



Product Technical Bulletin

ORALITE® Series 5600 Fleet Engineering Grade Reflective Film Release 1, Effective April 2007

Description

ORALITE® Series 5600 Fleet Engineering Grade Reflective Film was specially developed for the manufacture of fleet vehicle, long-term traffic control, guidance, warning and information signs, reflective letterings, numbers and symbols. Compatible with solvent-based inkjet and thermal printers, conformable Series 5600 film features a permanent, solvent-based adhesive and an 84-lb., PE-coated liner. This 5-mil, 7-year film offers outstanding resistance to chemicals and corrosion and features excellent reflectivity to provide a good reflection even in poor visibility and bad weather conditions. Its special impact- and scratch-resistant surface and high flexibility make it an excellent choice for use on all types of reflective signage. Series 5600 film complies with international specifications for reflective materials, including ASTM D4956.

Product Data

Construction

This information is subject to change. Please ensure you are referencing the most recent Product Bulletin.

- **Face Film** – 5-mil retro-reflective cast PVC film
- **Adhesive** – Solvent polyacrylate, permanent, removable with heat

Physical Properties

The information stated below is based on testing results and intended solely as an information source. These values are given without guarantee and no warranty is implied or expressed. ORACAL recommends the purchaser conduct independent tests prior to use in order to determine suitability for his/her intended application.

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| Outdoor Durability | 7 years |
| Application Surface Contours | Uneven or curved surfaces, corrugations or rivets |
| Minimum Surface/Air Application Temperature | +46° F |
| Temperature Resistance | Adhered to acrylic, -68° F to +176° F no variation |
| Resistance to Solvents and Chemicals | After 72 h adhered to aluminum at room temperature, resistant to most oils and greases, weak acids, salts and alkalis |
| Shelf Life | 2 years (68°F/50% relative humidity) |
| Adhesive Power | (FINAT-TM 1, after 24h average) adhered to stainless steel: 3.4 lb/in ² , tear of the film |
| Tensile Strength (along) | (DIN EN ISO 527) min.10 MPa |

| | |
|------------------------------|-----------------------------|
| Tensile Strength (across) | (DIN EN ISO 527) min.10 MPa |
| Elongation at Break (along) | (DIN EN ISO 527) min. 30% |
| Elongation at Break (across) | (DIN EN ISO 527) min. 50% |
| Dimensional Stability | N/A |

Colors

ORALITE® Series 5600 Fleet Engineering Grade Reflective Film is available in 14 high-impact colors including white, lemon yellow, yellow, orange, red, ruby red, green, sky blue, blue, brown, black, gold, turquoise and violet.

Printing and Fabrication

Color Profiles

Color profiles can be downloaded from www.oracal.com. For additional color management support, please call ORACAL USA's Technical Support team at 1-800-ORACAL-1 (672-2251).

Ink Drying

Allow printed film to dry flat for at least 24 to 72 hours at 70°F before applying a laminate or cutting, trimming, mounting or applying the graphic.

Laminating

To provide UV protection and extend the life of the ink for up to four years, ORACAL recommends laminating all digital prints. Series 5600 is compatible with ORAGUARD® Series 290 laminates.

Compatible Substrates

ORALITE® Series 5600 film is compatible with most clean, smooth, non-porous, rigid, weather-resistant surfaces. For use in manufacturing traffic signs, the most reliable and durable substrates are properly prepared aluminum sheets and extrusions. ORACAL recommends that users carefully evaluate all other substrates to determine their suitability for reflective film applications.

Substrate Evaluation

For successful application of reflective media, the following substrate properties must be tested and determined to be suitable:

- Adhesion – initial and long term
- Outgassing
- Mechanical properties
- Durability

Adhesion

Following the guidelines provided on pages 5 through 10 of this bulletin, prepare the substrates to be tested. In addition, an etched and degreased aluminum panel should be used as a control. Substrate preparation is an area to test various procedures, such as:

- Aluminum – Etch, no etch, alloy, mechanically reclaimed, surface roughness, surface coating type, panel thickness
- Plywood – Grade, sanded, not sanded, sealed edges, unsealed edges, paint type
- Plastics - Type, new, recycled, flame treated, chemically treated surface, solvent wiped

Properly apply the reflective film to the prepared substrates (including the aluminum control panel) following the instructions for each substrate as described in this bulletin.

