General Information

This document refers to the following ORAFOL vehicle livery products; ORALITE® VC 110, ORALITE® VC 311 / VC 312 / VC 312R Daybright®, ORALITE® VC 309 / VC 310 Durabright®, ORALITE® VC 212 Hi-Performance, and ORALITE® VC 30710+ (for the remainder of this document referred to as ORAFOL livery film). These films are tough, weather and solvent resistant products designed for graphics applications on vehicles. They are easy to apply to smooth painted or unpainted vehicle surfaces. For more information, please reference the Technical Product Bulletins, which are available from your local customer service agent or on our website. Read carefully through the full application instructions before commencing the application process. For information on ORALITE® VC 612 (ideal for curved surfaces) see the application instruction, specific to that product.

Before Application

Step 1: Templating

The material conforms to flat or simple shallow curved surfaces (single radius). It is not suitable for use on complex curves (where the surface bends in two directions) as it is not stretchable. Although it may conform on initial application, it is liable to lift after one to two weeks. Complex curves can be avoided by templating smaller pieces that will be butt jointed giving the appearance of one single piece. Please see Annex 1 for more information.

Step 2: Cutting

Manual cutting

The material can be easily cut with a sharp knife or a rotary trimmer. When using a knife, hold the knife at an angle of 45 degrees from the surface. This leaves the tape with a slightly recessed edge, which prevents lifting of the edge during mechanical or power washing. Cutting on the vehicle is not recommended.

Plotter cutting

Below are suggestions of parameters to be used with selected equipment.

Equipment : Summa S120 T Series

Film	Programme	Blades	Speed (mm/s)	Pressure* (g)	# of passes
VC 110, VC 311, VC 312 (non fluorescent), VC 309, VC 310, VC 212, VC 30710+	Flexicut	Double etch T (390-551)	100	240	1
VC 312 Fluorescent	Flexicut	60° T Blade (390-550)	100	360	1

*) Pressure can be changed as the blades wear out

Equipment: SummaSign Pro T1400

Film	Programme	Blades	Speed (mm/s)	Pressure* (g)	# de passes
VC 312 Fluorescent	Winplot 6	60° T Blade(390-550)	100	600	1
VC 312 Fluorescent	Winplot 6	Double etch T (390-551)	200	400	2

*) Pressure can be changed as the blades wear out

The above equipments and settings are suggestions based on ORAFOL's laboratory tests and field use; there are a number of satisfactory plotters on the market that are not listed among our recommendations. The user should test the chosen equipment for the best parameters to be used.

Edge sealing after cutting
This is not necessary after cutting, as the film is not an open cell structure material.

Tape corners
It is recommended that where possible the square edges be rounded to give improved cosmetics and to minimise risk of corners being lifted by mechanical and power washers. Minimum recommended radius is 5 mm.

Step 3: Substrate preparation

The user is responsible for determining whether the ORALITE® product is fit for a particular purpose and is suitable for the user's application. **Users are urged to carefully evaluate substrates for material adhesion and compatibility.** Listed below are guidelines for selected substrates. Material failures caused by the substrate or improper surface preparations are not the responsibility of ORAFOL (Please contact ORAFOL on reflective.solutions@orafol.de for any further information required).

Two-part polyurethane paints

Two-part polyurethane paints must be cured before applying ORAFOL livery film. If the paint is not properly cured, outgassing will cause bubbles to form under the applied material and the adhesive will not adhere adequately. ORAFOL recommends testing for outgassing prior to applying ORAFOL sheeting. For drying times, paint manufacturers' guidelines are to be followed in all instances. While most paints are usually touch-dry within a few hours, dependent upon the primer, paint mixture and thickness, proper curing may take significantly longer, up to one week.

GRP (Glass Reinforced Plastics) and/or gelcoated surfaces

Similar guidelines to the above will apply for composite materials such as GRP substrates and/or gelcoated surfaces, in that the substrate must be properly and fully cured before applying, otherwise outgassing may result.

Stainless Steel

ORAFOL products may be used on stainless steel when used with the correct pressure sensitive adhesive.

