General Remarks

ORAFOL® films for application on boats (hereinafter also referred to as "ORAFOL® film") are high grade, self-adhesive film products manufactured by ORAFOL Europe GmbH (hereinafter also referred to as "ORAFOL") for temporary boats decoration.

Please note that films are by nature more sensitive than lacquers, 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 Application Guidelines *(www.orafol.com/gp/europe/en/support)* when applying, using, cleaning, or removing ORAFOL® films. Application and removal of ORAFOL® films should be carried out exclusively by qualified specialists (i.e. trained and experienced technicians in fields such as advertising).

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

Service life

The service life specified in the technical data sheets represents the maximum expected service life, on boats for vertical outdoor exposure under normal central European environmental conditions (climate zone 1). The expected service life will be reduced as shown in the below table in case of application onto boat hulls as well as in other climate zones.

The following table provides an overview of the expected reduction of maximum service life under deviating environmental conditions and orientations, divided into three climate zones. Applications with a deviation from the vertical level of more than 10° are considered horizontal applications. The specification is valid for all ORAFOL coloured and metallic films suitable for vertical and horizontal application.

In case of print or digital print media, the expected maximum 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)*: Vertical: Specifications in technical data sheets minus 2 years (metallic minus 1 year) Horizontal on request	Climate zone 2)*: Vertical: K1) vertical minus 2 years Horizontal on request
Climate zone 3)*: Vertical: K1) vertical minus 4 years Horizontal on request	**Exceptions** With expected maximum service life of ≤ 5 years in K1) vertical, the following shall apply: K2) vertical = K1) vertical less 50% K3) vertical = K2) vertical less 50%

