



TECHNICAL ASSISTANCE

Mactac Bubble Free Series Vehicle Wrap Application Instructions

Thank you for your interest in **Mactac's B-Free®** digital media. Our micro-structured air egress technology provides the best opportunity for a successful application.

- 1) Our **Gruv GV729BFD** series is best suited for *flat to moderately curved* surfaces normally found in a typical vehicle wrap. This 2.7-mil vinyl film, combined with our 2-mil cast LF3600 series overlaminating film, is easy to handle, fast to apply and brilliant as a final product. Recommended for flat to simple curves such as:
 - a. P.O.P.
 - b. Exterior and interior graphics
 - c. Buses / Trains
 - d. Flat to slightly curved automotive wraps, such as:
 - Vans
 - Trucks
 - Sedans
- 2) Our **Gruv cast GVC929BFD** is also suited for *flat and moderately curved* surfaces; and is exceptional on *complex surfaces*. These 2.1-mil proprietary vinyl films, when combined with our 1.5-mil cast, gloss and matte, RAYZor (LF3638 gloss and LF3638 matte) overlaminating films are one of the thinnest, most conformable, film/laminate combinations on the market. This results in an easy to handle, high gloss final product. Recommended for two and three-dimension curves such as:
 - a. Everything above plus;
 - b. Fleet
 - c. Moderate to complex automotive wraps such as:
 - Sport coupes
 - Sprinter vans

- Recreational vehicles

Questions? Your Mactac sales representative can put you in touch with technical support to help.

Preparing the Media for Application:

1. Did you select the correct media for your application? **GV727BFD** can be used for outdoor applications on flat to moderately curved surfaces for up to seven years. **GVC929BFD** are for more complex surfaces.
2. Is the media within proper shelf-life and has it been stored in a reasonably controlled environment (ideal is 60° - 80°F @ 50% relative humidity)?
3. Was the correct ICC profile used to match the printer, ink, RIP and Mactac media used? Download the latest profiles from our website at http://www.mactac.com/profiles_icc.html
4. Was the media allowed to dry, open to the air (not rolled up) for 24 hours prior to being laminated?
5. Was Mactac's Permacolor RAYZor overlaminating film used to protect the B-Free series media?

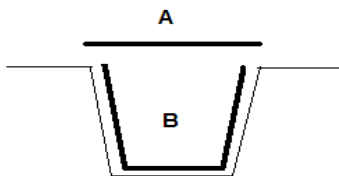
Pre-application Planning (Application Checklist):

Prior to application, plan your steps for a successful wrap by using the following checklist:

1. The ideal location for an installation is indoors in a controlled environment. If this is not possible, do your best to protect the surface from changes in temperature, moisture, wind and dust as these will affect the integrity of the application.
2. All trim items that can safely be removed should be prior to the wrap. This includes: license fixtures, antennas, name plates, lighting fixtures, etc.

3. Inspect the vehicle and fill out the proper inspection sheet (attached) and send it to Mactac. This is required to qualify for the Mactac Vehicle Wrap Warranty. This helps you identify potential points of failure like: poor paint jobs, rust, dents, nicks, scratches, seams, silicon seals, and rubber window gaskets. The adhesive is designed to adhere to the painted vehicle surface; it does not stick to silicone, rubber, etc. The material must be trimmed around these areas!
 4. Conduct a tape test with 610-tape to insure a sound paint job. Note: areas that have been repainted chipped, or show rust may result in paint damage upon graphic removal and these areas must be noted on the vehicle inspection report.
 5. The surface of the vehicle must be cleaned 24 hours prior to application and kept indoors to allow drying. If not possible, keep in mind that morning dew will re-wet critical areas, like seams and rivets which must be re-dried prior to application. Some of the modern finishes and finish enhancers like waxes and paint conditioners require using Xylene (a.k.a. Zylol) as a cleaner to remove. Be sure to follow directions on the can and to use Personal Protection Equipment. Ref: TA2032 (Technical Assistance bulletin) for complete cleaning recommendations.
 6. Just prior to application, the vehicle should be wiped down with isopropyl alcohol. Wipe with a wet rag and then towel off with a dry rag, do not simply allow evaporation. Pay special attention to edges, seams, around moldings and gaskets and where objects were removed. Use compressed air or a heat gun to ensure dryness.
 7. The recommended surface temperature of the vehicle for application, at wrap time, must be above 60°F.
 8. Lay out your graphics and tape to the vehicle to ensure everything lines up correctly.
- Tool Kit:**
- A temperature adjustable industrial heat gun or propane torch (be very careful with a propane torch as it's very easy to burn the application surface!)
 - No-touch temperature gauge
 - A hard and soft squeegee, or a hard squeegee with a low friction sleeve
 - A **sharp** knife with many replacement blades
 - Tape measure and positioning tape
 - Air release tool (straight pin)
 - Rivet brush
 - Cotton gloves
 - And a helper (if possible)!
 - 610 tape for snap tape test
 - Masking tape
- Application:**
1. Application begins at the back of the vehicle for vertical panels and from the bottom up for horizontal panels. This allows for all overlaps to face the back or the bottom which prevents wind and rain from causing a premature failure. Seams should have a ¼ to ½ inch overlap.