Outgassing plastics

Polycarbonates, polyprenes and other plastics can interact with the environment absorbing or outgassing moisture, or outgassing processing aids and solvent carriers for additives, which might cause the formation of bubbles on the film. Preliminary tests are essential to ensure that no adverse effects arise from this interaction.

Step 4: Surface cleaning

Successful adhesive bonding always starts with surface preparation. To achieve a strong and permanent bond, it is important to remove all contaminants so as to provide a smooth, clean and dry surface before applying the adhesive. The surface must be thoroughly cleaned of all grease, road film and any other materials that will affect the adhesive bond. Use a clean cloth with isopropyl alcohol to wipe the surface in one direction only to avoid spreading contamination. Best results are achieved by removing old paint chips, burrs etc.

Step 5: Application temperature

The recommended application temperature range to achieve the best results is between 15° C to 38° C. Surfaces should be warmed up in order to achieve optimum substrate temperatures. Ensure both substrate and film are at the optimum temperatures.

Application

Step 6: Choosing wet or dry method

ORAFOL recommends either the wet or dry method to apply ORAFOL livery films. If the wet method is used it is essential that attention is given to ensuring excess water is removed and edges re-squeegeed.

For more information on the dry method, please refer to Annex 2.

For more information on the wet method, please refer to Annex 3.

NOTE! It is important not to touch the adhesive side of the material during application

Do's and don't's

Concave surfaces

The film should not be applied onto surfaces bending in two directions. If the surface is slightly concave in one direction only, make sure that the squeegee is bending in such a way as to provide correct contact and enough pressure between the film and the substrate.

Butt Joints

When more than one piece of reflective material is required to form a continuous marking on a substrate, pieces should be butt jointed and not over-lapped onto one another.

Application to corners / edges

The material should not be applied around corners or edges (e.g. door edge, wheel arch etc). Instead it should be cut back 6 mm (1/4") in front of the edge.

Application of reflective sheeting over reflective sheeting

ORAFOL does not recommend applying any reflective sheeting (e.g. ORALITE® VC 309 / 310 Durabright® or ORALITE® VC 311 / 312 Daybright®) over the sheeting to create a chevron effect or lettering. This practice violates the warranty.

Application of reflective sheeting over vinyl

ORAFOL does not recommend applying ORAFOL livery film over vinyl sheeting. This practice violates the warranty.

Heat application

Do not use any source of heat to apply ORAFOL livery film.

After application

Bonding time

It is recommended that the vehicle is kept at temperatures between 15° C to 38° C for 24 hours to allow the adhesion to build up between the substrate and material before putting the vehicle into service.

Storage of material

Tape rolls should be stored in the box supplied when not in use, sitting on waxed paper squares or circles at each end of the roll. This prevents dirt / particles sticking to the tape edges and protects the roll. Material should be stored in a cool, dry area, preferably at room temperature (18 - 28° C).

Kit material should not be stored face to face. It is recommended to store cut kit material with siliconised slip-sheets in between for protection and to avoid material face to face contact, either folded inwardly or outwardly particularly when stacked and stored.

Painting after application

ORAFOL does not recommend painting on or close to the reflective sheeting, after ORAFOL livery film has been applied to the vehicle. This practice violates the warranty.

Cosmetics

The manufacturing process means that a thin “weld line” appears across the width of the material/tape approximately every 225 mm (9”). This is not a manufacturing flaw and the material cannot be supplied without these lines. For the same reason, an exceptionally thin line may occasionally be seen running the length of the tape/material. This is virtually invisible to the naked eye, when viewed from one meter (3 ft) away

Removal

When removing ORAFOL livery film for repair damage or de-commissioning of vehicles, it is recommended that the tips in Annex 4 are followed.

