

General Information

ORALITE® VC 412RA Ecoflex™ / ORALITE® VC 612 Flexibright™, ORALITE® VC 612RA Flexibright™, ORALITE® VC 612RA Flexibright™ Imagine and ORALITE® VC 612 Fleet Marking Grade (for the rest of this document referred to just as VC 412RA Ecoflex / VC 612 / VC 612RA Flexibright / Fleet Marking Grade) are tough, weather and solvent resistant products designed for graphics applications on vehicles. They are easy to apply to smooth painted or unpainted surfaces. Moreover, VC 612 is available with different adhesives ranging from high tack, for instant binding to low tack for superior repositionability. For more information, please reference the Technical Product Bulletin, which is available from local ORAFOL offices. Read carefully through the full application instructions before commencing the application process.

1. Maximum service life

The service life specified in the technical data sheets is the maximum service life achieved only for vertical outdoor exposure under normal central European environmental conditions.

The following table provides an overview of the expected reduction in maximum service life under deviating environmental conditions and orientations. It is divided into three climate zones. Applications with a deviation from the vertical level of more than 10° are considered horizontal applications.

The assessment of the maximum service life is based on the information in the technical data sheet of each series.

Climate zone 1) (C1): temperate

(e.g. North/Central Europe / North US)

Vertical: data in the technical data sheet

Horizontal: C1) vertical minus 50%

Climate zone 2) (C2): humid / warm

(e.g. Europe – Mediterranean region, Southeast US, Oceania)

Vertical: C1) vertical minus 2 years

Horizontal: C1) horizontal minus 1 year

Climate zone 3) (C3): dry / hot

(Middle East/North Africa, desert regions in AUS, Southwest US)

Vertical: C1) vertical minus 4 years

Horizontal: C1) horizontal minus 2 years

Exceptions

For service lifes of ≤ 5 years in C1) vertical applies:

C3) vertical = C2) vertical minus 50%

C3) horizontal = C2) horizontal minus 50%

Maximum service life in years

	Climate zone 1) temperate		Climate zone 2) humid / warm		Climate zone 3) dry / hot	
	vertical	horizontal	vertical	horizontal	vertical	horizontal
Non fluorescent VC 612	7	3,5	5	2,5	3	1,5
Fluorescent VC 612*	7	3,5	3,5	1,5	1,5	0,75
Non fluorescent VC 412RA	5	2,5	3	1,5	1,5	0,75
Fluorescent VC 412RA	5	2,5	2,5	0,5	0,5	0,25

*Excludes VC 612 Fleet Marking Grade

Note:

The information about the maximum expected service life does not constitute a legally binding guarantee, warranty or other claim. The information provided is based on practical experience from artificial and natural weathering tests under normal conditions. It cannot simply be transferred to the maximum expected service life for every vehicle given the wide variety of possible influences (e.g. additional mechanical and chemical impacts).

2. Storage and Transportation

ORALITE® reflective films should be stored in a cool, dry indoor area that is protected from direct sunlight. Recommended temperature for storage is 20° C and a relative air humidity of 50%.

Rolled material should be stored in the original carton. The rolls have standard spacers (core plugs) that prevent contact between the roll surface and the carton and thus the formation of pressure marks and surface damage. Please make sure that partly processed rolls are stored tightly and never without spacers (core plugs). 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.

Before Application

STEP 1: Templating

VC 412RA Ecoflex / VC 612 / VC612RA Flexibright / Fleet Marking Grade are vinyl based reflective films and as such, will conform more easily to curves (surfaces bending in two directions). However, its use should be limited to minor curves only. Complex curves can be avoided by templating smaller pieces that will be butt jointed (and not overlapped onto one another) giving the appearance of one single piece.

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

In general less pressure is needed when cutting VC 412RA Ecoflex / VC 612 Flexibright/Fleet Marking Grade in comparison with other open cell structure livery films. Below are suggestions of parameters to be used with selected equipment.

