

General Remarks

ORAFOL® digital printing films for application on car components and car wrapping (hereafter referred to as “ORAFOL® colour film”) are premium self-adhesive film products manufactured by ORAFOL Europe GmbH (hereafter referred to as “ORAFOL”) for temporary vehicle decoration.

Please note that films are more sensitive than vehicle paintwork, and therefore require special care when applying and cleaning. To ensure maximum service life, please refer to and comply with the current version of our Processing Guidelines (www.orafol.com/gp/europe/en/support) when applying, using, cleaning, or removing ORAFOL® digital printing films.

Applying and removing ORAFOL® digital printing films should be done exclusively by trained specialists (i.e. skilled and experienced advertising engineers or technicians).

Inappropriate or incorrect application or removal of ORAFOL® digital printing films or use of film types unsuited for the application may result in paint damage or considerably reduced ORAFOL® colour film performance and/or service life.

Service Life

The service life specified in the technical data sheets represents is the maximum service life 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. Applications with a deviation from the vertical level of more than 10° are considered horizontal applications. The specification is valid for all ORAFOL® digital printing films and metallic films suitable for vertical and horizontal application.

In case of print or digital print media, the service life data apply only to vertical uses. The assessment of the maximum service life is based on the information in the technical data sheet for each series.

Climate zone 1:	Climate zone 2:
Albania, Andorra, Belgium, Bosnia and Herzegovina, Bulgaria, Denmark, Germany, Ecuador, Estonia, Finland, France, Georgia, Ireland, Iceland, Italy, Kosovo, Croatia, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Moldova, Monaco, Montenegro, the Netherlands, Norway, Austria, Poland, Romania, Russia, San Marino, Sweden, Switzerland, Serbia, Slovakia, Slovenia, Czech Republic, Ukraine, Hungary, USA (no deserts), Vatican City, United Kingdom, Belarus	Afghanistan, Angola, Equatorial Guinea, Armenia, Azerbaijan, Australia (no deserts), Bahamas, Bangladesh, Barbados, Belize, Benin, Bhutan, Bolivia, Botswana, Brazil, Burkina Faso, Burundi, Chile, China, Costa Rica, Dominica, Dominican Republic, El Salvador, Ivory Coast, Fiji, Gabon, Gambia, Ghana, Grenada, Greece, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, India, Indonesia, Jamaica, Japan, Cambodia, Cameroon, Cape Verde, Caribbean Islands, Kazakhstan, Kenya, Kyrgyzstan, Colombia, Congo, Laos, Lesotho, Liberia, Madagascar, Malawi, Malaysia, Maldives, Mali, Mauritania, Mauritius, Micronesia, Mozambique, Myanmar, Namibia, Nepal, New Zealand, Nicaragua, Niger, Nigeria, East Timor, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Portugal, Puerto Rico, Rwanda, Zambia, Samoa, San Marino, São Tomé and Príncipe, Senegal, Sierra Leone, Zimbabwe, Singapore, Spain, Sri Lanka, South Africa, South Korea, Suriname, Swasiland, Tajikistan, Taiwan, Tanzania, Thailand, Togo, Trinidad and Tobago, Turkey, Turkmenistan, Uganda, Uruguay, Uzbekistan, Venezuela, Vietnam, Central African Republic, Cyprus

Climate zone 3: Dry / hot All deserts, exposed heights from 1000 m above sea level and regions with extreme high UV exposure. Egypt, Algeria, Ethiopia, Bahrain, Eritrea, Iraq, Israel, Yemen, Jordan, Qatar, Kuwait, Lebanon, Libya, Morocco, Mexico, Oman, Saudi Arabia, Somalia, Chad, Tunisia, United Arab Emirates	Exceptions For service lives of ≤ 5 years in C1) vertical applications: C3) vertical = C2) vertical minus 50% C3) horizontal = C2) horizontal minus 50%
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Climate zone 1* Temperate		Climate zone 2* Humid/warm		Climate zone 3* Dry/hot	
Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal
12.0	6.0	10.0	5.0	8.0	4.0
10.0	5.0	8.0	4.0	6.0	3.0
8.0	4.0	6.0	3.0	4.0	2.0
7.0	3.5	5.0	2.5	3.0	1.5
6.0	3.0	4.0	2.0	2.0	1.0
5.0	2.5	3.0	1.5	1.5	0.75
4.0	2.0	2.0	1.0	1.0	0.50
3.0	1.5	1.0	0.5	0.5	0.25

* Maximum expected service life in years

Note: The information regarding 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 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).