2. Use firm pressure on the squeegee to apply the media to the surface, starting at the high points in the middle and working out toward the edges.
3. For channels, wherever possible lay the media through the channel rather than bridging and stretching the media. Any vinyl film (cast or calendered) can exhibit shrinking or tenting when overstretched or overheated.
4. In many cases it is not possible to work through the entire complex curve. In this case bridging is the only option. **GV729BFD** can be stretched 120% up to 150% into recesses. **GV729BFD with an overlamine (Permacolor LF3600 series)**, because of the combined total of 5.7 mils (two films plus adhesive), can only be stretched up to 80% before memory failure occurs. **GVC929BFD can be stretched up to 150% into recesses. However, with an overlamine (RAYZor), the combination can be stretched only up to 120% max.** Areas being stretched any further must be cut to relieve tension. To calculate, take the surface length (B) of the recess and divide it by the bridged length (A) of the recess then multiply by 100.



5. In many difficult areas, a thin layer of an adhesive promoter or acrylic spray primer can enhance adhesion. Be sure to use the primer sparingly and allow it to completely cure according to the directions on the can, prior to graphic application. *Use of a primer will result in adhesive being left behind in these areas and is not considered a reason for a warranty claim.*

6. To properly bridge a gap, apply the film to the flat areas first as indicated above. Use heat to soften the film, somewhere around 200°F. Immediately stretch the film into the groove, **starting at the middle of the groove and working out to both sides**. Sometimes using a cotton glove or soft cloth instead of a squeegee is the way to go. Since the film cools quickly, it is important to work in small areas and continue to heat the film as your work moves along. Finally, after the film has been applied, to eliminate the stresses created from stretching,, you **must** heat the film to a higher temperature, somewhere between **220° and 250°F**. Move the heat source slowly. Now that the film has been applied you are also heating the body of the vehicle and it takes more heat to achieve the final temperature requirement. The colder the vehicle body is the more heat required to get the film up to a minimum of 220°F. Using a no-touch temperature gauge is strongly recommended to ensure this very important step is done correctly.
7. Edges, seams and trim should now be cut and re-squeegeed to ensure good adhesion. It is a very good idea to also use high heat along these areas to speed up the adhesive build (this is to overcome the repositionability we built into the adhesive for ease of application) and ensure a good final bond. Do not wrap films around 180° turns as this will most likely result in failure. Do not wrap films under the edges of the car or into areas that do not clean well.
8. For over rivets, digital media with an overlamine will tent and this is not considered a reason for failure. To apply, use the same technique as the bridging described above, apply the film over the flat areas, bridging the rivet head. Using an air release

tool or pin, (do NOT use a knife blade as this will result in a cut propagation issue), poke multiple holes around the rivet head to release the air, then using heat and a rivet brush work the film down. Finally apply high heat to release any tension stresses and to 'super-activate' the adhesive to a quick high strength bond. The only proven way to eliminate tenting around rivets with an overlaminated film is to completely cut around the rivet head after application. Rivet head cutters are available from your sign distributor.

9. Mactac's B-Free Digital media employs air egress technology that allows air to flow easily in all directions. This will minimize the need to pop bubbles. However, it is still possible to get an occasional bubble due to our adhesive having very small channels which will completely wet out during the squeegee process. Should a bubble appear use an air release tool or pin to prick the bubble. Do NOT use a knife as this starts a tear which can result in a failure.

