

This document describes ORALITE® Reflective Films for temporary application of vehicles and provides guidelines for their usage. The product series herein are premium self-adhesive films manufactured by ORAFOL Europe GmbH (hereinafter called ORAFOL).

Please observe and comply with the most current version of ORAFOL Technical Information by viewing this document electronically at www.orafol.com.

Processing Instructions for ORALITE® Series 5600, 5600D/E and 5650, 5650D/E

These processing instructions apply to the following ORALITE® reflective films:

For Vehicle Livery

ORALITE® 5600 Fleet Engineer Grade
ORALITE® 5650 RA Fleet Engineer Grade*

For Truck/Trailer application, ECE 104 compliant

(ECE 104 Class D)
ORALITE® 5600D Fleet Engineer Grade
ORALITE® 5650D RA Fleet Engineer Grade*

(ECE 104 Class E)
ORALITE® 5600E Fleet Marking Grade
ORALITE® 5650E RA Fleet Marking Grade*

**ORALITE® 5650 RA Fleet Engineer Grade with "RapidAir®" technology enables easy and quick application reducing the incidence of bubbles & creases, especially of large-sized applications.*

The information within this document is based on our knowledge, experience and application tests. Its purpose is to provide suggestions and support to applicators. Even though it is not possible to explain all aspects that need to be taken into account, this guideline comprises a large number of useful tips for handling ORALITE® reflective films series listed above (hereafter called ORALITE® Reflective Film).

The user is responsible for determining whether the 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.** ORAFOL is not responsible for material failures caused by the substrate or improper surface preparation.

ECE 104

ECE 104 is the regulation outlining the technical requirements to approved retroreflective marking tapes for trucks and trailers in Europe. Further information on the Regulation and the complete ORAFOL product offering for Class C, D and E can be found at www.orafol.com. The user is fully responsible for ensuring compliance to the specific regulation.

General Requirements

Please note that reflective films are by nature more sensitive than vehicle paintwork. This means that special care is needed when applying and cleaning the films.

The application and removal of ORALITE® reflective films may be done exclusively by trained specialists (i.e. by skilled and experienced application engineers or technicians).

In case of inappropriate or incorrect application or removal of ORALITE® reflective films or in case of use of film types unsuited for the application, the paint of the vehicle may be damaged and/or the service life of the ORALITE® film may be considerably shorter.

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): temperate

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

Vertical: data in the technical data sheet

Horizontal: C1) vertical minus 50%

Climate zone 2): 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): 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 lives 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
7	3.5	5	2.5	3	1.5

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).

Storage and Transportation

ORALITE® reflective films should be stored in a cool, dry indoor area that is protected from direct sunlight. Recommend temperatures for storage are from 20° C to 24° C.

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 never stored without spacers (core plugs).

Printing

ORALITE® Reflective Film can be screen printed with ORALITE® 5018 screen printing ink or inkjet printed with solvent based inks, UV or Latex inks.

Protective Laminates

Please refer to the chosen ink manufacturer's instructions to determine if an application laminate is required. If required, it is recommended that the material is laminated with ORAGUARD® 290F or ORAGUARD® 293F in order to provide increased UV protection.

Recommended Application Materials

The following application tapes are suitable for use with ORALITE® reflective films;

- ORATAPE® MT52 Application Tape
- ORATAPE® MT72 Application Tape
- ORATAPE® LT72 Application Tape
- ORATAPE® MT95 Application Tape

Preparation

To achieve the best possible result, the preparatory measures described below shall be taken:

Checking the vehicle surface

The ORALITE® Reflective Films which are recommended for high-quality commercial and fleet livery to produce lettering, markings and decorations are all supplied with an adhesive which is balanced in terms of its composition and adhesive strength. This means that the films will not lift or damage the vehicle paintwork, provided that painting has been professionally done and has cured completely prior to application of the film. It is also important that the paintwork of the vehicle is not damaged by rust, fire, scratches, grit, age-related embrittlement or similar influences. Paintwork to which the ORALITE® Reflective Films are applied must adhere with a rating of 0 when tested according to EN ISO 2409. ORAFOL materials should only be applied to vehicle surfaces where the paintwork completely fulfils these quality requirements. Please also make sure that the paintwork of the vehicle is OEM specified. In case of any doubt, please consult the vehicle manufacturer or a specialized paint shop before application.