* see map on page 2 for climate zone definitions

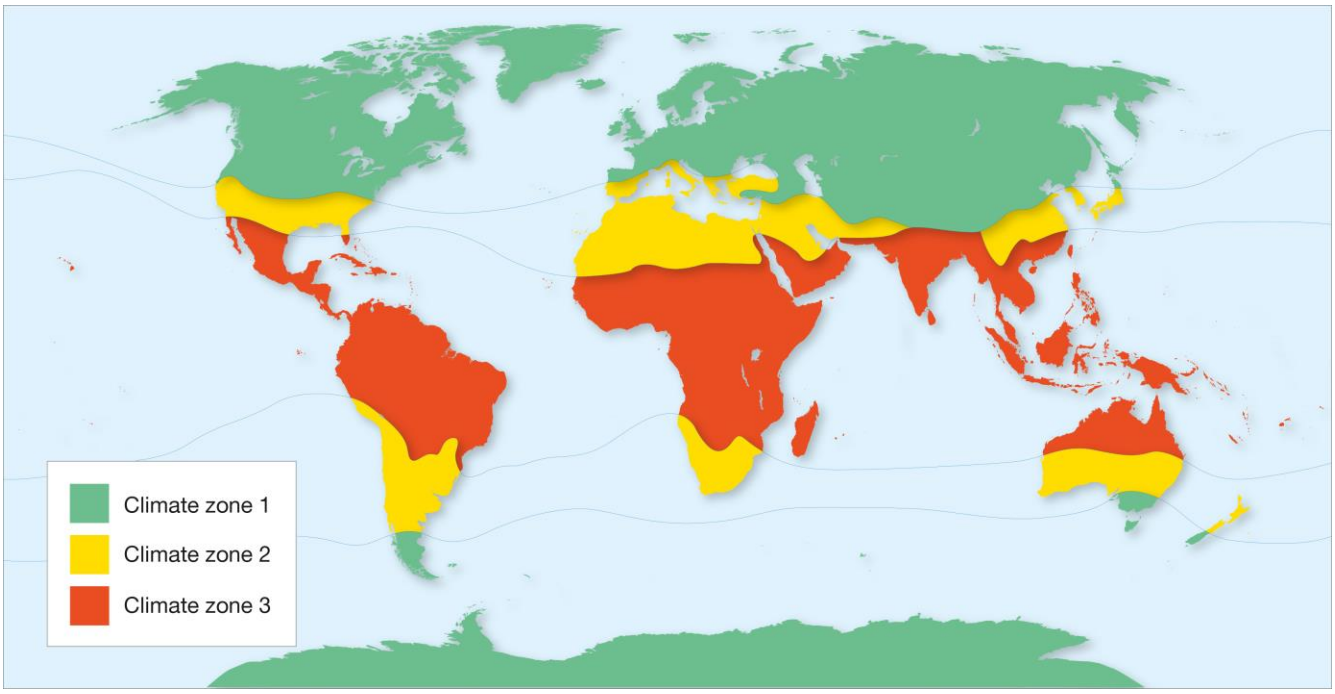

Fig. 1: The three climate zones

Expected maximum service life in years for application on hulls (vertical)		
Climate zone 1	**Climate zone 2**	**Climate zone 3**
10.0	8.0	6.0
8.0	6.0	4.0
6.0	4.0	2.0
4.0	2.0	1.0
2.0	1.0	0.5
1.0	0.5	0.25

Notes

The information on expected maximum service life does not justify claims under guarantees, warranties or for other reasons. The information is based on practical experience under artificial and natural weathering under standard conditions and is not strictly applicable to the calculation of expected maximum service life for all boats, since the possible influences are manifold (additional mechanical and chemical impacts, among other).

Application on boats is generally not recommended below the water line. No warranty is given for applications under water.

Preparation

For best results, please follow the preparation guidelines below before application on boats:

Inspect the Boat Surface

ORAFOL® films for boat lettering or 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 boat surface, provided the gel coat or lacquer has been professionally done and has cured completely prior to application of the graphic film. The films are suitable also for boats with aluminium surfaces. Removal without residues can however not be guaranteed. ORAFOL® materials should only be applied to boat surfaces where the finish completely fulfils these quality requirements. In case of any doubt, consult the boat manufacturer or a specialized paint shop before application.

Inspect the gel coat or varnish of the boat to ensure there is no damage from rust, fire, scratches, grit, age-related embrittlement or similar influences. Solvent residues due to improper cleaning or uncured varnish may create bubbles between film and substrate, which can affect the adhesion. Always ensure that film is applied only to fully cured and dry varnishes. A minimum drying period of three weeks may be assumed as a guideline. Over time, the film may also tear in case the substrate forms cracks. This will not constitute a defect of the film.

ORAFOL® films may be applied to plastic parts on boats only if these are varnished, or if they have a completely smooth surface. Otherwise, the ORAFOL® 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, materials that contain HT adhesives could be suitable. It is nevertheless necessary to test before applying them.

Select the Right Film Type for your Application

The next step is to find the appropriate film type for your application.

a) Application to simple curved areas and rivets, and with the advantage of excellent hot moulding properties: Cast films with and without micro-structured adhesive. For application of films with micro-structured adhesive, follow the application tips on page 6.

b) Application to boats or boat parts without difficult 3D geometries: Textured films (Premium Structure Cast)

c) For application to difficult 3D geometries and corrugations the films should be cut and applied with an overlap at the edges.

When in doubt, ask your specialist 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® colour films to light shades or light metallic shades. Please make sure in advance whether the chosen ORAFOL® colour film enables your desired result.

Inspect the ORAFOL® Film

Carefully inspect your ORAFOL film for visible defects before application. Please contact your retailer in the event that any defects are detected and do not use the film, as we cannot process claims of pre-application defects once the material has been processed in any way.

Check the batch number printed at the edge of the back of the film to ensure that only materials from the same batch are used together. Using other manufacturers' products for the same application is not advisable, as it may negatively affect processing, aesthetics, performance or service life.

Keep an unused sample of the selected ORAFOL film with complete labelling at the margin (product code, colour, batch number) for documentation and reference purposes.

