution:
Commercial drive through brush type car washes are not recommended. Dirt and debris on unlaminated vinyl surfaces can not be removed.

These instructions are intended only as guidelines. The end-user bears the ultimate responsibility for the care of the graphics.

STORAGE

Store unapplied graphics in a clean, dry, cool room. Never subject fabricated graphics to moisture, excessive humidity, direct sunlight or temperatures above 100°F (38°C). Finished graphics should be stored flat, rather than rolled.

APPLICATION PAPER

Application paper may be applied to protect the surface of the ink jet vinyl or laminated vinyl from damage during installation. Application paper (also called transfer tape, premask and prespacing tape) is applied over the completed graphics.

CAUTION: Application paper applied directly onto the imaged surface of DMCVLA3 may cause slight yellowing of the coating. American Biltrite Inc. transfer tape TransferRite® has been found to cause the least amount of yellowing and is recommended for use. 3M tapes have been found to increase the yellowing effect.

Proper lamination of the application paper is a relatively simple procedure.

1. Use application paper with a low tack adhesives. High tack adhesives or tapes may cause coating removal.

2. Use a single sheet of application tape to cover a vinyl graphic rather than using overlapped pieces of tape. Overlapped application tape often results in a line of small bubbles at the overlap.

3. Use care in applying application tape to a vinyl graphic. Wrinkles and bubbles in the application tape often result in wrinkles and bubbles in the installed vinyl. Also, avoid stretching the application paper. This helps prevent poor graphic registration and wrinkles.