



## Product Technical Bulletin

### ORAJET® Series 3951 Professional Wrapping Cast Inkjet Media Release 1, Effective May 2006

#### Description

High-performance ORAJET® Series 3951 Professional Wrapping Film has been specially developed for vehicle wraps that require the highest degree of durability, conformability and performance. Engineered to be highly conformable, repositionable and removable with no adhesive residue for up to four years after installation, 2-mil, 10-year Series 3951 features a smooth, ultra-glossy surface to produce vivid, life-like prints.

Series 3951 is designed to be used in combination with ORAGUARD® Series 290 laminating film, resulting in the CommandForm™ Wrapping System, the industry's top-performing matched materials system for vehicle wraps and other complex surface installations. The combination of these two films provides ease of handling, extended UV protection (up to four additional years) for printed images, and the strength and durability needed to withstand abrasions and fading from road debris, chemicals and automatic car washes.

#### Product Data

##### Construction

*This information is subject to change. Please ensure you are referencing the most recent Product Bulletin.*

- **Face Film** – 2-mil cast film
- **Adhesive** – Grey, solvent-based, repositionable, permanent
- **Liner** – 80-lb. silicone-coated paper liner

##### Physical Properties

The information stated below is based on testing results and intended solely as an information source. These values are given without guarantee and no warranty is implied or expressed. Oracal recommends the purchaser conduct independent tests prior to use in order to determine suitability for his/her intended application.

Outdoor Durability <sup>1</sup>	10 years
Application Surface Contours	Uneven surfaces, complex curves, rivets and corrugations
Minimum Surface/Air Application Temperature	+50° F
Temperature Resistance	Adhered to aluminum, -58° F to +230° F no variation

Resistance to Solvents and Chemicals	After 72h adhered to aluminum at room temperature, short-term resistant to most oils and greases, fuels, aliphatic solvents, weak acids, salts and alkalis
Shelf Life	2 years (68°F/50% relative humidity)
Adhesive Power	(FINAT-TM 1, after 24h average) adhered to stainless steel, 4.1 lb/in <sup>2</sup>
Tensile Strength (along)	(DIN EN ISO 527) min.19 MPa
Tensile Strength (across)	(DIN EN ISO 527) min.19 MPa
Elongation at Break (along)	(DIN EN ISO 527) min. 120%
Elongation at Break (across)	(DIN EN ISO 527) min. 120%
Dimensional Stability	(FINAT-TM 14) adhered to steel, no shrinkage in cross direction, in length <.004" max

<sup>1</sup> Applies to graphics created using unprinted, unlaminated film with no UV inhibitors and installed with vertical exposure within 10°. In certain climates, some color fade will occur.

## Compatible Substrates

- Acrylic
- Aluminum
- Glass (uncoated)
- Painted metal
- Polycarbonate<sup>2</sup>
- Rigid vinyl
- PETG
- Smooth, non-porous, painted surfaces

<sup>2</sup> Refer to manufacturer's suggestions on the processing and handling of this material. Ensure that the graphics are applied to the proper side of the material.

## Application Methods

### Dry or Wet Application

There are two major methods of application – dry and wet adhesion. The initial steps for either application method are as follows:

### Preparing the Surface

When using materials that tend to outgas, such as polycarbonate or polystyrene products, we recommend the following steps:

1. Clean the surface, mount a piece of film to it, and store at 140° F for 24 hours.
2. If bubbles form after 24 hours, outgassing is still occurring. Either treat the plastic with a heat source or store it for an extended period at room temperature conditions in order to cure the substrate prior to application of the vinyl.

The high-quality special adhesives used on Oracal pressure-sensitive films create an excellent bond with most clean, smooth, weather-resistant surfaces that are free of grease, dust or any contaminants. For a long-lasting bond, the target surfaces must be properly prepared. ***Be sure to check the directions provided by the manufacturer of the substrate you are using to determine the recommended cleaning method for that surface.*** Gas bubbles may form between the film and the surface if any solvent residue remains as a result of improper cleaning or if paint on the surface is too fresh. Freshly lacquered or painted surfaces should be allowed to stand for at least three weeks after complete curing before adhering the film. *The compatibility of selected lacquers and paints should be tested by the end-user prior to use.*

### **Application Temperatures**

Oracal films should never be adhered at temperatures below 46° F. Newly fabricated sign faces should remain in the application environment for at least 24 hours to promote uniform adhesion characteristics and allow any residual moisture to evaporate. A significant drop in temperature should be avoided during the first 24 hours after adhesion.