Prepare the Boat

Prepare the boat prior to application:

a) Thoroughly clean the entire hull (e.g. with a high-pressure cleaner, and follow up by degreasing with solvents such as acetone). Ensure that no wax or the like is used. The boat must be completely clean and dry when the film is applied.
b) Remove all elements that obstruct the application (e.g. exhaust cover, vent connections, air grid).
c) Never apply detergents that use nanotechnology to establish nano-sealing or nano-coating on the surface to be cleaned. Polishes containing Teflon or the like are also not suitable. Please observe manufacturer's instructions.
d) Clean all surfaces to which the film is to be applied with ORACAL® Pre-wrap surface cleaner or with isopropanol. Do not use spirits. Make sure that any remaining detergents are thoroughly and completely removed.
e) Make sure that the surfaces, edges, corrugations, hollows and joints are completely dry. Carefully remove remaining humidity especially under rubber seals. Remove excess sealant from mounted fittings. If any seams need to be corrected or removed due to improper mounting, the reinstalling of these must be done after the wrapping.

Apply ORAFOL® Films

The film is applied under dry conditions.

Wet application is possible for partial decorations (e.g. trim strips, lettering) on even or slightly curved surfaces, but only for films without micro-structured adhesive. Films with micro-structured adhesive (*Rapid*Air®) and textured films (Premium Structure Cast) are *not* suited for wet application.

Required Application tools

The following tools are crucial for application:

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

Required Conditions

- For large area applications, take the entire boat out of the water and clean as described above. The boat may remain in the water if only in case of application of lettering or decorative stripes.
- Application should only be done in clean, dust-free and well-lit rooms (rising or assembly platform may be useful).
- Ensure that the boat surface temperature exceeds the minimum temperature specified in the data sheet for the selected ORAFOL® film. The best results will be achieved with a boat surface temperature between +21° C and +23° C. The boat surface temperature is easily measured with an infrared thermometer.

Test Application

After boat preparation is complete (see page 4) and before final application, a test application is absolutely necessary. Check the final adhesion of the ORAFOL® film 24 hours after the test application. Repeat the preparatory cleaning process (see page 4) if the adhesion of the ORAFOL® film is sub-optimal and/or air bubbles develop under the film. For reasons of comparison, it is advisable to simultaneously apply the film to uncritical surfaces.

Pre-treating the boat surface or boat parts with substances using nanotechnology, designed to nano-seal or nano-coat the substrate, may result in sub-optimal adhesion of the ORAFOL® film, and will require repeating the preparation and test application steps.

Application Method

Basic remarks

High performance cast films without micro-structured adhesive: 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 and applied with an overlap at the edges.

Films with micro-structured adhesive (*Rapid*Air®): These are suitable for surfaces that are even or slightly curved, as well as slight 3D structures that can be found on boat hulls. For application to deep, sharp-edged angled corrugations these films must be worked in, cut and applied with an overlap at the edges

Textured films (Premium Structure Cast): Because of their surface structure, these films must not be stretched too much during the applications. 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 print media: This should be spread out and left to dry for at least 72 hours before laminating, irrespective of the type of film. Please follow the current Processing Guidelines for digital printing materials (download here: www.orafol.com/gp/europe/en/support)

Application Tips

- Measure the boat components that are to be covered, and pre-cut the ORAFOL® film generously. Cut the film in such a way that avoids overlapping and studs (except for the above-mentioned corrugations and rivets). A film width of 1520 mm allows application to many boat types without gaps or overlap.
- The ORAFOL® film should be trimmed on the boat.
- Apply the ORAFOL® film under rubber seals to avoid open edges
- If it is unavoidable to cut the ORAFOL® film on the boat surface, apply siliconized crepe where the cut is performed. Lift the ORAFOL® film slightly after cutting and remove the siliconized crepe material before finally applying the film. Alternatively, you can also use knifeless tape.
- For application to the bow, ensure there is an adequate overlap to prevent the film edges from being directly subjected to the water flow.

