

Technical bulletin 4.17 "The Anatomy of a Great Wrap"

It is well known in the industry that vehicle wraps are in vogue. However, if you look at ten different wraps done by ten different installers you're going to see a great deal of variation in quality, attention to detail, and ultimately the finished product. Taking the time to do a good job is the easy part. Knowing the tricks that make up the anatomy of a great wrap may not be as clear.

From graphic design, to vehicle preparation, to knowing the necessary tools to have on hand there is knowledge to gain that will make every applicator better. If we can share that knowledge we will increase the credibility of the application craft, and in turn ensure that all vehicle wraps are works of art.

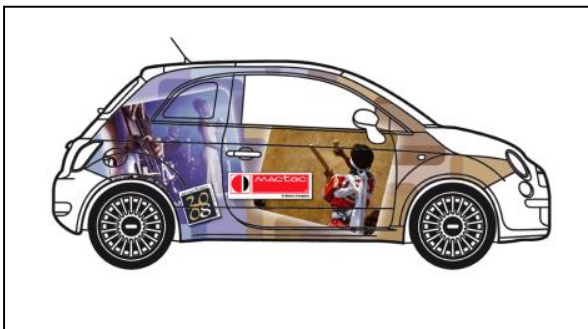


To design a great wrap it is extremely important for the designer to have a good understanding of the vehicle wrap process. By no means do they need to be an expert, but basic fundamentals are necessary to the success of the completed wrap.

There are several obstacles involved with a good application that the designer needs to be aware of:

1. Vehicle Shape:

- The design of the graphics should complement the body lines of the vehicle.
- The designer should be familiar with the shapes and measurements of the vehicle in a three dimensional format before design starts. Using an image of the actual vehicle is recommended as there can be many variants.
- When there are very prominent, complex door handles or other recesses that require extra vinyl, have extra material printed.



2. Graphic Elements:

- Messaging should be the focal point of the design. Place all messaging in visible, unobstructed areas.
- Corners and adjoining side panels require particular attention in order to flow with the design.



3. Creation & printing:

The graphics need to be printed properly, with the correct amount of ink saturation.

Precautions for printing JT5000 films:

Point 1 : Always use the corresponding media-printer-ink-rip ICC profile before starting a print job.

Media profiles can be found on our website www.mactacdigital.com, section Media Profiles and Printer Settings Library, or through our Partners : OEM's and Distributors.

ICC profiling:

- Colour can be measured and controlled: this process is called ICC profiling.
- What? A worldwide accepted Industry Standard for Colour Management.
- Why? It allows obtaining the maximal colour range from the printer for each media, ink type and print resolution versus a non profiled print i.e. it improves the output result from the printer.

As such, ICC profiling can be considered a colour correction software programme.



Aim : consistent colours over all devices and as close as possible to the Original.

- A print reflects an original image through a necessarily limited number of dots printed on the media using standard process CMYK inks.
- The RIP (Raster Image Processor) creates the raster file needed for printing into dots and drives the printing equipment.
- Printing is always a compromise between input (scanner, digital camera etc) and output devices (printer, proofing equipment etc). Colour reading characteristics of input and output devices have to match as close as possible. Therefore they need to be "profiled".
- How is it done? ICC profiling is a three step process:
 - 1° Linearization (to standardize the colour output by equalizing the steps between specified ink densities).
 - 2° Measuring the Ink Limits of the Media (or the maximum amount the media can hold).
 - 3° Profiling using ICC profile creation software.

Point 2 : Don't take shortcuts when drying graphics!

- *Solvents cause the graphic to become soft and stretchy and the adhesive may become too aggressive. This may result in edge curling, shrinkage, media lifting from the substrate and adhesive transfer.
- *It is recommended to use an auxiliary dryer or air drying for at least 48h.
 - *Extended air drying **MUST** be considered on the UNROLLED graphic if total ink coverage is 300% or more.
 - *Solvent retention may significantly affect post-printing operations & handling!

Cold air flow by means of an air blower mounted at the bottom of the cylinder

Air drying at room t°



Or use additional drying equipment on the printer:



4. Protect the print before Application

Prints must be protected before application on the car body/ commercial vehicle.

Why overlaminate?

Effect - Gloss sharpens colors and contrast, Matt softens colors and contrasts, good at hiding imperfections, good for interior applications as it minimizes glare of in-store lighting.

Protection - Protects print from scratches, chemicals and graffiti.

Durability - Some overlaminates contain UV inhibitors and protect inks against color fading.

Application - Make prints more rigid, easier to apply.

Liquid lamination can be an option in some specific cases but is more limited for long-term protection and durability.

