





Fig. 1: Overview of the three climate zones

Expected maximum durability in years for application to a boat hull					
Climate zone 1		Climate zone 2		Climate zone 3	
vertical	horizontal	vertical	horizontal	vertical	horizontal
10.0	8.0	8.0	4.0	6.0	3.0
8.0	4.0	6.0	3.0	4.0	2.0
6.0	3.0	4.0	2.0	2.0	1.0
4.0	2.0	2.0	1.0	1.0	0.5
2.0	1.0	1.0	0.5	0.5	0.25
1.0	0.5	0.5	0.25	0.25	0.13

### Notes

As a general rule, no warranty, guarantee or other claims may be derived from the information on expected maximum durability. The values are based on empirical data from artificial and natural weathering tests under standard conditions and cannot be applied generally to the expected maximum durability for every vessel, as the relevant influences, including additional mechanical and chemical stress, are more complex in this context.

**As a general rule, application on boats is recommended only above the waterline. No warranty is provided for applications below the waterline.**

### Preparatory measures

To achieve the best possible result, a number of preparatory measures must be carried out before applying film to the boat, as described below:

### Inspecting the boat surface

In terms of their adhesive chemistry and adhesive strength, ORAFOL films recommended for boat lettering or wrapping are designed so that they do not lift a gelcoat that has been applied properly and is fully cured or damage the paintwork. They are also suitable for aluminium boat surfaces. However, residue-free removability is not guaranteed. These ORAFOL® films should only be applied if the boat paintwork meets these quality requirements. In case of doubt, please contact the boat manufacturer or a professional paint technician before application.

The gelcoat or paintwork of the boat concerned must also be undamaged; that is, there must be no damage caused by rust, fire, scratches, stone chips, age-related embrittlement or similar defects. Solvent residues resulting from improper cleaning, or paintwork that is too fresh, may cause blistering between the film and the substrate and impair adhesion. Ensure that film is only applied to paintwork that is fully dried and cured. As a guide, a minimum drying time of three weeks applies. If cracks develop in the substrate over time, the film will tear also. This does not constitute a defect in the film.

ORAFOL® films may only be applied to plastic parts on boats if they are painted or if the plastic surfaces are completely smooth. Otherwise, the adhesion of the ORAFOL® films to the substrate may be significantly reduced. If in doubt, the "water droplet test" should be carried out as follows before applying film to plastic surfaces: The plastic surface to which the film is to be applied is wetted with water. If the water runs off the plastic surface without forming large droplets, film can be applied to the surface. If the water forms droplets on the plastic surface, application using materials equipped with HT adhesives should be tested.

### Selecting the film type

The next step is to determine the suitable film type for the planned application.

- a) For application to boat hulls with simple 3D geometries and rivets, with the advantage of excellent thermoforming properties:  
Cast films
- b) For application to boats or boat parts with no pronounced 3D geometries:  
Structured films (Premium Structure Cast)
- c) For application in deep and complex channels, the films must be cut and overlapped.

In case of doubt, please contact your specialist dealer.

Light colours and coloured metallic shades naturally have lower opacity than dark colours. As a result, ORAFOL® films with light colours or coloured metallic shades may produce a different colour impression on dark substrates. In such cases, it must be clarified in advance whether the desired result can be achieved with the selected ORAFOL® film.

### Checking the selected ORAFOL® film

Check the selected ORAFOL® film for visible defects before use. If visible defects are identified during the preliminary inspection, the film must not be used. In this case, please contact your specialist dealer.

Please note: once an ORAFOL® film has been applied, subsequent complaints based on pre-existing defects can generally no longer be accepted.

Use only ORAFOL® films from the same batch, identifiable by the batch number printed on the edge of the reverse side, for any one application. The use of ORAFOL® films from multiple batches on a single object, or combined use with products from other manufacturers, is not permitted, as this may adversely affect application and the result.

An unapplied sample of the selected ORAFOL® film with the complete reverse-side edge print must be archived for documentation purposes.