ORAFOL does not recommend application of ORALITE® Reflective Films to plastic parts or glass surfaces of the vehicle. In instances where this is required, we strongly recommend performing an application test in advance. Glass substrates are hydrophilic by nature which makes adhesive bond durability susceptible to change under high humidity or exposure to moisture. ORAFOL does not warrant the application on plastic parts or glass.

Checking the selected ORAFOL film

Please check the selected ORALITE® Reflective Films for visible defects before application. In case of any defects identified, do not use the film and contact your retailer

We expressly point out that no complaints about defects of an ORALITE® reflective film existing before the application can be accepted later on.

ORAFOL recommends using material from the same batch only. If materials from different batches have to be used, the user must check in advance whether any differences between the batches will affect processing of the films and/or impair the final result.

An unused sample of the selected ORALITE® Reflective Films (approx. 20 x 30 cm) with complete labelling at the margin shall be archived for documentation purposes.

Preparation of the vehicle

Please take the following steps to prepare the vehicle:

- a) Take the vehicle to a car wash before application (no manual cleaning). Please make sure to select a cleaning programme that uses no wax or nanotechnology finish. The vehicle must be completely clean and dry when applying the film.
- b) All parts obstructing the application must be dismantled (in particular outside mirrors, door handles, trims, windscreen wipers etc.).
- c) Check the vehicle surfaces and edges for remaining preservation wax or polish. Any such residues must only be removed with a silicone-free industrial detergent. Surfaces with more stubborn stains can be cleaned additionally with a commercially available insect or tar remover.

d) Never apply detergents that use nanotechnology to establish nano-sealing or nano-coating on the surface to be cleaned. Please observe manufacturer's instructions.

e) In a next step, all surfaces to which the film is to be applied should be cleaned with the ORACAL® Pre-wrap surface cleaner or with Isopropanol. Do not use spirits. Make sure that any remaining detergents are thoroughly and completely removed.

f) Make sure that the surfaces, edges, corrugations, hollows and joints of the vehicle are completely dry. Carefully remove remaining humidity under rubber seals.

Application of ORALITE® Reflective Films

We recommend only dry application of the film (wet application is not warranted).

Necessary tools

The following tools are required for applying the film:

- Film squeegee with felt edge (it is recommended to use soft natural fibre-based felts).
- film knife, paper knife or scalpel
- magnets
- hot-air gun
- infrared thermometer

Further basic tools:

- set of Torx screw drivers
- set of hexagon screw drivers
- screw drivers of different sizes
- spanners of different sizes and/or ratchet tool set
- universal and pointed pliers
- rubber mallet

Required conditions

The application of ORALITE® Reflective Films may be carried out exclusively in clean, dust-free and light-filled rooms (with rising or assembly platform).

The vehicle surface to which the selected ORALITE® reflective films are applied must have the minimum temperature specified in the data sheet. The best possible result is achieved when the car surface temperature ranges between +21° C and +23° C. The car surface temperature is easily measured with the help of an infrared thermometer.

Test application

We recommend a test application after the preparatory cleaning of the vehicle and before a final application. Check the final adhesion of the ORALITE® reflective film 24 hours after the test application. It is necessary to repeat the preparatory cleaning process if the adhesion of the film is too weak and/or air bubbles develop under the film.

The adhesion of the ORALITE® reflective film may prove insufficient, if the vehicle or the vehicle parts were pre-treated with substances using nanotechnology to establish nanosealing/nanocoating on the surface to be cleaned.

In such a case it is necessary to repeat the preparatory cleaning of the vehicle and to carry out another test application.

Outgassing

For new or recently repaired vehicles, potential outgassing should be assessed. At elevated temperatures, the resulting gases cannot escape through the material and lead to the formation of bubbles. Prior to bonding, therefore, the following test should be conducted:

Apply a sample from the same roll of film, e.g. 100 mm x 100 mm to a cleaned area of the substrate and maintain at a temperature higher than 40° C for 48 hours. If no bubbles have formed, the application can proceed. If bubbles have formed, repeat the test after 2 days.