Care instructions

ORAFOL livery film can be washed manually by brush, cloth or sponge using water, soap or detergent followed by a clean water rinse. If an automatic truck / car wash or standard high-pressure hand spray is used, please follow these recommendations:

- Maximum pressure – 1200 PSI / 80 bar
- Maximum water / wash solution 60˚ C
- 40˚ Nozzle cone opening size should be used
- Cleaning wand or jets to be at no greater angle than 45 degrees from perpendicular to the marking surface
- Hold the cleaning jet a minimum of 60 cm away from the material

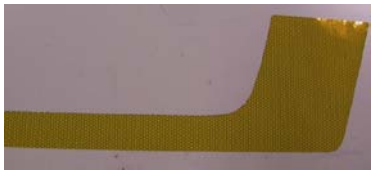
When using cleaners/degreasers, make sure the product is suitable for vehicles and follow the manufacturer’s recommendations for dilution. Thoroughly rinse after soaking vehicle. Prolonged exposure to cleaners/degreasers can in some circumstances affect the material negatively. Prolonged exposure in combination with sunlight can reinforce cleaners/degreasers negative effect.

Do not use solvents to clean the film, as they can adversely affect the product. If soap or detergent does not sufficiently clean the film, VC 312, VC 310 and VC 212 only can be gently rubbed with a cloth soaked in isopropyl alcohol to remove the stains.

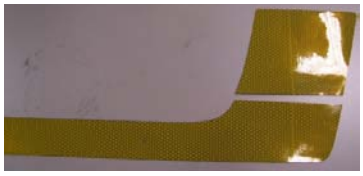
Important: The suitability of the intended care process must be determined by the end user.

ANNEX 1- Templating

The material conforms to flat or simple shallow curved surfaces and it is not suitable for use on complex curves (where the surface bends in two directions) as it is not stretchable. Complex curves can be avoided by templating smaller pieces that will be butt jointed giving the appearance of one single piece. The following procedure is an example of how this can be done.
Original piece which is liable to tunnel or lift when applied on a complex curvature:



The original piece should be cut in such a way as to allow the resulting smaller pieces to be individually applied on simple shallow curved surfaces, avoiding the complex curvature of the surface: Once the piece is cut in smaller parts, they should be applied following the guidelines below:

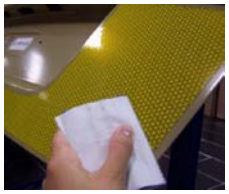


STEP 1:
Squeegee the first part into place ensuring no tunnels have merged.

STEP 2 :
Position the second part and keep it in place with masking tape. Ensure both parts are butt jointed and neither overlapped nor with a gap between them.

STEP 3 :
Squeegee the second piece into place ensuring no tunnels have emerged.

STEP 4 :
Remove remaining masking tape and re-squeegee all edges.



More information on application instructions can be found in Annex 2 and Annex 3.

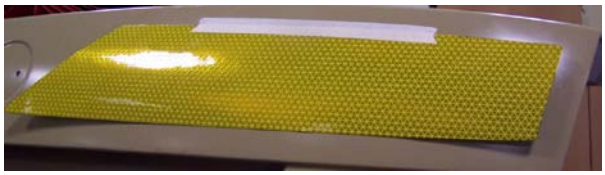
ANNEX 2 – Dry method

After properly preparing and cleaning the substrate, the following items will be necessary to apply the dry method:

- Squeegee with a soft side or a cloth/squeegee sleeve to avoid scratching the film
- Masking tape
- Pair of scissors

NOTE! It is important not to touch the adhesive side of the material during application.

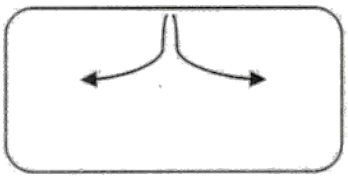
STEP 1:
Position the piece to be applied on the vehicle, with liner still on it, and keep it in place with masking tape securely holding the piece at the top end. Place masking tape so that half the masking tape is on the piece and half will be in contact with the surface. It will serve as a hinge during the application. Ensure that the piece is in the exact desired position.

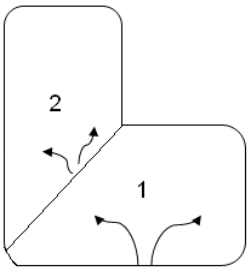


STEP 2:
Remove the liner from one side of the piece and cut the liner at this point.

Apply the film from the middle out to avoid the build-up of tension and reduce the risk of tunneling.