### Preparing the boat

Before application, the boat must be prepared as described below:

- a) First clean the boat hull completely and thoroughly, e.g. using a high-pressure cleaner, followed by degreasing with solvents such as acetone. Ensure that no wax or similar substances are used. The boat must be completely clean and dry at the time of application.
- b) Before application, remove all fittings that may obstruct the work, e.g. exhaust pipe covers, vent connectors and ventilation grilles.
- c) As a general rule, do not use cleaning agents designed to create a nano-seal or nano-coating by means of nanotechnology on the surface to be cleaned. Polishes containing Teflon or similar substances are also unsuitable. The manufacturer's instructions must be observed in this respect.
- d) Then clean all surfaces to which film is to be applied using ORACAL® Pre-Wrap Surface Cleaner or isopropanol. Do not use methylated spirits for this purpose. Ensure that any remaining cleaning agent residues are removed thoroughly and completely.
- e) Finally, ensure that the boat surfaces, edges, channels, recesses and joints are completely dry. In particular, carefully remove any residual moisture from beneath rubber seals. Remove excess sealant from sealed fittings. If poorly fitted joints are straightened or removed, they must be reapplied after application.

### Applying ORAFOL® films

Application is carried out under dry conditions.

For partial decorations (e.g. decorative strips, lettering) on flat and slightly curved surfaces, wet application is possible, but only for films without microstructured adhesive.

In general, films with microstructured adhesive (*RapidAir*®) and structured films (Premium Structure Cast) are not suitable for wet application.

### Tools required

The following tools are essential for the application:

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

### Application conditions

- For large-area application, the boat must be completely removed from the water and cleaned beforehand as described. For lettering or decorative strips, under certain circumstances, the boat may remain in the water.
- Apply the ORAFOL® films (using a lifting platform or assembly ramp) in clean, dust-free and well-lit rooms only.

- The boat surface to which the film is to be applied must have the minimum application temperature specified in the relevant data sheet for the selected ORAFOL® film. The best possible result is achieved at temperatures of +21°C to +23°C on the boat surface to which the film is to be applied. The temperature on the boat surface can be determined easily using an infrared thermometer.

### Test application

After the preparatory cleaning of the boat (see page 4) and before each final application, a test application must always be carried out. Check the final adhesion of the ORAFOL® film 24 hours after the test application. Repeat the preparatory cleaning (see page 4) if the ORAFOL® film adheres too weakly and/or if air bubbles form beneath the film. It is advisable to carry out a simultaneous test application on non-critical substrates for comparison purposes.

The ORAFOL® film may not adhere properly if the boat or boat parts were prepared using cleaning agents designed to create a nano-seal or nano-coating on the surface by means of nanotechnology. In this case, the boat must be cleaned again as described on page 4, followed by a further test application.

### Application process

#### Basic principles

High-performance cast films can be thermoformed into channels. However, when applying film in pronounced recesses (e.g. sharp-edged channel geometries), the film must be formed into these areas, cut and overlapped.

Structured films (Premium Structure Cast): Due to the surface structure, this film type must not be subjected to excessive mechanical stress during application. In recesses and over rivets, this film type must be formed into position, cut and overlapped.

As a general rule, freshly printed solvent-based digital printing media should be left to dry flat for at least 72 hours, regardless of the film type, before being laminated. The relevant information in the current application guidelines for digital printing media must be observed (available at: [www.orafol.com/gp/europe/de/support](http://www.orafol.com/gp/europe/de/support))

### General application instructions

- Measure the boat parts to which film is to be applied in advance and cut the ORAFOL® film to size with a little to spare. When cutting, avoid applications with overlaps and joins (apart from the aforementioned exceptions regarding channels and rivets). Film widths of up to 152 cm allow application on many boats without visually disruptive joins or overlaps.
- The ORAFOL® film is trimmed after it has been applied to the boat.
- In order to avoid exposed edges, the ORAFOL® film must also be applied underneath rubber seals.
- If the ORAFOL® film has to be cut on the boat surface, the cutting edge must first be underlaid with siliconised masking tape. After cutting, slightly lift the ORAFOL® film to remove the siliconised masking tape before final application. Alternatively, Knifeless Tape may be used.
- At the bow, the film must be applied with a sufficient overlap so that the film edges are not directly exposed to the oncoming flow.