### **Removing the Release Liner**

Lay the cut film on a flat surface with the film side down. Pull back only as much release liner as required to begin mounting. Always draw the release liner from the film, never the other way around.

### **Dry Application**

For dry adhesion, we recommend using a high-tack application tape.

1. Arrange the cut film on the surface to which it is to be adhered and press it firmly to the surface at one corner.
2. Adhere the remainder by sweeping a plastic squeegee across the film in an overlapping motion.
3. Depending on the size of the cut film being mounted, the release liner may be removed completely before bonding or gradually during the adhering procedure.
4. When using ORATAPE masking tape, pull slowly away from the film at a 180° angle. If needed, the top of the masking tape can be lightly sprayed with water to allow for easier release from the graphic.

### **Wet Application**

*Recommended for large applications. Wet adhesion should only be done in ambient temperature environments of at least 70° F.*

1. Prepare Application Fluid – For best results, use a prepared application fluid that is designed for use with vinyl sign materials.
2. Clean and Prepare the Substrate – Clean flexible face materials using the prepared application fluid described in Step 1. **Never use alcohol to clean acrylic or polycarbonate.**

### 3. Film Application for Full-Coverage Sign Faces

- a. Lay the substrate face up on a clean surface.
- b. Spray the substrate with prepared application fluid.
- c. Wipe off the film with a clean, lint-free cloth.
- d. Lay the film, liner side up, in a dry location near the wetted surface.
- e. Spray the exposed adhesive side with application fluid and place it on the substrate.
- f. Position the cut film where you want it. The wet application method allows for more precise positioning of film.
- g. Squeegee the film to the surface using sweeping, overlapping motions. Be certain that there is no water left between the substrate and adhesive to avoid bubbles and ensure a positive bond.

For wet adhesion, we recommend using a medium-tack application tape. After a short drying period, remove the application tape carefully at a 180° angle.

#### **Application Tips**

- Seams can be made using the overlap method. It is recommended that overlaps and seams measure no more than 1/8".
- Puncture air bubbles with an air release tool. Do not use a knife or razor.
- If using application tape, always remove it at a 180° angle and immediately re-squeegee the film.
- Cutbacks should be performed soon after application as adhesion builds with time.

## **Practical Information and Tips for Installing Vehicle Wraps**

### **Before Application**

The first step to any graphic application is cleaning the substrate. For a vehicle wrap, the day before film application, the car should be taken to a car wash that uses brushes. Manual cleaning is not recommended.

After the car is washed, thoroughly inspect the surface and edges for any remaining wax, polish, grease or grime. Any such substances must be removed using industrial cleaners or silicone detergents (isopropyl alcohol will not do the trick). **CAUTION:** Before using any solvent on a vehicle, be sure to test in an inconspicuous area to ensure the solvent won't damage the vehicle's paint. A final cleaning should be done with isopropyl alcohol to clean away any leftover impurities that could hinder the adhesive.

The next step is to remove any parts that may hamper the application (mirrors, trims, wiper blades, etc.). Check and clean the covered surfaces as described above.

It is very important to allow the vehicle to dry completely. It can take up to 24 hours for a vehicle to dry fully, especially in humid or cold conditions, which may mean allowing the vehicle to dry indoors overnight before applying.

## Recommended Installation Conditions

Whenever possible, try to apply graphics indoors in a controlled environment, such as a covered car bay or garage. Doing so will not only help you control the temperature (ideally between 71°F and 73°F), but also reduce the amount of wind, dust and other contaminants that may hinder the install process. Make sure your bay or garage is as clean as possible from dust or debris that may happen to circulate during your install (mop floor and dust with damp cloth prior to application) before bringing in the vehicle.

## Necessary Tools

- Low-tack masking tape—for positioning if laminate is not being used
- Felt-tipped squeegee—for applying the graphic
- Hobby knife (OLFA or XACTO knife)—for trimming away excess vinyl
- Air release tool—for removing air bubbles
- Rivet brush—for installation over rivets
- Heat gun—for heating the vinyl on complicated applications

## Application of the Film

***VERY IMPORTANT:*** When performing a vehicle wrap you should start with the back of the vehicle first, then work your way to the front. This ensures that when you are driving the vehicle, the wind will not peel up the installed graphic. For boat wraps, work horizontally starting at the bottom so that water will drain off of the film.

