

Avery[®] Technical Bulletin # 5.01

Substrate Requirements for Reflective Sheeting

Introduction

The following standard practices are essential for the proper application of Avery Dennison Reflective Sheeting. To realise the full effective performance life of Avery Dennison Reflective, properly prepared surfaces and application to approved materials must be used.

Users are urged to carefully evaluate, under actual use conditions, any sheeting application to such materials. Failure of sheeting caused by the substrate (such as thermal expansion, warpage, or surface contaminants) will void any sheeting warranty.

Testing for surface Cleanliness

Before applying Avery[®] Dennison Reflective, the surface of the material must be totally free of any contamination, dust, residue, loose scale and, in particular, traces of oil, greases or wax. Sign blanks should be handled by the edges using clean cotton or canvas gloves. Refer to Technical Bulletin #1.01 for Substrate cleaning and Preparation.

In case of doubt as to cleanliness of the substrate, two tests are available for guidance:

Tape Test – Press onto the surface a 75 – 125mm length of common transparent self-adhesive tape. After 60 seconds, tear off quickly at a right angle and inspect for evidence of transferred material or indications of a contaminated surface for metal substrates.

Water-Break Test – Minute traces of grease, oil or wax can be detected by pouring clean water onto the surface. On a clean surface, water tends to hold a uniform film. On a contaminated surface, the water beads up into many small droplets.

Solvent Wiping

Immediately prior to the application of the sheeting, it may be necessary to remove any contamination, greasy fingerprints or residue by solvent wiping the surface of the substrate. Refer to Technical Bulletin #1.01 for Substrate cleaning and Preparation.

1. Saturate a clean cloth, with an alcohol based solvent, mineral spirits, or a similar commercial solvent. Be sure the solvent is absolutely clean. Continual use from the same solvent container can result in contamination
2. Wipe the surface thoroughly, including areas near the edges where handling occurs
3. With a dry, clean, lint-free cloth wipe the surface before the solvent evaporates.

Surface Preparation

Many reasonable rigid, weather-resistant substrates having smooth, flat, clean surfaces will work satisfactorily for proper application. However, the approved materials of choice are sheet and extrusion aluminium, and MDO

Sheet aluminium- Sheet aluminium (6061- T6 or 5052-H38) that has been thoroughly treated and properly prepared.

These materials fulfill the terms of the Avery® Dennison warranty and are found to be the most reliable. Users are urged to carefully evaluate all other materials for their specific use.

Extrusion Aluminium - Extrusion Aluminium may be 6061-T6 or 5052 H38 alloys and must be properly prepared and chemically treated prior to the application of High Performance Reflective Sheeting. This also applies to special sign extrusions (See Fig. 1).

Generally users will obtain aluminium blanks from an experienced supplier who will treat them to a “degreased, etched and chromate conversion coated” specification. Use of an experienced, reliable source with quality treatment is strongly recommended.

1. **Degreasing-** degrease using an alkaline solution in a tank-type bath may be used. Contact the solution manufacturer for details regarding time, temperature and concentration. Rinse thoroughly using a high-pressure wash with clean water and allow to dry completely.
2. **Etching-** this process is performed using specially designed chemical conversion tanks and either an acidic or alkaline etch solution. Time, temperature and concentration may vary depending on the type of solution. Contact the solution manufacturer for details. Always rinse thoroughly using a high-pressure wash with clean water and allow to dry completely.
3. **Chromate Conversion Coating-** This type of coating is used to resist corrosion and aluminium oxide. It must be applied according to ASTM B449-67 specification. It should be consistent weight and no darker than pale yellow. The coating should be well bonded to the metal and coherent within itself showing no dusting on the surface.

Reclaimed Aluminium- The refurbishment of aluminium from old traffic control signs may be achieved by means of mechanical abrasion processes. The signs must first be flat and free of large indentations or surface damage. The aluminium must be treated as stated above.

Note: Be sure to obtain and follow all Material Safety Data Sheets in the use of any chemicals.

Steel- Direct applications to galvanised steel that has been phosphate coated can be made. The surface must be smooth and free of scale and any type of rust. If necessary, degrease or solvent wipe the surface and rinse with clean water. Allow to dry.

Consult a Stimsonite representative regarding the application of Stimsonite Reflective Sheeting.

Plywood and Other Wood Products

Due to the inconsistencies in wood products, carefully evaluate, under actual use conditions, any sheeting application to such materials. Failure of the sheeting caused by the substrate is not covered by any warranty.

The only approved wood product is properly prepared medium density overlaid plywood (MDO). A cal rod must be used, during lamination of sheeting to this substrate.

Overlaid Plywood- When using MDO, the surface must be clean and free of release agents or other contaminants. Before application, abrade the surface with fine grit sandpaper and wipe with a tack cloth to remove any foreign particles or residue. Seal all edges of the wood.

Other Substrates

The following are recommendations on other substrates. As many of these products vary in composition and uniformity, users are urged to carefully test and evaluate each product for their intended use.

Plastics

All plastics vary as to the manufacture because of the various types and composition (polyethylene, polypropylene, etc.) Some plastics contain migrating contaminants that will migrate to the surface during exposure and affect the adhesive bond. The use of processes such as solvent wipes, flame treatment and heat-treating may help in achieving initial and maximum adhesion. Application to these substrates requires careful evaluation. Evaluate all plastic substrates under actual use conditions prior to production. The following are only recommendations for using the various substrates. Check with an Avery Dennison representative for the warranty coverage on special applications.

Acrylics and ABS- Solvent wipe the surface with isopropyl alcohol before application.

Fibreglass and Polycarbonates- Sometimes outgassing may occur with these materials. Solvent wipe the surface with isopropyl alcohol before application. Apply a small piece of sheeting and allow it to bake at 65°C for 24 hours. If bubbles appear under the sheeting outgassing is occurring. It may be necessary to heat treat the panel prior to lamination.

Polyolefin's- It is recommended these types of plastics be flame treated prior to use. Solvent wipe the surface with isopropyl alcohol before application. These products exhibit a range of thermal expansion, and the users are urged to test each product for its intended use.

Glass and Painted Surfaces- Due to the various surfaces encountered, evaluate these substrates under actual use conditions. Prior to application refer to Technical Bulletin #1.01 for Substrate Cleaning and Preparation.

Other Materials- Application of Avery® Dennison Reflective Sheeting can be made successfully to many materials but all substrates should be carefully evaluated before use.

Contact an Avery® Dennison representative for further instructions on materials other than the ones listed in this bulletin.