

Avery Dennison® Instructional Bulletin 1.01

Substrate Cleaning and Preparation

Introduction

Proper cleaning and preparation of substrate prior to application of pressure sensitive adhesive films is critical to the success of the application. All substrates should be considered as contaminated and must follow substrate cleaning and preparation guidelines outlined in this bulletin immediately prior to application. Failure to adhere to these requirements can cause adhesion loss and therefore reduce the durability and performance level of the material. The following conditions are relevant to properly prepared substrates and paint systems when processed correctly as per the manufacturers specifications.

Note: It is the responsibility of the end-user/applicator to ensure all painted substrates have been processed and cured per the paint manufacturer's requirements. Failure to follow paint manufacturer requirements can lead to adhesion failure and/or removal problems.

This bulletin provides procedures for effectively cleaning and preparing identified substrates for optimised material performance.

Note: The use of any chemicals recommended in this bulletin should be done with caution, and ALL manufacturer's safety guidelines and warnings should be followed, including use of the appropriate personal protection equipment. When using Avery Dennison Surface Cleaner or Adhesive Remover, the use of chemical resistant Nitrile Gloves and Safety Glasses in a well ventilated area is required. Always read the instructions on the container, MSDS, or contact the manufacturer for usage guidelines.

1.0 Standard Cleaning and Preparation - Fleet and Automotive

Vehicle surface must be OEM paint, in good condition and must be cleaned thoroughly to remove all dirt, grime, grease, oil, wax, polish, copolymer or ceramic coatings and other contaminants.

Note: Aftermarket automotive paint, are not warranted for the application of Avery Dennison pressure sensitive adhesive films. Aftermarket paints that are uncured, poorly prepared, can result in a range of problems from outgassing and bubbling under our films to softening of our adhesive resulting in a range of adhesive related issues such as reduction in adhesion, film shrinkage, loss of long term removability, adhesive transfer, or even the debonding of the aftermarket paint from the vehicle. Any application to aftermarket automotive coatings will be at the installer's risk.

1.1 Pre Cleaning Wash

- Remove all dirt and grime with water and detergent solution
- Remove any co-polymer paint protection coatings with the use of Autoglym Multiwash, as per manufacturer instructions
- Remove any further paint protection coatings: ie. Ceramic, or other liquid coatings as per the recommended manufacturer's guidelines.
- Do not use any polishes, waxes or tyre shining agents post wash
- Allow the vehicle to dry thoroughly ensuring no water remains in areas such as seals and behind door handles. A compressed air gun can be used to aid in drying hard to get to areas
- For any hard to remove grease, oil, wax or polish, use a rag soaked in solvent, such as Isopropyl Alcohol (IPA), or Avery Dennison Surface Cleaner

Note: The surface must be completely clean, smooth, and dry before final preparation.

Caution: Prior to cleaning with solvents, test the solvent on an inconspicuous area of the surface to check for potential damage from solvent usage.

1.2 Final Surface Cleaning and Preparation

- After following the pre-cleaning instructions above, the substrate should be thoroughly cleaned with Avery Dennison Surface Cleaner.
- Spray Surface Cleaner onto the substrate and allow it to dwell, remove using a clean, soft, lint-free cloth, remembering to rotate the cloth for each new area you clean.

or alternatively

- The substrate can be cleaned with an IPA and water solution (70% IPA and 30% water), using a lint free cloth or microfiber towel soaked with the solution and then wiped off with a clean dry lint free cloth or microfiber towel, before the solution has time to evaporate, remembering to rotate the cloth for each new area you clean.
- Take special care with recesses, corners, returns of panels, behind rubbers (e.g. inside edge of door) and any hard to reach areas
- It may be necessary to clean some areas more than once until the desired result is achieved

1.3 Final Check

- Check all critical areas using the 'nail test'. Feel the surface with the back of your fingernail. If the surface feels slippery and your nail slides easily, then it should be cleaned again. If it is difficult to slide your nail across the surface and it grips heavily, then the surface is clean.

Note: There must be no dirt, grime, grease, oil, wax, polish, copolymer or ceramic coatings or solvent residue remaining on the substrate prior to application. Using a heat gun to heat the substrate can accelerate the removal of any residual solvent.