The maximum expected service life for car wrapping applications is generally based on the data for horizontal application.

Reduction of expected service life

Please be advised that a reduction in expected service life can occur in the following instances:

- When used on unsuitable substrates
- If the substrate has not been cleaned sufficiently
- When exposed to high temperature and/or high humidity
- If the films are not cleaned regularly, e.g. if insects or bird droppings are not removed promptly
- At a high degree of air pollution, e.g. in industrial areas, in conurbations, or in large cities
- When exposed to high UV exposure, e.g. at high altitudes

Preparation

For best results, please follow the preparation guidelines below.

Inspect the Vehicle Surface

ORAFOL® graphic films for car lettering, car decoration and full car wrapping 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 graphic film. ORAFOL® materials should only be applied to vehicle surfaces where the paintwork completely fulfils these quality requirements.



Please ensure that vehicle paintwork complies with OEM specifications. In case of any doubt, consult the car manufacturer or a specialized paint shop before application.

Inspect the paintwork to ensure there is no damage from rust, fire, scratches, grit, age-related embrittlement, or similar influences.

ORAFOL[®] digital printing films may be applied to plastic automotive components only if they are painted in accordance with OEM specifications, and if they have a completely smooth surface. Otherwise, the ORAFOL[®] digital printing films' adhesion will be significantly compromised. A water drop test can help to determine whether these conditions exist: Moisten the plastic surface with water. If the water runs off in drops, 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.

Select the Right Film Type for your Application

In a next step, the best type of film depending on the application needs to be chosen.

a) Applications to difficult 3D geometries and rivets: Cast films and ORAJET® 3981RA+

b) Applications to vehicles or vehicle parts without difficult 3D geometries: Calendered films, structured films (Premium Structure Cast)

When in doubt, ask your retailer.

Lighter shades and coloured metallic shades have by nature a lower opacity (higher ability to see through) than darker shades. Dark substrates may thus change the colour impression of ORAFOL® digital printing films in light shades or light metallic shades. Please make sure in advance whether the chosen ORAFOL® colour film enables your desired result.

Prepare the Vehicle

Before application of ORAFOL® colour film the vehicle must be prepared as described below:

- Take the vehicle to a car wash before application (no manual cleaning). Select a cleaning programme that uses *no wax*. The car must be completely clean and dry when applying the film.
- Remove all elements that obstruct the application (e.g. outside mirrors, door handles, trims, windscreen wipers etc.).
- Inspect all surfaces and edges for residual preservation wax or polish. Any residues must only be removed with a silicone-free citrus-based industrial detergent. Surfaces with more stubborn stains can be cleaned additionally with a commercially available insect or tar remover.
- Never apply detergents that use nanotechnology to establish nano-sealing or nano-coating on the surface to be cleaned. Please observe manufacturer's instructions.
- Clean all surfaces to which the film is to be applied with ORAFOL® Pre-wrap surface cleaner. Do not use spirits. Make sure that any remaining detergents are thoroughly and completely removed.
- Make sure that the surfaces, edges, corrugations, hollows and joints of the vehicle are completely dry. Carefully remove remaining humidity under rubber seals.

Apply ORAFOL® digital printing films

The film is applied under dry conditions.

Wet application is possible for partial decorations (e.g. racing stripes) on even or slightly curved surfaces, but only for films without micro-structured adhesive.

Films with micro-structured adhesive (*RapidAir®*) and Premium Structure Cast films are *not* suitable for wet application.

Required Application Tools

The following tools are necessary for application:

Application tools:

- Film squeegee with felt edge (soft natural fibre-based felts are recommended) • Film knife, paper knife or scalpel
- Magnets
- Hot-air gun
- Infrared thermometer

Basic tools:

- Set of Torx screwdrivers
- Set of hexagon screwdrivers
- Screwdrivers of various sizes
- Spanners of different sizes and/or ratchet tool set
- Universal and needle-nose pliers
- Rubber mallet

Required Conditions

- Clean, dust-free and light-filled room (rising or assembly platform is strongly recommended).
- Minimum vehicle surface temperature as specified in the data sheet. Optimum surface temperature ranges between +21° C and +23° C. The car surface temperature is easily measured with an infrared thermometer.