#### Application

- After cutting, position the ORAFOL® film to be applied and secure it to the boat using adhesive tape.
- Ensure that the ORAFOL® film extends approx. 5 cm beyond the edges of the area to which it is to be applied.
- Then remove the release liner from the ORAFOL® film and stretch the ORAFOL® film over the relevant boat part evenly.
- Squeegee the ORAFOL® film using even, broad sweeping movements.
- On curved substrates, heat the ORAFOL® film over a large area to a surface temperature of between +40°C and max. +60°C using a hot-air gun.

- To activate the adhesive quickly, all thermoformed areas, borders and edges must be carefully reheated after application using the hot-air gun. To ensure that the ORAFOL® film assumes a permanent shape in channels, the ORAFOL® film must then be heated in these areas to between +110°C and max. +120°C. In the case of extreme channels, this procedure must be repeated several times.
- Finally, trim or fold over the edges of the ORAFOL® film, but only after the ORAFOL® film has cooled down.
- After the previously removed boat parts have been refitted, heat all border areas, edges and channels again to between +110°C and max. +120°C using the hot-air gun.

### Important notes

Use an infrared thermometer to measure the heating of the substrate accurately.

Keep the hot-air gun in constant motion during all work. Otherwise, there is a risk of damaging the ORAFOL® film.

If small air bubbles with a diameter of less than 5 mm remain beneath the applied ORAFOL® film, experience has shown that these will diffuse through the film within a few days to three weeks, depending on the ambient temperature. Larger air bubbles must be pricked with a needle and the air then squeegeed out.

When using films with microstructured adhesive, the adhesive structure at corners and edges must be smoothed with heat after application has been completed, if necessary, by repeated post-heating at approx. 110°C.

### Note on the visibility of the air-channel structure in films with RA+ structure

The ORACAL RA+ structure in the liner and adhesive of car-wrapping films was developed to significantly improve the repositionability of the films and thereby achieve easier and faster application results.

This structure differs from the ORACAL RA structure due to the rougher texture of the liner and therefore also of the adhesive surface. Accordingly, the structure is more visible after application and is therefore one of the fundamental product characteristics. The visibility of the structure does not constitute a product defect but is due to the improved usability of the RA+ structure. Depending on the customer's or user's requirements, either the RA variant or the RA+ variant may be suitable. The customer or user must make this assessment themselves before starting the project.

For transparent films, it should be noted that films with an air-channel structure may appear cloudy immediately after application; this cloudiness will diminish over time and under the influence of heat.

### After completion of the work

After application, the boat must be kept at application temperature for at least a further 24 hours (see page 5 in this regard).

Experience has shown that the ORAFOL® film reaches its optimum final adhesion three days after application. The boat should not be launched before this period has elapsed.

As a general rule, ORAFOL recommends regular cleaning and care by hand using the ORACAL® cleaning and care products specially developed for boat wrapping with ORAFOL® films, available as complete sets for gloss and matt film surfaces. The mild yet highly effective cleaning and care products included in these sets are precisely matched to the differing sensitivities of the film surfaces. Care must be taken to prevent ingress of cleaning agents into the water. Cleaning with fresh water after each sea trip is recommended, particularly in highly saline waters, on horizontal surfaces and in strong sunlight.

In addition, ORAFOL expressly recommends initial impregnation with ORACAL® Long-Term Sealant from the corresponding cleaning and care sets for gloss and matt film surfaces immediately after completion of the application work or before first use.

The surfaces of matt and/or structured ORAFOL® films are naturally more sensitive than those of gloss and smooth films. Accordingly, these ORAFOL® films must be treated with particular care during application as well as cleaning and care. In addition, depending on the duration and frequency of use, experience has shown that cleaning and care are required more frequently.

In our experience, cleaning a vessel to which film has been applied using high-pressure cleaners or aggressive chemicals and solvents, e.g. acetone or paint thinner, generally results in damage to the film and possibly also to the paintwork, or in reduced durability of the applied film, and must always be avoided. In case of doubt, please contact our customer service.