Examples :

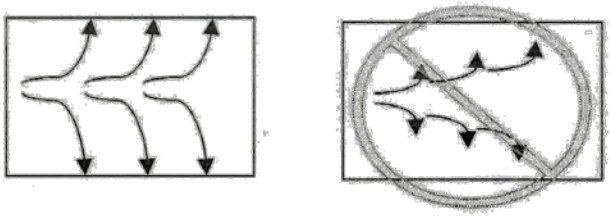




STEP 3: Squeegee piece into place working from the middle out, ensuring no tunnels or bubbles have emerged.

NOTE! The adhesive has a high initial tack and is difficult to reposition after application. Therefore, do not let the tape touch any surface before positioning to the correct location.

Squeegee the film in one movement from the middle to the edge to avoid the formation of bubbles.



STEP 4:
Remove masking tape and the liner from the other side of the piece and pull partially.

STEP 5:
Squeegee from the middle out again, pulling back the liner as the film is applied, ensuring that the film is applied “as it goes”, i.e. it is not forced to any direction.

STEP 6:
Re-squeegee all edges.

ANNEX 3 – Wet method

After properly preparing and cleaning the substrate, the following items will be necessary to apply the wet method:

- Squeegee with a soft side or a cloth/squeegee sleeve to avoid scratching the film
- Application fluid
- Marker pen

The application fluid can be a mixture of 98-99 parts water and 2-1 parts liquid soap. Otherwise ready solutions might also be used. It is the user's responsibility to evaluate the suitability of the application fluid chosen.

STEP 1:
With a marker pen, mark the position where the piece will be applied.

STEP 2:
Remove the liner from the reflective film starting at one corner and pulling up.

STEP 3:
Lightly spray the adhesive side of the film as well as the surface to be applied. Apply the wet film to this surface. The moisture allows for easier positioning.

STEP 4:
Using a squeegee, burnish out soap and water working from the middle in all directions. Wipe away any excess water and allow it to dry, usually 10 minutes or less depending on air and surface temperature.

NOTE! If the film/lettering has masking paper or application tape on top of its surface, remove masking (application tape) by folding a top corner and slowly pulling back, flat against the surface. DO NOT PULL OUTWARD – this could cause letters to lift if not dry enough.

STEP 5:
Gently wipe off alignment marks and allow it to dry thoroughly for a few days before washing or waxing this part of the vehicle. If an air bubble exists after you squeegee, puncture with the corner of a razor or pin and squeegee to the edge.

STEP 6:
After completing this process, re-apply pressure using a squeegee to the edges. Ensure all edges are dry.

ANNEX 4 - Removal

When the need arises to remove ORALITE® livery film, the following tips can help facilitate the task.

- Keep the angle of removal perpendicular (90°) to the surface and pull at a moderate speed:
  – If the angle is more or less, there is greater chance of adhesive transferring from the sheeting to the working surface.
  – The same problem is possible if the tape is removed too slowly. If removed too quickly, the tape may tear or sliver.

- For areas that are difficult to remove, due to increased adhesion, a heat gun may be used to gently warm the adhesive. Optimum temperature will be approximately 35° C. Softening the adhesive will make it less aggressive. Warm the area in a circular pattern and be careful not to leave the heat source in one spot for too long. It could melt the adhesive causing it to release from the sheeting, or worse, damage the painted finish below. Note: removal at warmer temperature increases the potential for adhesive transfer to the working surface.

- With the surface warm, use a wooden applicator or similar (one that will not scratch the working surface) to gently lift the edge of the material. Continue to peel the sheeting at moderate speed.

- If the graphic breaks or tears during the removal process, additional support to the sheeting can be achieved with the use of duct-tape (or similar). Apply the tape over the sheeting, initiate the peeling action again. The added thickness will provide more durability through the peeling process.

- Once the graphic is removed, there may be adhesive residue left behind on the working surface. The residue can often be removed using packing tape or duct-tape. With a repeating motion, dab the adhesive residue with the adhesive side of the packing or duct-tape to pull off the residue.

- Leftover adhesive residue may also be removed with clean-up solvents and adhesive removers. Before use, always review the manufacturer's MSDS and test the surface in an inconspicuous area for compatibility.

IMPORTANT NOTICE