Test Application

A test application is strongly recommended before full application and after vehicle preparation is complete (see above). Check the final adhesion of the ORAFOL® colour film 24 hours after the test application. Repeat the preparatory cleaning process if the adhesion of the ORAFOL® colour film is sub-optimal and/or air bubbles develop under the film. For reasons of comparison or to rule out other factors if adhesion or performance is not optimal, it is advisable to simultaneously apply the film to uncritical surfaces (e.g. vehicle window panes).

Pre-treating the vehicle or the vehicle parts with substances using nanotechnology may result in sub-optimal adhesion of the ORAFOL® digital printing films and will require repeating the preparation and test application steps.

Application Method

Basic remarks

High performance cast films: These can be heated and deep-drawn into corrugations. In very deep recesses (such as sharp-edged angled corrugations) these films should be worked in, cut and applied with an overlap at the edges.

Calendared films: These are suitable for surfaces that are even or slightly curved in many places. These types of films must not be heated and deep drawn into deep car corrugations. These films must be worked in, cut and applied with an overlap at the edges where there are recesses or rivets.

Premium Structure Cast films: Because of their surface structure, these films must not be stretched too much during the application. Over rivets and in recesses, these films have to be worked in, cut and applied with an overlap at the edges.

Freshly printed solvent digital printing media: This should be spread out and left to dry for at least 72 hours, irrespective of the film type. Please follow the current Processing Guidelines for digital printing materials (download here: www.orafol.com/gp/europe/en/support).

Application to vehicle windows: Use only ORAFOL® digital printing films which are type-certified for such purposes in accordance with section 22a German Regulations Authorizing the Use of Vehicles for Road Traffic (StVZO). Refer to the technical data sheet to determine if an ORAFOL® colour film is certified for application to vehicle windows.

ORAFOL® digital printing films must not obstruct the driver's view. For this reason, applying the films to windscreens and front side windows of a vehicle is prohibited.

Application to a rear window requires a second outside mirror. Do not cover the window frame or rubber seals. Do not clamp the film between the window frame (see also the ABG, i.e. the certificate of the film). A copy of the ABG document is available for each film upon request by contacting graphic.products@orafol.de.

Attach the enclosed label with the D number of the type-certified ORAFOL® colour film to each vehicle window to which the film is applied so that the D number is readable from the interior of the vehicle. It is also necessary to carry a copy of the ABG document in the vehicle.

Application Tips

- Measure the vehicle parts and pre-cut the ORAFOL® colour film generously. Cut the film in such a way that avoids overlapping and studs. A width of 152 cm allows application to many car types without gaps or overlap.
- The ORAFOL® colour film should be trimmed on the vehicle.
- Cutting should always be done on the clearance edge that borders the part to which the film is applied.
- The overlapping part of the ORAFOL® colour film (clearance width) should be used for wrapping the ORAFOL colour film into the interior area of the car.
- To avoid film shrinkage or mechanical wear on the open edge from elements such as cleaning brushes or wind, do not cut ORAFOL® colour film flush with car.
- Apply the ORAFOL® colour film under rubber seals to avoid open edges.
- If it is unavoidable to cut the ORAFOL® colour film on the car surface, apply siliconised crepe where the cut is performed. Lift the ORAFOL® colour film slightly after cutting and remove the siliconised crepe material before finally applying the film.
- Cutting tapes are recommended as an aid for knife-free processing. In any case, the cutting tape should be tested for suitability before use. Cutting tapes with low stretch are recommended.

Applying the Film

- Position the pre-cut ORAFOL® colour film to be applied to the car surface and affix to the vehicle with adhesive tape or magnets.
- Make sure the ORAFOL® colour film rises approximately 5 cm above the edges of the vehicle part to which the film is to be applied.
- Remove the backing paper from the ORAFOL® colour film and stretch the ORAFOL® colour film equally over the part to be wrapped.
- Apply the ORAFOL® colour film to the vehicle part with big equal swipes of a squeegee.
- For curved surfaces (e.g. car wings), use a hot-air gun to heat the entire ORAFOL® colour film to +40° C or a maximum +60° C .
- Any deep-drawn areas, borders and edges should be carefully reheated with a hot-air gun immediately after application of the film in order to activate the adhesive. It is necessary to reheat the ORAFOL® colour film in deep corrugations to a temperature of +110° C up to maximum +120° C to ensure film structure stability in these areas.
- After completing the assembly of the previously dismantled vehicle parts, all edge areas, edges and beads should be heated again to +110° C to a maximum of +120° C using a heat gun. This step is not absolutely necessary, but is recommended to prevent the memory effect.
- All surfaces must then be heated again with the heat gun or an infrared lamp to +50° C to make any remaining air bubbles visible and to activate the adhesive
- For more helpful application information and tips, watch our ORAFOL® Car Wrapping Video:
www.orafol.com/gp/europe/en/support