**The current care and usage conditions issued by ORAFOL must be handed to the customer and explained upon delivery of the boat to which ORAFOL® films have been applied.**

### Removing ORAFOL® films

ORAFOL® films feature high-quality pressure-sensitive adhesives that provide permanent final adhesion. The possibility of adhesive residues remaining on the substrate after the film is removed cannot be ruled out. However, these can be removed using a silicone-free, citrus-based industrial cleaner.

A substrate and ambient temperature of at least +20°C is required for the ORAFOL® films to be removable. The ORAFOL® film should be carefully lifted at one corner with the aid of a knife and slowly peeled off at a 180° angle. The removal process can be made significantly easier by moderately heating the applied film to between +40°C and max. +60°C. The use of a commercially available steam cleaner is also recommended. The film's behaviour during removal is also significantly influenced by the type and condition of the substrate and by the conditions of use.

### Warranty information

Failure to comply with the application guidelines and care and usage conditions will exclude warranty and liability. The durability of ORAFOL® films applied to boats is largely determined by strict compliance with the application guidelines and the care and usage conditions. ORAFOL® films may only be applied and removed by qualified specialist personnel, i.e. trained and experienced signmakers or installers.

The qualified specialist personnel carrying out the work are responsible for the quality of the application. The owner of the film-coated boat is responsible for complying with the care and usage conditions. The information contained in these application guidelines is based solely on our current knowledge and experience. It does not constitute either an agreed quality or an assurance of specific properties, or a quality and/or durability guarantee with regard to ORAFOL® films. We do not cover the costs of removing an application.

ORAFOL provides project-specific warranty agreements for demonstrably qualified installers and signmaking companies.

If you have any further questions regarding the application and removal of ORAFOL® films, please contact our customer service.

Related documents:

Technical data sheets for the respective products

Care and Usage Conditions for Vehicle Film Installation:

[http://www.orafol.com/tl\\_files/content/downloads/careinstructions/de/PNB\\_CarWrapping\\_de.pdf](http://www.orafol.com/tl_files/content/downloads/careinstructions/de/PNB_CarWrapping_de.pdf)

Application Guidelines for Vehicle Film Installation:

[http://www.orafol.com/tl\\_files/content/downloads/applicationinstructions/de/Hinweise\\_CarWrapping.pdf](http://www.orafol.com/tl_files/content/downloads/applicationinstructions/de/Hinweise_CarWrapping.pdf)

Application Guidelines for Stone Guard Films:

[http://www.orafol.com/tl\\_files/content/downloads/applicationinstructions/de/Hinweise\\_StoneGuardFilm.pdf](http://www.orafol.com/tl_files/content/downloads/applicationinstructions/de/Hinweise_StoneGuardFilm.pdf)

Application Guidelines for Plotter Films:

[http://www.orafol.com/tl\\_files/content/downloads/applicationinstructions/de/Hinweise\\_Plottermaterialien.pdf](http://www.orafol.com/tl_files/content/downloads/applicationinstructions/de/Hinweise_Plottermaterialien.pdf)

Application Guidelines for Digital Printing Materials:

[http://www.orafol.com/tl\\_files/content/downloads/applicationinstructions/de/Hinweise\\_Digitaldruckmaterialien.pdf](http://www.orafol.com/tl_files/content/downloads/applicationinstructions/de/Hinweise_Digitaldruckmaterialien.pdf)

Application Guidelines for Print Media:

[http://www.orafol.com/tl\\_files/content/downloads/applicationinstructions/de/Hinweise\\_Druckmaterialien.pdf](http://www.orafol.com/tl_files/content/downloads/applicationinstructions/de/Hinweise_Druckmaterialien.pdf)

Application Guidelines for Interior Wall Application:

[http://www.orafol.com/tl\\_files/content/downloads/applicationinstructions/de/Hinweise\\_WallArt.pdf](http://www.orafol.com/tl_files/content/downloads/applicationinstructions/de/Hinweise_WallArt.pdf)

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