Preliminary remarks

The following general tips are given for application of ORAFOL® Plotter Materials. If you want to apply plotter material on a car, please also see our practical information for self-adhesive films for application on cars (www.orafol.com).

ORAFOL recommends to use only material with the same batch number for one graphic application. In this context ORAFOL ensures that every film roll consists of material of the same batch number and consequently does not have any splice. When different batch numbers are used the technician should make tests to find out possible differences in using the films and in the quality of the graphic application.

Storage and processing conditions

ORACAL®, ORAMASK®, ORALITE® and ORATAPE® self-adhesive products are delivered in rolls which should at any times be stored either suspended or standing on the roll blocks provided in a cool, dry place protected from sunlight. Prior to processing, the self-adhesive films should be accommodated to the humidity and temperature prevailing in the processing area. Relative humidity between 40 % and 50 % and temperatures in the range of +18° C to + 22° C are considered ideal. Extreme variations of the above conditions could lead to expansion or shrinkage of the protective paper. The result is insufficient flatness of the self-adhesive material and dimensional changes in the cuts. Please observe the storage instructions provided in the technical data sheet accompanying each film.

Preparing the surface

The high-quality special adhesives used for ORACAL® self-adhesive materials create an excellent bond with just about any clean, smooth and weatherproof surface which is free of grease, wax and silicone. Prior to applying the ORAFOL® self-adhesive products, clean the surface thoroughly with isopropanol and wipe it dry with a cloth. Gas bubbles may form between the film and the surface if any solvent residue remains as a result of improper cleaning or if the lacquer on the surface is too fresh. Allow at least three weeks to elapse before applying the film to lacquer which has been air-dried or baked. Isopropanol is recommended as the cleaning agent as other agents may, under certain circumstances, attack the lacquer or reduce the adhesive strength of the film.

For surfaces which tend to outgas, such as polycarbonate products, we recommend the following steps. Clean the surface, apply a piece of film and store it at +60° C for about 24 hours. If after this time bubbles have formed in the bond, outgassing is still taking place. In such a case, the plastic material must be thermally treated or stored under room conditions for a longer period. When using ORAMASK® plotter films, it is important that the surfaces receiving the designs be thoroughly cleaned. Isopropanol is preferred for cleaning lacquered surfaces and vehicle tarpaulins. When used on those surfaces (tarpaulins in particular), the spirit should be removed as soon as possible after cleaning to prevent it from penetrating into the surface coating. Be sure to allow sufficient time for the solvent to evaporate after cleaning. For jobs calling for multi-coloured designs, make absolutely sure that the ORAMASK® plotter films are only applied onto paint which is thoroughly dry. Residual solvents may cause residue from the adhesive to remain after the stencil film is removed.

Application temperatures

The application should be at the temperature mentioned in the respective data sheet. A significant drop in temperature should be avoided during the first 24 hours after adhesion. Should a temperature drop nonetheless occur, we recommend treating the film with hot air from a hot-air gun.

Removing silicone paper

Lay the cut plotter film with the film side down on a flat surface. Pull back only as much silicone paper as required to begin mounting. Always draw the silicone paper from the film, never the other way round.

Application

ORAFOL recommends to use only material with the same batch number for the same colour. There are two major methods of application: dry and wet adhesion. For dry adhesion, first position the film cut and press it at one corner on the surface. Then adhere the remainder by applying a plastic squeegee across the film in overlapping sweeps. Depending on the size of the cut being mounted, the silicone paper may be removed completely before bonding or gradually during the adhering procedure. When using ORATAPE® application paper or film, pull these slowly away from the film at a 180° angle. Wet adhesion should only be done in warm weather when temperatures are at least +18° C. Spray the exposed adhesive side with low-surface-tension water (water mixed with a flushing agent) and lay it upon the receiving surface. The ease of precise positioning is the great advantage of the wet adhesion method.

Press the film to the surface using sweeping, overlapping motions. Make sure that the water is completely squeezed out from between the surface and the adhesive. For wet adhesion, we recommend ORATAPE® MT72 application paper. After a short drying period, remove application paper carefully at a 180° angle. Slightly moistening the back side of the application paper makes this procedure even easier. The bond is improved if the film is pressed again to the surface after a few hours. To avoid differences in perceived colour after adhesion, ORACAL® coloured films should always be worked and adhered in one direction only. When mounting across overlapping sheets of metal or expansion joints, use a sharp knife to separate the film at these points so that the film does not come loose when exposed to motion. Different background profiles are used in vehicle construction.

When applying films to such backgrounds always follow the profile. Never just lay out the film and press it under tension into the recess. With overlapping film adhesion, it is important to make sure that the edges of the film sheets overlap by a minimum of 4 mm and a maximum of 12 mm. When applying film to film, make absolutely sure that only films of the same manufacturer and the same type are put on top of each other (monomeric film on monomeric film and polymeric film on polymeric softened film).

Caution! Certain thermal insulation glazing systems may be damaged by self-adhesive films due to thermal stresses caused by extreme temperature fluctuations.

Application on cars

For the application on cars please see additionally the practical information on how to apply self-adhesive films on cars. For the application on car windows the remarks in the practical information for application on cars are to be followed.

Service life by climate zones

The service life specified in the technical data sheets applies to vertical outdoor exposure under normal central European environmental conditions. The following table provides an overview of the expected reduction in the service life under deviating environmental conditions, which are divided into three climate zones. The specification is valid for all color films suitable for vertical and horizontal application (such as entire vehicle wrapping, vehicle lettering and marking). In case of all other films, the service life data apply only to vertical uses.

Climate zone 1: temperate (e.g. Nord/Central Europe / North US) Vertical: Data in the technical datasheet 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): arid / hot (e.g. 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 life of ≤ 5 years in C1) vertical applies: C3) vertical = C2) vertical minus 50% C3) horizontal = C3) vertical minus 50%

Climate zone 1* temperate		**Climate zone 2*** humid / warm		**Climate zone 3*** arid / 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

Note
The service life data exclude in principle any gradual changes that may be caused by aging or weather conditions during the application period. Examples are minor color deviations, reduction of gloss and surface embrittlement without crack formation.

Removability

Environment and surface temperature must be at least +20° C before these films can be removed. Using a knife, first lift up cautiously one corner of the film. Then slowly draw the film from the surface at a 180° angle. Heating the film with a hot-air gun while pulling makes removal considerably easier. If the film being removed is very old, a small amount of residue from the adhesive may remain on the surface. It can be removed easily with varnish thinner.

This information is based on our knowledge and experience. We have not explained all considering aspects of application. Specialised or occupational knowledge and competence of a professional sign maker are presupposed. Due to the diversity of potential influencing factors during application and use, we recommend to make own tests of our products by customers who wish to use the films for special applications. No legally binding warranty of certain qualities can be derived from our information.

Oranienburg, 11 May 2012

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