2.0 Instructions for Specific Substrates

2.1 Non-Recommended Paint Surfaces

Caution: Avoid the use of the following paint finishes; always test adhesion and paint/adhesive compatibility prior to production use.

- Avoid unpainted walls or gyprock.
- Avoid highly pigmented or flat metallic paints, which tend to chalk and flake promoting poor film adhesion.
- Avoid matte, highly textured paints, stain resistant or wash and wear paints.
- Avoid flat latex paint and all latex paints on wooden substrates.
- Paints containing migratory agents, such as chlorinated waxes and silicones, may cause adhesion failure. Avoid oil alkyd primers and enamels, as they are slow to dry and will adversely affect adhesion.

Note: Oil alkyd or enamel coatings can take up to 1 month or longer to fully cure, and any films applied to uncured coatings can result in shrinkage and distortion of our film.

- If applying film to a newly painted surface, follow all drying and curing instructions provided by the paint manufacturer prior to surface preparation and film application.
- All air-drying (non-enamel/non-oil alkyd) paints should be allowed to dwell at or near ambient room temperature (16°C to 25°C) and dry (50%) non-humid conditions for a minimum of one week or longer under colder or high humidity environments prior to film application.

Note: Increased airflow and ventilation will assist paint drying in humid conditions.

- Baked enamel paints may be used directly upon cooling.
- Application of retroreflective film to zinc chromate primer or zinc rich primer is not recommended.
- Chalked and otherwise weathered paint surfaces must be refurbished with buffing, then sealed with a recommended paint.
- Any section of painted metal with bare or rust spots should be entirely resurfaced.
- Non-film covered portions of painted metal should have a minimum of one finish coat.

2.2 Recommended Paint Surfaces

- The use of high quality exterior or interior grade paints and OEM systems in gloss or semi-gloss finishes are recommended, followed by substrate cleaning and preparation instructions as specified above.
- Qualified paint coatings: Viponds Self Adhesive Prep Coat, in clear or white and in gloss or semi-gloss finishes is recommended. Application and curing time are outlined in Instructional Bulletin 1.62 interior Wall - Viponds Self Adhesive Prep Coat System.

Note: Always test adhesion and adhesive compatibility prior to use and refer to Instructional Bulletin 1.6 Printing Processing and Application of Interior Wall Graphics for detailed information on interior wall paints.

Note: Paints that are 'wash and wear' or have additives that are designed to repel stains or contaminants, are not recommended due to the potential of reduced adhesion resulting in edge lifting and adhesive failure.

2.3 Tin or Alloys of Tin, Copper, Magnesium, Lead and Brass

- Not recommended or warranted for pressure sensitive film applications.

2.4 Stainless Steel

- The use of high quality exterior grade paints, OEM systems, etched or anodised stainless steel (degreased).

- Use 'Final Surface Preparation and Cleaning' method

Uncoated, unetched, badly pitted or oxidized stainless steel:

- Remove oxidation, with a light acid wash, or with sandpaper
- Smooth with sandpaper (150 grit or finer)
- Degrease the metal
- Etch the surface or prepare with the following treatments
 - Chromate: ASTM B 449, Class 2

- Non-Chromate: ASTM B 449, Class 1

- Ensure treatment adheres to substrate, and no residue can be removed easily
- Stainless steel substrates tend to maintain cold surface temperatures longer than most substrates. The use of a heat gun immediately before and after application accelerates adhesion.

Note: Application of Avery Dennison PX metallised films (PX 1070, 2070, 1071, 2071, 1076, 2072) and all retro reflective films (unless specifically designed for stainless steel use) to bare stainless steel substrates is not recommended or warranted.

2.5 Unpainted Fibreboard and Unpainted Wood

- Generally not recommended for pressure sensitive adhesive films.
- Must be sealed with recommended gloss or semi-gloss water based paint, or Viponds Self Adhesive Prep Coat and cured according to recommendations in IB 1.62 prior to decal application.