5. Vehicle Preparation

It is essential to have the vehicle cleaned properly before beginning to apply the media.

There are several kinds of surface contamination:

-**Organic Contaminates**: dirt, bug spatters, bird droppings, tree sap, spilled food, etc.

-**Petrochemical Contaminates**: (petroleum based): wax, road tar, grease, oils, gasoline, water pollution, etc.

-**Atmospheric pollution**

And therefore, even if they appear clean, substrates must be cleaned:

- **Step 1** Wash area with soap and water.
- **Step 2** Clean the area with a petrochemical based solvent cleaner : Isopropyl alcohol is a good choice. Use a soft *clean* towel.
- **Rivets and Seams need to dry!**
 - Trapped moisture in these complex areas take much longer to dry.
 - Heat from an Industrial Heat Gun can speed up the process.

- Pay extra attention to cleaning around door jams and seals. As any dirt can result in the vinyl not staying in place.

Other preparation factors that can make a great wrap include **removal of parts**.

It may be easy to cut around some parts but a good wrap can become a great wrap by removing them prior to application. The time taken to remove these items can easily be made up during installation if you keep the parts well organized.

Recommended part removal:

Wipers
Washer Nozzles
Lights
Side Mirrors
Antennas
License Plates



Testing Fitting the Graphics: -All panels should be test fitted before starting to check for proper design alignment and to verify all components.

6. Tools

When you are ready to apply, another key component to a great wrap is having the right tools. While there are many obvious items needed, like multiple squeegees, razor knife, bubble releaser, and heat guns, there are several others that are becoming more popular.



Emblem Remover: A very small pry bar with felt on one side can be useful to remove all adhesive backed emblems without harming the vehicle.

Magnets: Two or three small tape wrapped magnets will allow for the graphics to be aligned properly without having to continuously pull tape, and will not damage the painted surface.

Grease Pencils: Can be used for registering adjoining graphics by putting hash marks along edges.

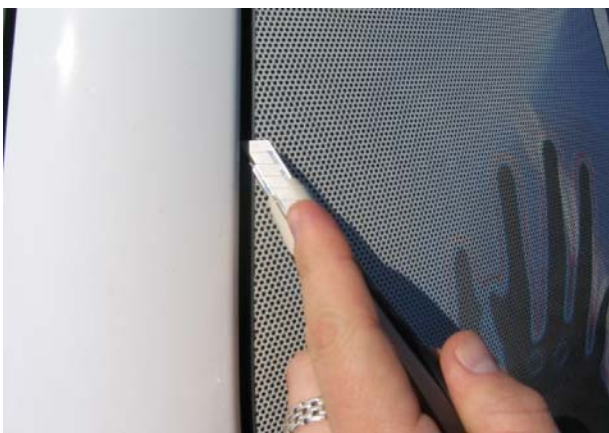
Self-Igniting Torch: When used properly, a propane torch can add a great deal of heat very quickly allowing for an easier more fluid application.

Squeegee: A hard plastic squeegee with an added piece of velvet ribbon along one edge. It is recommended to replace the ribbon after each side of the vehicle has been completed.

7. Trimming Techniques

There are several small cutting techniques that will facilitate a successful wrap. Proper trimming not only helps the finished product look great, but also helps it survive. Even though most people will never see the trimmed edges it is important that they are treated equal to the rest of the graphic.

Glass Trimming: When trimming window perforation on glass it is very important to keep the blade even to the glass edge because most vehicle glass has a beveled and frosted edge that adhesive will not stick to.



Tucking Body Edges: When trimming around door seams, the graphic can be trimmed right to the front edge as long as the media is not under stress, and not facing the front of the vehicle.



If the surface is curved or is susceptible to weather/wind it should be tucked approximately 5mm around the edges. This is where extra attention to cleaning around the edges and seals of the vehicle brings results and helps to reduce the chance of the vinyl lifting.



Patching: For complex curved areas that prohibit the media from conforming, a patch should be printed of the area. -Patches should be done prior to application of large areas whenever possible to create less resistance to lifting.



8. Heating Techniques

The final component to a successful installation is using proper heating techniques, necessary to ensure the integrity of the media. In order to warranty the duration of the product, heat has to be utilized in one manner or another.

Stretching: Without heat, stretching the vinyl around curves will cause failure over time. At the same time, too much heat will cause weaknesses in the media also resulting in failure. It is very important to use heat to relax the media, but just as important to let it cool to a point that provides as little stretch as necessary, or as some would say: never stretch unless you have to.