Application Important Notes

- The high-quality adhesives used on ORACAL pressure-sensitive films create an excellent bond with most clean, smooth, weather-resistant surfaces that are free of grease, dust or any contaminants. For a long-lasting bond, the target surfaces must be properly prepared. ***Be sure to check the directions provided by the manufacturer of the substrate you are using to determine the recommended cleaning method for that surface.*** Gas bubbles may form between the film and the surface if any solvent residue remains as a result of improper cleaning or if paint on the surface is too fresh. Freshly lacquered or painted surfaces should be allowed to stand for at least three weeks after complete curing before adhering the film. *The compatibility of selected lacquers and paints should be tested by the end-user prior to use.*
- ORALITE® Series 5600 film should be conditioned prior to application to provide a minimum film temperature of 65 °F throughout the roll. Be sure to store both the film and the substrate in the same area so that the temperatures of the substrate and the media are the same.
- For best results, use a mechanical applicator to apply reflective film. Mechanical applicators apply even pressure and ensure a bubble-free and wrinkle-free application, whereas hand application can result in bubbles and/or wrinkles that cannot be removed from the finished sign.
- Never use a wet application method with reflective film as the moisture between the face stock and the substrate can cause the reflective metal particles to oxidize. Use of a wet application method will invalidate the standard warranty on this product.
- Clean, lint-free gloves should be used to prevent contamination when handling blanks and film.

Application Techniques

Application Temperatures

ORACAL films should never be adhered at temperatures below 46°F. Newly fabricated sign faces should remain in the application environment for at least 24 hours to promote uniform adhesion and allow any residual moisture to evaporate. A significant drop in temperature should be avoided during the first 24 hours after adhesion.

Cutting

Reflective film either can be cut by hand or die cut one sheet at a time, or it can be band sawed or guillotined in stacks. If two or more pieces are used side by side, they must be matched to assure uniform day color and night appearance. ORALITE® Series 5600 Reflective Film is designed for use on electronic cutting plotters. To reduce the possibility of stress cracking, the inside corners of cut out letters and symbols should be rounded using the largest radius consistent with acceptable appearance. Minimum radius should be 1/8" on a 3" letter.

Edge Sealing and Clear Coating

Clear coating of ORALITE® Series 5600 Reflective Film is not recommended because it will reduce the normal effective performance life. Edge spotting of cut letters that will be exposed to de-icing salts or will be installed in highly industrialized areas can be minimized by coating the sign with edge sealer.

Storage

Shipping, Storage, Shelf Life

- Film must be stored at 68°F/50% relative humidity.
- For optimal product quality and performance, film must be stored in a dry, clean area, out of direct sunlight.
- Shelf life of ORACAL® Series 5600 must not exceed two years from the date it is received from ORACAL USA.
- Store rolls horizontally in the shipping carton.
- Store partially used rolls in the shipping carton or suspend horizontally from a rod or pipe through the core.
- Unprocessed sheets should be stored flat.
- Finished signs should be stored on edge.
- Screen processed faces or signs must be protected with resin-coated paper or the liner from Series 5600 used as slipsheeting. Place the glossy side of the slipsheeting against the sign face. Double-faced signs must have the glossy side of the slipsheet against each face of the sign.
- Avoid banding, crating or stacking because this puts signs and faces under pressure. Package for shipment in accordance with commercially accepted standards to prevent movement and chafing, which may cause damage during handling.
- Store sign packages indoors on edge.
- Do not allow panels or finished signs to become wet in shipment or storage. Should packages signs become wet, unpack immediately and allow signs to dry.

General Performance Considerations

The durability of ORALITE® Engineering Grade Reflective Film depends upon substrate selection and preparation, compliance with recommended application procedures, geographic area, exposure conditions and maintenance. The stated maximum durability rating of Series 5600 film can be expected in applications that are subject to vertical exposure when processed and applied to properly prepared aluminum according to ORACAL recommendations.

The user must determine the suitability of any non-metallic sign backing for its intended use. Applications to unprimed, excessively rough or non-weather-resistant surfaces, or exposure to severe or unusual conditions can shorten the durability of such applications. Signs in mountainous areas that are covered by snow for prolonged periods may also have reduced durability.

Warranty

ORACAL USA warrants its pressure-sensitive vinyl films to be free of defects in materials and manufacture, and to perform as stated in published product technical information bulletins if properly stored and applied. ORACAL USA will, at its discretion, either replace defective material or refund the purchase price of any ORACAL®, ORAJET®, ORAGUARD®, ORALITE® or ORAMASK® materials that do not meet this warranty within the specified effective performance life. The customer assumes responsibility in determining product suitability for intended use. ORACAL USA shall not be liable for any direct, indirect or consequential damages arising from the use or inability to use the product. This warranty is declared in lieu of any other claim, whether

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expressed or implied, and is not subject to interpretation. If you are in extreme climate zones (Southwestern United States, desert, tropics, etc.), South America, Latin America or the Caribbean, contact ORACAL USA for specific warranty information for your area.

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