Pre application information

- ORALITE® Reflective Film is suitable for flat and slightly curved surfaces. Position the graphic to minimize the number of rivets and substrate seams that will be covered. This eliminates the need to cut around the rivets.
- The film is not suitable for deep-drawing.
- The film may be cut using a plotter (preferably a flat-bed plotter with integrated, pneumatically-controlled cutting head).
- Use accurately templated pre-cut film kits whenever possible.
- If plotting is impossible, measure the vehicle parts and pre-cut the ORALITE® Reflective Films generously.
- Do not use any source of heat to make the film conform to curves.
- It is important to avoid touching the adhesive side of the material, particularly the edges, during application.
- Films printed with solvent based inks should dry out thoroughly before application.
- 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.
- Sharp tips are more likely to lift during cleaning and should therefore be avoided. Tips should be rounded for improved visual appearance as well as adhesive performance.
- ORAFOL does not recommend application onto anti-freeze or nanotechnology coated surfaces.
- Cut the film in a way to avoid overlapping and studs.
- Do not cut ORALITE® Reflective Film flush with car edges to avoid shrinking of the ORALITE® reflective films or mechanical wear on the open cutting edge through cleaning brushes, wind etc.
- Apply the ORALITE® Reflective Films also under rubber seals to avoid open edges.

Application of the film

- Position the pre-cut ORALITE® reflective film 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.
- Make sure the film rises some 5 cm (2 inches) above the edges of the vehicle part to which the film is to be applied.
- Partially remove the liner and holding the film near the bottom center, begin squeegeeing the piece into place.
- Squeegee starting at the center of the tape hinge and working outward from the hinge to the closest edge.
- Apply the ORALITE® reflective film with big equal swings of a squeegee to the vehicle part. Do not stretch the film to achieve an even appearance of the applied sheeting.
- Continue to gradually remove the liner and squeegee until the entire film is applied.
- Remove the tape hinge. Squeegee the top edge.

For further practical information about the application of ORALITE® Reflective Film, please contact your local customer support.

Important to Note

Remaining tiny air bubbles (of a diameter below 5 mm (1/5 inch) under the ORALITE® Reflective Film will diffuse through the film within a few days or up to three weeks depending on the ambient temperature. Only larger bubbles should be slightly punctured by a pin or pointed scalpel and the air should be squeezed out using a squeegee.

After finishing the application

The vehicle should remain at the application temperature for at least 24 hours after the film is applied. According to our experience the ORALITE® Reflective Film will have reached optimum adhesion after three days. You should not take the vehicle through a car wash before this time has elapsed (See following section Care & Maintenance).

Practical Information

ORALITE® Reflective Films - Series 5600, 5600D/E and 5650, 5650D/E
for Vehicle/Truck/Trailer Application according to ECE 104

Care & Maintenance

It is not recommended to use high-pressure cleaning, aggressive chemicals or solvents (such as acetone, paint thinner, tar remover) as this will reduce the service life of the film. The following practices will help maintain the life and quality of the reflective film:

- ORAFOL recommends regular cleaning and maintenance of the vehicle by hand.
- If using a cleaning product, wash applied film with a blend of clean water and a mild car wash detergent.
- Test any cleaning solution on a small section of the film before using. Always read the warning labels on car care products for proper safety instructions.
- Once you've washed the vehicle with the soapy water blend, rinse it with clean water.
- Either let the vehicle air dry or use a microfiber cloth.

Please obey the following instructions, otherwise it may result e.g. in a loss of gloss level, fading, embrittling and cracking, chipping, or peeling around edges:

- Do not allow fuels to stay in contact with the film for extended periods of time. Clean all spills as soon as possible.
- Do not use automated car washes, truck washes using caustic cleaners, tar remover, or pressure washers to clean your vehicle
- Do not apply any type of wax or polish over the material.
- Do not use mechanical brush washing.

In case of any doubt, please contact our Customer Support.

Removing ORALITE® Reflective Film

ORALITE® Reflective Films 5600, 5600E and 5600D are equipped with a high-quality adhesive, removable with heat within the warranty period specified. If residual adhesive remains on the surface, it can be removed with a silicone-free citrus-based industrial detergent.

Environment and surface temperature must be at least +20° C before the ORALITE® reflective film can be removed. First cautiously lift up one corner of the ORALITE® reflective film with a knife. Then slowly draw the film from the surface at a 180° angle. Heating the film moderately with a hot-air gun to +40° C while pulling makes removal considerably easier. Removing behaviour is also markedly affected by the type and texture of the surface and the conditions of use.

ORALITE® Reflective Films 5650, 5650RA, 5650E RA and 5650D RA are equipped with an adhesive for permanent bonding. Heat will help to remove parts of the sheeting. Use of commercially available removers will help to remove the residual parts. ORAFOL does not warrant the removability of permanently bonded films.

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. We are 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. Information on the above described materials, please visit www.orafol.com.