Position the film to be applied and secure it to the car with small pieces of masking tape. Make sure that the film rises at least two inches past the edge of where the film is to be applied.

Lift the graphic from one side, slowly remove the backing paper from the film and stretch it equally over the part to be wrapped (For larger prints, you may only want to remove half of the release liner and lay the graphic up to it, then proceed with the rest of the graphic).

Apply the film with a felt tip squeegee, using short, overlapping swipes. For rounded surfaces such as wings and tightly curved panels, work small sections at a time, using a heat gun to evenly heat the film. Cut and fold edges only after the film has cooled. Trim the film on the car to ensure a proper fit. A printed piece of 60" film usually works best with transit applications (buses and panel trucks), whereas 48"-54" films typically work for passenger vehicle applications. Trimming your graphic correctly is the most important part of the install, so pay extra attention to detail when performing this task. To avoid shrinking of the film or mechanical wear on the open cutting edge (through cleaning brushes, wind, etc.) do not cut the film flush with car edges. Remove any elements, such as mirrors or wiper blades that would force you to make extra cuts or unnecessary marks in the vinyl.

***IMPORTANT:*** Any deep-drawn areas, borders and edges should be carefully reheated with a heat gun in order to quickly activate the adhesive. In case of deep corrugations, reheating the area to almost production temperature of the film (approximately 356°F) is recommended. While this temperature seems very high, it is necessary to achieve the required migration of softeners needed to harden the film in these areas of the car. This

*temperature will not damage the adhesive substance or the vehicle's paint. Specialized shops offer infrared thermometers, which allow exact measuring of the underground temperature. Move heat gun constantly to avoid damage to the film.*

When the wrapping is finished, if necessary, reheat all borders, edges and corrugations again with a heat gun. If you notice any tiny air bubbles under the film, don't panic—remaining tiny air bubbles under the film will diffuse through the film within a few days depending on the ambient temperature. Only larger bubbles should be slightly punctured by an air release tool and the air squeezed out with a squeegee.

### **Unpainted Plastic Parts**

Be careful when applying the film to unpainted plastic parts of the car. If in doubt, use the water drop test. If the water continues to run off in drops after the cleaning procedure described above, it is not advisable to apply the film. If the water runs off without marked drop formation, the film can be applied to the plastic surface. In any case, such surface should also be completely smooth since no film will stick to a structured surface for long.

### **After Finishing the Application**

After three days, the film will be adhered so tightly that you can take the car through a car wash without any problems. Polish shouldn't be applied to the car for at least three weeks after wrapping, so as not to close the fine pores of the film, allowing air bubbles to diffuse. Only wax-free, silicone or Teflon polishes should be used on plastic surfaces. No high-pressure cleaning or caustic chemicals should be used for cleaning the car.

### **Warranty**

Oracal USA warrants its pressure-sensitive vinyl films to be free of defects in materials and manufacture, and to perform as stated in published product technical information bulletins if properly stored and applied. Oracal USA will, at its discretion, either replace defective material or refund the purchase price of any ORACAL®, ORAJET®, ORAGUARD®, ORALITE® or ORAMASK® materials that do not meet this warranty within the specified effective performance life. The customer assumes responsibility in determining product suitability for intended use. Oracal USA shall not be liable for any direct, indirect or consequential damages arising from the use or inability to use the product. This warranty is declared in lieu of any other claim, whether expressed or implied, and is not subject to interpretation.

If you are in extreme climate zones (Southwestern United States, desert, tropics, etc.), South America, Latin America or the Caribbean, contact Oracal USA for specific warranty information for your area.

### **Shipping, Storage, Shelf Life**

- Film must be stored at 68° F/50% relative humidity.
- For optimal product quality and performance, film must be stored in a dry, clean area, out of direct sunlight.

- Before processing, self-adhesive films should be acclimated for 24 hours to the humidity and temperature prevailing in the processing area. Extreme variations between storage and processing conditions could cause the protective paper to shrink or expand, leading to insufficient flatness of the self-adhesive material and dimensional changes in the cuts.
- Shelf life of Oracal® Series 8500F must not exceed two years from the date it is received from Oracal USA.

## Contact Us

Oracal USA offers unparalleled support for all of our technologically advanced self-adhesive products. If you have any questions or comments about Oracal films, please contact our Technical Support team:

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