2.6 Galvanized Steel

- Confirming Proper Steel Galvanizing is Necessary
- To ensure the substrate is properly galvanized, it is recommended to test all lots of galvanized steel. The following prepared solution is recommended:
- 1 molar solution of Cupric Sulphate (25g of CuSO_4 mixed in 1 litre of deionized or purified water).
- Apply solution to the substrate using a clean dry rag. Surface is properly galvanized if the solution turns 'black'; continue with preparation procedures.
- A 'copper' colour indicates lack of galvanizing, and does not apply to this substrate.

2.7 Preparation of Galvanized Steel Sheet

- Remove any zinc oxide, zinc hydroxide, and the like from the surface by mechanically brushing the surface with a plastic abrasive pad.
- Degrease with a petroleum-distillate solvent such as Heptane, wipe the surface with a clean dry cloth.
- Wipe the surface with IPA, and dry with a clean dry cloth before the solvent evaporates.

2.8 Special Conditions for Retroreflective Film Applications to Galvanized Steel

- For retroreflective film application, the surface must be primed and painted.
- If metal is to be completely covered with film, a primer coating is generally sufficient on a smooth surface. Application of retroreflective film to zinc chromate primer or zinc rich primer is not recommended.
- Retroreflective film must be sealed around all edges.
- Portions of painted metal not covered by film should have a minimum of one finish coat.

2.9 Aluminium

Note: It is recommended to use etched aluminium surfaces only.

Etched or anodized aluminum (degreased):

- Use 'Final Surface Preparation and Cleaning' method

Uncoated, unetched, badly pitted or oxidized aluminium:

- Remove oxidation, with a light acid wash, or with sandpaper
- Smooth with sandpaper (150 grit or finer)
- Degrease the metal
- Etch the surface or prepare with the following treatments
 - Chromate: ASTM B 449, Class 2
 - Non-Chromate: ASTM B 449, Class 1
- Ensure treatment adheres to substrate, and no residue can be removed easily

3.0 Polycarbonate (i.e. Lexan®)

- Not recommended or warranted for polyester films.
- Using a soft, clean, lint free cloth, solvent wipe the surface with IPA, wipe substrate dry before the solvent evaporates.
- Follow polycarbonate manufacturers drying and preparation instructions. Failure to properly prepare polycarbonate before film application may result in severe air bubbles trapped between the film and substrate sheeting.
- Test for outgassing by applying a small sample of film intended to be used to the polycarbonate, then oven bake the applied sample for 18 to 24 hours at 65°C to 70°C. Resulting bubbles under the film indicate outgassing is occurring. If outgassing occurs, application of Avery Dennison film to the polycarbonate is not recommended or warranted.
- Refer to Instructional Bulletin 1.05 for detailed instructions

3.1 Acrylic and other Acrylates (i.e. Plexiglas®)

- Not recommended or warranted for polyester films.
- The use of high quality exterior grade paint and OEM systems are recommended, followed by substrate cleaning and preparation instructions as specified above.

3.2 ABS

- The use of high quality exterior grade paint and OEM systems are recommended, followed by substrate cleaning and preparation instructions as specified above.

3.3 New Fibreglass

- Using a soft, clean, lint free cloth, solvent wipe the surface with an IPA and water solution (70% IPA and 30% water), wipe substrate dry before solvent evaporates.
- Follow manufacturers' curing and preparation instructions. Failure to properly prepare before film application may result in severe air bubbles trapped between the film and substrate sheeting.
- Test for outgassing & adhesion by applying a small sample of film intended to be used to the fibreglass, allow to dwell at room temperature for 24 hours or oven bake for 3 hours at 65°C.
 - If bubbles appear, outgassing is occurring. Cure the fibreglass for 5 days at 60°C and repeat the outgassing test.
 - If the adhesion is low, contact the manufacturer for recommended solvent to clean to remove any surface contaminants.

Note: New fibreglass that has mould release (silicone) agents on the surface can be removed with strong solvents like Acetone. Testing should be done in an inconspicuous spot to ensure the strong solvent doesn't damage the fibreglass. Caution should be exercised with the use of solvents, following the manufacturer's safety instructions for use ie Personal Protective equipment, and flammability hazard.