Post Heating or stabilization of the media: This is the one crucial step that is dependent on the installer for adhesion and proper sealing. All edges and trimmed areas require a post heating of at least 220°C (air temperature) or 95°C on the surface of the vinyl/vehicle. For the greatest precision use a good heat gun and an infrared thermometer. Good installers will agree that this step may be a bit more time consuming, but it will insure the length of the wrap.

9. Applying the Graphics

For car wraps or any other full three-dimensional surface, only the dry application method must be used. Dry application is a safer application method because the Graphic reaches its final adhesion more quickly than if water & soap would be used.

With bubble free products (MACTac B-Free series), given the low initial surface contact, the dry application method is a must! In this case, tiny entrapped air bubbles can easily be removed by pushing out the air with the thumb or a soft squeegee.

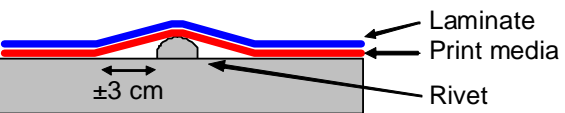
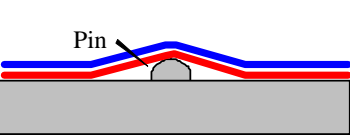
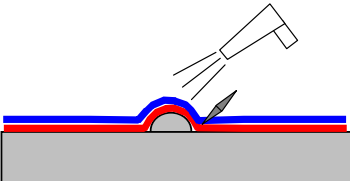
Never apply a Graphic below the minimum application temperature (indicated on the Technical Data Sheets). Cars, vans or trucks should be decorated within a workshop/fitting bay to ensure correct application and adhesion build-up of the Graphic on the vehicle before it is released into the Traffic.

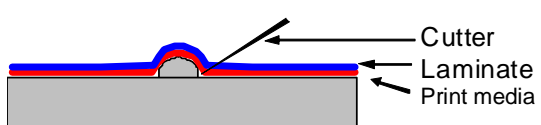
9.1. Products for full car wraps

Printing media	Laminating films	Remarks
JT 5529 P/PM/MBF	LUV 3399 LF 3398	Highly conformable & compatible with UV inks Matt soft touch finish
JT 5629 PM	LF 3499 LF 3599	Conformable, economical Long durability ; not over corrugations/rivets

9.2. Three-dimensional surfaces: rivets

Products : see 9.1

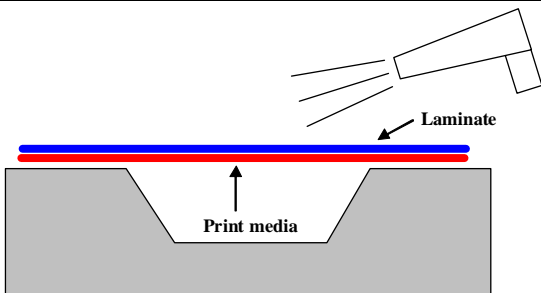
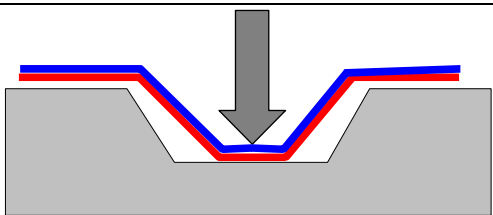
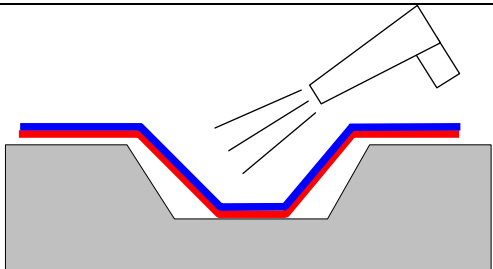
1.	 <p>Laminate Print media Rivet ±3 cm</p>	Apply using the dry method described earlier, to the whole area of the surface of application, leaving a ±3 cm gap between the vinyl and the substrate, around rivets.
2.	 <p>Pin</p>	Collect the bubble around the rivet without putting the vinyl out of shape. Prick several holes in the vinyl around the rivet.
3.		Squeeze out any air trapped between the vinyl and the rivet using your finger. Press the vinyl down hard around the rivet using a plastic squeegee and a hot air gun (air temperature of ±300°C). Surface t° 45 to 60°C