Equipment	Non fluorescent VC 412RA / VC 612	Fluorescent VC 412RA / VC 612
Zünd 1600XL (flatbed plotter)	Pressure – 450 grams (cutting through liner)	Pressure – 550 grams (cutting through liner)
Gerber P2C 1600 (flatbed plotter)	Pressure – 360 grams, 2 passes (not cutting through liner)	Pressure – 360 grams, 2 passes (not cutting through liner)
Summa D140 (tangential plotter)	Pressure – 250 (60° drag knife, not cutting through liner)	Pressure – 300 (60° drag knife, not cutting through liner)

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. Plotter cutting results depend on the type of knife, environmental conditions (in particular temperature) and the settings being used, therefore 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 square edges and chevron tips be rounded to give improved cosmetics and to minimise the risk of corners being lifted by mechanical and power washers. Minimum recommended radius is 5 mm.

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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.

STEP 3: Substrate Preparation

The user is responsible for determining whether the ORAFOL product is fit for a particular purpose and 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.**

Two-component Polyurethane Paints

Two-component polyurethane paints must be cured before applying VC 412RA Ecoflex / VC 612 / VC612RA Flexibright / Fleet Marking Grade. 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.

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

VC 412RA Ecoflex / VC 612 / VC612RA Flexibright / Fleet Marking Grade are not recommended for use on stainless steel.

Glass

VC 412RA Ecoflex / VC 612 / VC612RA Flexibright / Fleet Marking Grade are not warranted for applications on glass substrates. Glass substrates are hydrophilic by nature which makes pressure sensitive adhesive bond durability susceptible to change under high humidity or exposure to moisture. A satisfactory bond may not be possible and the user should evaluate the suitability of the product for glass substrates.

Outgassing Plastics

Polycarbonates, polypropylene copolymers and other plastics can interact with the environment absorbing or outgassing moisture, or outgassing additives/processing aids and residual solvents, 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. ORAFOL only recommends the cleaner isopropyl alcohol with a concentration of isopropyl alcohol (2-Propanol) greater than 98%*. Please check the Safety Data Sheet from the cleaner manufacturer to verify this. 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.

*Other Surface Preparation Cleaners may contain slow evaporating solvents, scented additives etc. that may affect final adhesion properties. ORAFOL cannot accept warranty claims when such cleaners are used.

Please contact ORAFOL Customer Service if in any doubt.

STEP 5: Application Temperature

The recommended application temperature range to achieve the best results is between 15° C to 28° C. Ensure both substrate and film are at the optimum temperatures. In cold climates surfaces should be warmed up in order to achieve optimum substrate temperatures. Applying the material in hot environments can cause the film to stretch more easily.

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STEP 6: Dry Method

ORAFOL recommends the dry method to apply VC 412RA Ecoflex / VC 612 / VC612RA Flexibright / Fleet Marking Grade.

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

After properly preparing and cleaning the substrate, the following tools are required to apply the product using the dry method:

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



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.

NOTE! If repositioning the piece is necessary, it should be done carefully. Slowly pull back the film at 90° angle. The film can stretch if pulled too hard or too fast causing damage to the reflectivity as well as registration failures.



STEP 2:

Remove the liner and squeegee piece into place. It is important to avoid touching the adhesive side of the material, particularly the edges, during application.

STEP 3:

Remove masking tape and re-squeegee all edges.

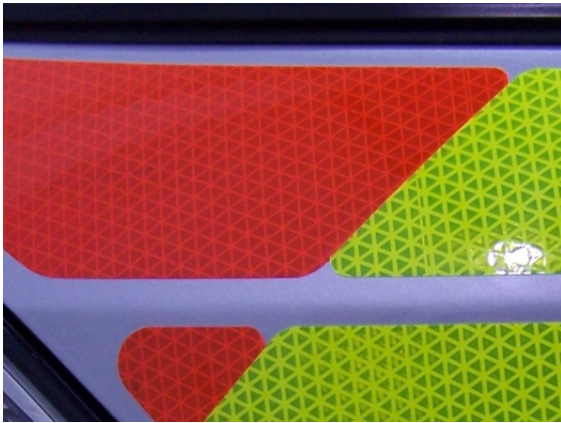
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Chevron Application

After properly preparing and cleaning the substrate, the following recommendations should be followed when applying Chevron markings:



TEMPLATING:

Sharp tips are more likely to lift during power washing and should therefore be avoided. **Tips should be rounded** for improved cosmetics and adhesive performance.

APPLICATION:

When removing the liner and squeegeeing the film, it is essential not to touch the adhesive side, **specially the edges**, as it can weaken the adhesive where touched and consequently cause a weak bond to the surface.