3.4 Weathered (Oxidized) Fibreglass

- Fiberglass that has been exposed to the elements can become oxidized and therefore may require additional cleaning.
- Begin by following procedure as outlined above:
 - Standard Method (scrubbing the surface until water runs clear), followed by
 - IPA and water solution method
 - Solvent Based Method
- After cleaning, test for proper adhesion by applying a small sample of the film intended to be used. Allow to dwell for 60 seconds and then pull it off. Check the adhesive side of the sample to determine if it is still tacky or if it has removed additional residue from the fiberglass surface. If residue is on the sample additional cleaning is needed to remove oxidation.
- If further cleaning is required try using an abrasive pad such as the Mr. Clean Magic Eraser. Scrub the entire surface to remove additional oxidation. Once completed, follow the procedure outlined above again.

Note: If the Fibreglass surface continues to be removed upon adhesion testing, then it will need to be resurfaced with a new fibreglass gelcoat. Cleaning procedure as outlined in the New Fibreglass section should then be followed.

3.5 Concrete or Cinder Block

- Concrete should be indoors or in a well protected area away from environmental factors.
- All concrete surfaces should be sealed and/or painted with approved products as designated by their manufacturers to create a non-porous surface. Contact paint and sealant manufacturers for best recommendation.
- The use of high quality exterior grade paint and OEM systems are recommended, followed by substrate cleaning and preparation instructions as specified above.

Note: Ensure the paint manufacturer's instructions are followed with regards to surface preparation, application and adequate paint drying time before the application of films.

Note: Concrete walls both internal or external, that are facing North, North West or West, or are exposed to elevated temperatures: ie Afternoon sunlight / summer conditions / high heat regions of Australia, need to be sealed with a high quality coating to prevent outgassing and bubbling under any applied films.

3.6 Glass

- Glass must be perfectly clean prior to application.
- Remove any tape, stickers, paint, stain or overspray, using a single edge razor blade scraper and/or a 4" razor blade scraper or non-scratch window scourer (available at most hardware stores) pre spraying the glass with a detergent solution (1-2ml of baby shampoo soap per litre of water).
- Clean and dry all window frames and rubber seals prior to cleaning the glass
- Once the glass has been scraped clean of contaminants, use the 4" razor or a non-scratch window scourer to scrape the glass again, removing any remaining residue.
- Spray the glass with a cleaning solution and squeegee it dry using a soft rubber window squeegee.
- Wipe the window frame and edges dry using lint-free paper towels.

Note: Wetting the glass with a cleaning solution (DuPont Prepsol or Isopropyl Alcohol, or soap / water solution) will reduce the chance of scratching the surface during the scraping process. Use a fresh blade for each job. Check the blade for imperfections that may cause scratches.

Note: Do NOT use Windex, or ammonia based cleaners (ammonia affects the adhesive polymer stability).

Note: Special care must be taken when applying films made of polyester. These types of films will not conform to small amounts of dirt if left on the substrate and therefore defects will become more noticeable once the application is complete. Always ensure that the surface is 100% clean and the environment is dust and debris free.

Note: Avoid using large areas of dark colours on glass, especially black or large areas of highly contrasting colours. If these areas are exposed to direct sunlight it can cause thermal shock or stress resulting in glass breakage or cracking. Avery Dennison accepts no liability for glass breakage due to temperature differential across the glass, or stresses caused by differential expansion or contraction of the glass compared to an applied graphic or film. Glass is prone to break under the stresses caused by temperature changes across the surface, which could be amplified by the application of vinyl film.

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The above information provides basic information on how to apply pressure-sensitive graphics. The instructions are designed to help ensure success across a broad range of applications. Depending on the size and complexity of applications, a certain amount of expertise is needed.

Professional applicators can be hired to ensure proper application of finished graphics. When mounting graphics in remote geographic areas, professional applicators can offer the added benefit of local service.

Avery Dennison has a vast network of Certified Installers who have been specially trained and certified in accordance with our recommended techniques.

You can review the Certified Installer list here: [Find a Graphics Installer](#)

Consider hiring a professional whenever the application requires:

- Multiple panels to be registered
- Complex surfaces, such as rivet and corrugated trucks
- Harsh environmental conditions (i.e. outdoor applications in high heat climates)
- Remote geographic locations

For further information, contact your local Avery Dennison representative.