Tips and Tricks for Successful Applications

1. Know your surface and its limitations (gaskets, rust, channels)
2. Fill out and submit the vehicle inspection report as **required** for warranty coverage.
3. Provide a controlled environment and a clean vehicle.
4. Always use a sharp knife for trimming (snap-off or replace blades frequently).
5. Use an air release tool, not a knife, to relieve air bubbles.
6. Heated media applied to cold metal will cool quickly. Apply enough heat to do the job correctly and work in small areas.

7. Use heat to soften the film prior to stretching.
8. Use heat to relax the film after it has been stretched into the channels. This also allows the adhesive to build to a high bond quickly.
9. Seams and edges are common failure points. Be sure that edges are clean and dry. Cut all seams and then heat and re-burnish all edges to insure a good bond.
10. Do not over-heat or over-stretch the graphic media. Channels that result in the film being stretched too far must be cut.
11. After all the film has been applied, go back and using a heat gun, apply heat to the graphic to a high temperature, **220° to 250°F**, (use a hand-held thermometer to make sure you reach the minimum temperature!) in the areas the vinyl has been stretched to relieve stresses created by stretching. In the case of the **JT5529BFD Pro and Gruv 929BFD**, this step not only relieves stresses but creates a new memory in the film.
12. **Trimming and Finishing Windows:** Window trimming needs special care depending on the type of window you are marking:
 - a) Contact with Rubber Window Seals will cause the adhesive to fail. Therefore, graphics need to be trimmed off the rubber seals by 1/8 inch minimum.
 - b) Windows with beveled edges need to have the graphic trimmed away from the edge at a 45° angle to eliminate a hard edge that is easily peeled back.

Removal:

1. **Removing JT5529BFD Pro:** Heat the vinyl to approx. 160° - 180°F using a heat gun or propane torch or a weed burner for large



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areas (be careful not to burn the vinyl or the substrate). Pull off the film in small pieces. Listen to the sound of the vinyl as it's pulled off. The noise level will increase as the vinyl and adhesive cools. At a certain level (experience is the best teacher) you will know when it is time to re-heat. This will help you prevent paint failure as you pull the graphic off. Any adhesive residue can be removed using a towel soaked in alcohol or other commercially available adhesive remover. *Be sure to follow manufacturer's directions and use personal protective gear.*

Application Examination Checklist

All vehicles must be inspected prior to application to identify any possible problem areas. These are areas that will result in adhesion problems or areas that may result in paint damage upon graphic removal. Note the areas on the attached inspection templates and have the templates signed by the applicator and the vehicle owner. These noted problem areas will not be covered under any Mactac warranty.

It is the graphic printer's responsibility to ensure the necessary signatures are obtained and

IMPORTANT NOTICE: The information given and the recommendations made herein are based on our research and are believed to be accurate, but no guarantee of their accuracy or completeness is made. In every case, user shall determine before using any product in full scale production, or in any way, whether such product is suitable for user's intended use for their particular purpose under their own operating conditions. User assumes all risk and liability whatsoever in connection with their use of any product. The products discussed herein are sold without any warranty as to merchantability or fitness for a particular purpose, or any other warranty, express or implied. No representative of ours has any authority to waive or change the foregoing provisions, and no statement or recommendation not contained herein shall have any force of effect unless in an agreement signed by the officers of seller and manufacturer. Nothing contained herein shall be construed to imply the nonexistence of any relevant patents or to constitute a permission, inducement or recommendation to practice any invention covered by any patent without authority from the owner of the patent. The following is made in lieu of all warranties, express or implied: Seller's and manufacturer's only obligation shall be to replace or credit such quantity of the product proved to be defective at its discretion.

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submitted to Mactac for warranty consideration.

- 1) Inspect vehicle and locate any potential 'problem' areas.
- 2) Locate and mark the correct template where there is chipped paint, rust spots, dents, deep scratches, etc.
- 3) Note any areas where the vehicles have been re-painted. Check these areas for paint anchorage using a strip of an aggressive tape and a squeegee.
- 4) Confirm surface temperature and record.
- 5) Submit completed inspection report to Mactac Graphics Technical Marketing Manager. You can fax it to Mactac @ 330.686.3950, or e-mail to ijstadelman@mactac.com or mail it to:

MACtac Graphics
C/o Technical Marketing Manager
4560 Darrow Rd.
Stow, OH 44224-1898