Important Notes:

Use an infrared thermometer to ascertain exact substrate temperature.

Use continuous motion with the hot-air gun to avoid the risk of damaging the ORAFOL® colour film.

Remaining tiny air bubbles (of a diameter less than 5 mm) will diffuse through the film within a few days or up to three weeks, depending on the ambient temperature. Slightly puncture larger bubbles with a pin or pointed scalpel, and then use a squeegee to expel the air and smooth out.

Post-Application

Maintain application temperature for at least 24 hours after completing application (see item 5.2.).

Typically, the ORAFOL® colour film will reach optimum adhesion after three days. Do not take the vehicle through a car wash before this time has elapsed.

To protect the service life of the ORAFOL® colour film, the vehicle should only be cleaned manually or taken to a car wash that *does not use brushes* and *does not use a hot wax programme*.

In general, ORAFOL recommends regular cleaning and maintenance of the vehicle by hand with ORACAL cleaning and care products. These are available as complete kits for glossy and for matte films respectively. These products are mild yet effective and are developed specifically for these materials and applications.

ORAFOL strongly recommends a primary application of the ORACAL® Long-Lasting Seal contained in the Cleaning and Care sets directly after car wrapping or before first use of the vehicle.

High-pressure cleaning aggressive chemicals or solvents (such as acetone or paint thinner) usually damage the film and possibly also the vehicle paintwork. No high-pressure cleaning or aggressive chemicals should be used for cleaning the car. Contact our Customer Support team with any questions: (graphic.products@orafol.de).

The current Maintenance and Usage Terms published by ORAFOL® must be provided and explained to the customer when handing over the vehicle coated with ORAFOL® colour film.

Removing ORAFOL® Digital printing films

ORAFOL® digital printing films are equipped with a high-quality adhesive to enable optimum performance. It is possible for some adhesive residue to remain on the surface when removing the film. Such residues can easily be removed with a silicone-free citrus-based industrial detergent. ORAFOL cannot provide a guarantee or warranty for the speed or easiness of the removal of ORAFOL® digital printing films.

Environment and surface temperature must be at least +20° C before the ORAFOL® digital printing films can be removed. First, carefully lift up one corner of the ORAFOL® colour 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 or maximum +60° C while pulling makes removal considerably easier. A commercially available superheated steam device is also a good option. Removing behaviour is also markedly affected by the type and texture of the surface and the conditions of use.

Warranty Information

In case of non-compliance with the Processing Guidelines and Maintenance and Usage Terms, any warranty and liability shall be excluded.

The service life of ORAFOL® digital printing films applied to a vehicle is determined by exact compliance with the Processing Guidelines and Maintenance and Usage Terms. The processing (i.e. the application and removal) of ORAFOL® digital printing films shall only be done by trained specialists (i.e. skilled and experienced advertising engineers or technicians).

The 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 Processing and Handling 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 ORAFOL® digital printing films. We are not responsible for costs incurred for the removal of our films.

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

- New vehicle paintwork that is not completely dry or completely cured at the time of application
- Applying to unsuitable surfaces (see also item 3.1) and to unprofessionally painted surfaces
- Surfaces that are not appropriately prepared
- Using ORAFOL® materials in combination with materials from other manufacturers
- Using different batches for wrapping one object
- Using products or product combinations that are not recommended for the intended application
- Inappropriate or improper application by unskilled or non-professional wrappers
- 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)

Note:

Most graphics applications are subjected to varying weathering effects over time, which may cause a loss of gloss and slight colour changes. These do not constitute a product deficiency.

In case of further questions concerning the application and removal of ORAFOL® digital printing films, please contact our Customer Support team, graphic.innovations@orafol.de.

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