Applying the Film

- After cutting, position the ORAFOL® film, and affix to the boat with adhesive tape.
- Make sure the ORAFOL® film rises approximately 50 mm above the edges of the part to which the film is to be applied.
- Remove the backing paper from the ORAFOL® film and stretch the ORAFOL® film equally over the part of the boat to be wrapped.
- Apply the ORAFOL® film with big equal swipes of a squeegee.
- For curved surfaces, use a hot-air gun to heat the entire ORAFOL® film to +40° C or a maximum of +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® film in deep corrugations to a temperature of +110° C up to a maximum +120° C to ensure film structure stability in these areas. This procedure should be repeated several times for extreme areas.
- Once the ORAFOL® film has cooled down, cut or turn in the film edges.

- After re-installing any boat parts that were removed, reheat all edges, borders and corrugations again with a hot-air gun to +110° C up to maximum +120° C.

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® film.

Experience shows that any tiny air bubbles (< 5 mm) remaining underneath the applied ORAFOL® film will diffuse through the film over some days to three weeks, depending on ambient temperature. Larger air bubbles must be pricked with a needle and the air wiped out with a squeegee.

After the application of films with micro-structured adhesive, apply heat to all edges and borders to smoothen the structure of the adhesive (if necessary, repeat this process at approximately 110° C).

Post-Application

Maintain boat application temperature for at least 24 hours after completing application (see page 5).

Typically, the ORAFOL® film will reach optimum adhesion after three days. Do not launch the boat into the water before this time has elapsed.

In general, ORAFOL recommends regular cleaning and maintenance of the boat by hand with ORACAL© cleaning and care products. These are available as complete kits for glossy or matt films respectively. These products are mild yet effective and are developed specifically for these materials and applications. Do not allow the cleaning and care products to enter the water. Cleaning with fresh water is recommended after each ocean trip, especially horizontal surfaces when the boat has been exposed to water with a high salt content and intense sunlight.

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

The surfaces of matt and/or structured ORAFOL® films are naturally more sensitive than glossy and smooth ones. Accordingly, these ORAFOL® films must be treated very carefully during processing, cleaning, and care. Depending on duration and frequency of use, more frequent cleaning and care may be necessary.

High-pressure boat cleaning, or use of aggressive chemicals or solvents (such as acetone or paint thinner) will usually damage the film, reduce the film adhesion, and possibly also damage the paintwork. Contact our Customer Service team with any questions.

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

Removing ORAFOL® Films

ORAFOL® films are equipped with high-quality adhesive with permanent final adhesion. It is possible for some adhesive residue to remain on the surface when removing the film. Such residues can be removed with a silicone-free citrus-based industrial detergent.

Environment and surface temperature must be at least +20° C before ORAFOL® films can be removed. First, carefully lift up one corner of the ORAFOL® 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® films applied on boats is determined by exact compliance with the Processing Guidelines and Maintenance and Usage Terms. The processing (i.e. the application and removal) of ORAFOL® 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 boat. 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® films. We are not responsible for costs incurred for the removal of our films.

ORAFOL will enter into project-related warranty agreements with verifiably qualified technicians and technical advertising companies.

Please contact our Customer Service for further information on application and removal of ORAFOL® films.

Other applicable documentation:

Technical Data Sheets for the specific products

Usage and Maintenance guidelines for applications on vehicles:
http://www.orafol.com/tl_files/content/downloads/careinstructions/en/PNB_CarWrapping_en.pdf

Application guidelines for application on vehicles:
http://www.orafol.com/tl_files/content/downloads/applicationinstructions/en/Information_CarWrapping.pdf

Application guidelines for Stone Guard films:
http://www.orafol.com/tl_files/content/downloads/applicationinstructions/en/Information_StoneGuardFilm.pdf

Application guidelines for Plotter films:
http://www.orafol.com/tl_files/content/downloads/applicationinstructions/en/Information_PlotterMaterials.pdf

Application guidelines for Digital Printing films:
http://www.orafol.com/tl_files/content/downloads/applicationinstructions/en/Information_DigitalPrintingMaterials.pdf

Application guidelines for Printing films:
http://www.orafol.com/tl_files/content/downloads/applicationinstructions/en/Information_PrintingMaterials.pdf

Application guidelines for interior wall art:
http://www.orafol.com/tl_files/content/downloads/applicationinstructions/en/Information_WallArt.pdf

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