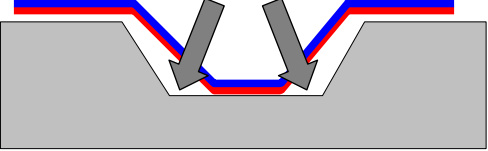
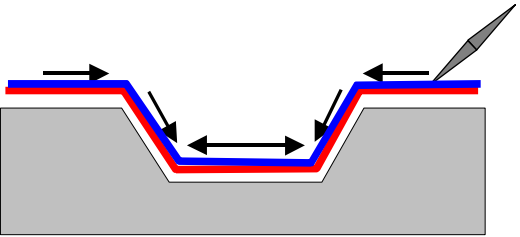
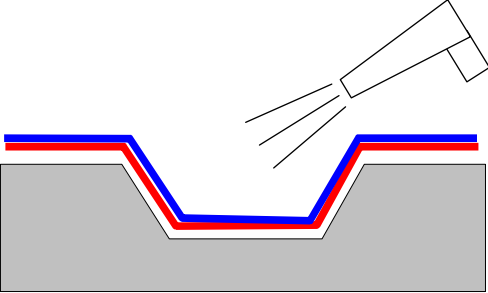
4.		Finish off by cutting the vinyl around the rivet using a cutter.
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Remark : Using BF series instead of the 'classic' self-adhesive car wrap film, increases productivity during the application job. The micro-structured repositionable adhesive system allows the installer to remove and re-apply the decals during the job. It is possible to press out small entrapped air bubbles with ease! **A real time saver on the application job.**

9.3. Three-dimensional surfaces : corrugations

Products : see9.1.

1.		Heat the complex with an industrial hot air gun (air temperature: 250°C). The vinyl itself must reach a temperature of $\pm 60^{\circ}\text{C}$. At this temperature, the adhesive will be "activated". This will help to reach 100% of its sticking capacity to the surface. NB: Take care not to burn the vinyl. Use quick movements with the industrial hot air gun, keeping it ± 20 cm away from the vinyl.
2.		Press the vinyl into the corrugation using your finger.
3.		Heat any areas that have not yet come into contact with the substrate.

<p>4.</p> 	<p>Press down once more using your finger.</p>
<p>5.</p> 	<p>Once the vinyl comes into contact with the surface, press firmly using a plastic squeegee. This point is essential to increase the initial adhesion and to avoid lifting. Prick any air bubbles that appear.</p>
<p>6.</p> 	<p>Once 100% of the vinyl is in contact with the surface, heat it one last time (air temperature: 600-650°C, distance 4-5cm). This reinforces the initial adhesion. The decoration should not be exposed to temperatures lower than 10°C during the first 3-4 hours. Ideally, at 10°C and below, (the lower the t° the greater the danger), the vehicle should be left in the workshop, thus avoiding thermal shock to the vinyl and increased risk of the graphics failing in the recesses.</p>

9.4. Important remarks:

1. Limits to the elongation properties of JT print media

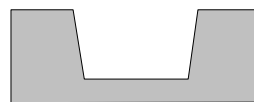
Depth of the corrugation:



Easy application

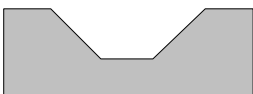


Difficult application

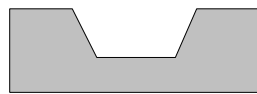


Very difficult application

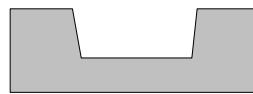
Angle of the corrugation:



Easy application



Difficult application



Very difficult application

2. **The chemical nature and the surface tension of the paint system** used on the substrate will influence the final adhesion.
3. **Age of the paint:** the older the paint, the better the adhesion but the higher the risk of paint damage once the vinyl is removed at the end of the application period.
4. **Paint surface aspect** (smooth, rough).

10. Cleaning vehicles

To best preserve vehicle graphics throughout a campaign, the ideal way to clean is by hand with a sponge. However, it is not a problem to clean a car decorated with MACtac films through a brush or brushless car wash.

Some guidelines should be followed to decrease the risks of damage or lifting:

- Ensure all edges are properly fitted.
- Wait at least one week after application before cleaning. This gives the adhesive time to reach its ultimate adhesion value.

The brushless car wash presents more of a danger to graphics. In this case:

- The water temperature should not be too high (ideally 30-40°C). Too high a temperature will reduce adhesion.
- the distance between the cleaning machine and the graphic should be higher than 60 cm,
- the pressure should be 100-120 bars as too high a pressure could lift the graphic.
- the water jet impact angle **must** be higher than 45°C. If you attack the edge of a graphic with high pressure and with a small angle, you have a high risk of getting edge lifting with any self adhesive product.

Several Demo films from MACtac on car wrapping exist and are available upon request.

Please also see the video section on our web site or surf to YouTube or Dailymotion.

The Final Result: *GRAPHICS THAT ROCK !!!!!!!!!!!!!!!*