After application, with a hot air gun **gently heat the Chevron tips** (approx 35° C) for a few seconds and re-squeegee all edges to guarantee a strong bond.

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.

Painting after application

ORAFOL does not recommend painting on, or close to, the reflective sheeting, after VC 412RA Ecoflex / VC 612 / VC612RA Flexibright / Fleet Marking Grade 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”) in VC 412RA Ecoflex / VC 612 / VC612RA Flexibright / Fleet Marking Grade. 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 metre (3 ft) away.

Care Instructions

VC 412RA Ecoflex / VC 612 / VC612RA Flexibright / Fleet Marking Grade 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, **gently** rub the film with a cloth soaked in isopropyl alcohol to remove the stains.

Organic Cleaners / Citrus Based Cleaners / Waxes (used for vehicle polishing) may cause irreversible staining of the product, particularly on fluorescent colours. All cleaners should first be tested for material compatibility on a sample piece or inconspicuous area of the product.

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

Removal

When the need arises to remove VC 412RA Ecoflex / VC 612 / VC612RA Flexibright / Fleet Marking Grade 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.
- At temperatures below approx. 18° C there is greater chance of adhesive transferring from the sheeting to the working surface, e.g. painted metal. In such cases 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.
- Once the film 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.

Due to the enormous variety of paint systems and substrates, ORAFOL cannot guarantee that VC 412RA Ecoflex / VC 612 / VC612RA Flexibright / Fleet Marking Grade will be cleanly removed from the working surface.

For applications using VC 412RA Ecoflex, a solvent based adhesive remover may be required to completely remove any residual adhesive.

DO's & DON'T's

Application of reflective sheeting over reflective sheeting

ORAFOL does not recommend applying any reflective sheeting (e.g. ORALITE® VC 412RA Ecoflex / VC 612 / VC612RA Flexibright / Fleet Marking Grade) 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 VC 412RA Ecoflex / VC 612 / VC612RA Flexibright / Fleet Marking Grade over vinyl sheeting. This practice violates the warranty.

Heat application

Do not use any source of heat to make VC 412RA Ecoflex / VC 612 / VC612RA Flexibright / Fleet Marking Grade conform to curves. Heat should only be used when applying Chevron markings.

3. Warranty information

In case of non-compliance with the Practical Information guidelines, any warranty and liability shall be excluded.

The service life of ORALITE® Reflective Film applied to a vehicle is essentially determined by the exact compliance with the Practical Information guidelines. The processing (i.e. the application and removal) of ORALITE® Reflective Films shall only be done by trained specialists (i.e. by skilled and experienced advertising engineers or technicians). These trained experts are responsible for the quality of application, while the responsibility for compliance with the Maintenance and Usage Terms lies with the owner of the vehicle. The information provided in these instructions is based exclusively on our current knowledge and experience. It constitutes neither a warranty of certain properties nor a quality or durability guarantee with regard to our ORALITE® Reflective Films. Orafol is not responsible for costs incurred for the removal of our films.

Any warranty and liability shall be especially excluded in case of:

- new vehicle paintwork that is not completely dry or completely cured at the time of application
- application to unsuitable surfaces and of un-professionally painted surfaces
- outgassing coatings or plastics
- surfaces that are not appropriately prepared
- use of ORAFOL materials in combination with materials from other manufacturers
- use of different batches for the application of one object
- use of products or product combinations that are not recommended for the intended application
- inappropriate or improper application by unskilled and unprofessional applicators.
- paintwork coming off when removing the film and changes in the paintwork (e.g. "ghost images")
- films coming off of angled corrugations with sharp edges (frequently seen in commercial vehicles such as delivery vans or panel trucks)

For further questions regarding the application and removal of ORALITE® Reflective Films please contact your local customer support.

IMPORTANT NOTICE

All ORALITE® products are subject to careful quality control throughout the manufacturing process and are warranted to be of merchantable quality and free from manufacturing defects. Published information concerning ORALITE® products is based upon research which the Company believes to be reliable although such information does not constitute a warranty. Because of the variety of uses of ORALITE® products and the continuing development of new applications, the

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purchaser should carefully consider the suitability and performance of the product for each intended use, and the purchaser shall assume all risks regarding such use. All specifications are subject to change without prior notice.

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