

Printing, Processing and Application Instructions for Bus Wrapping

Instructional Bulletin #6.20 (Revision 10)

Dated: 12/31/14

1.0 Overview

Avery Dennison™ recognizes that the bus wrap market continues to grow. As with any application there are specific considerations necessary for bus wraps. Products or application materials not specifically addressed in this bulletin, or in related bulletins are NOT recommended or warranted by Avery Dennison.

NOTE: As a condition for warranty, the bus pre-inspection form must be filled out and signed by the installer prior to installation. (All Viacom approved printers must also register with Avery Dennison. Contact your Avery Dennison Sales Representative for more information.)

IMPORTANT: Documentation of application date, material lot number and application conditions (temperature, substrate, etc.) is required to support warranty claims in the event of decal failure.

2.0 Safety

Avery Dennison is committed to safety and makes a continued effort to uphold all safety regulations and guidelines.

The windows on buses double as emergency exits and must remain operational. When applying bus graphics where any portion of the window is covered the installer must open all the emergency exit windows prior to installing any graphics. This will enable the installer to determine exactly where the graphics must be trimmed to insure there is no interference with the functionality of the emergency exit windows. If the installer is unable to open any of the windows it should be immediately reported to the bus maintenance facility personnel. The installer must not install any graphics to any emergency exit window that is not functioning properly. After the installation, the installer MUST confirm that the emergency window exits are still functional. Failure to do so may put the installer in violation of United States Code Title 49, USCS 30122, and subject to substantial fines.

49 USCS 30122. Making safety devices and elements inoperative.

(b) Prohibition. A manufacturer, distributor, dealer, or motor vehicle repair business may not knowingly make inoperative any part of a device or element of design installed on or in a motor vehicle or motor vehicle equipment in compliance with an applicable motor vehicle safety standard prescribed under this chapter [49 USCS 30101 et seq.] unless the manufacturer, distributor, dealer, or repair business reasonably believes the vehicle or equipment will not be used (except for testing or a similar purpose during maintenance or repair) when the device or element is inoperative.

If a manufacturer, distributor, dealer, or motor vehicle repair business renders an item of safety equipment inoperable, they are subject to civil penalties outlined in 49 U.S.C. 30165. See below.

49 USCS 30165. Civil Penalty.

A person that violates any of section 30112, 30115, 30117 through 30122,...or a regulation prescribed thereunder, is liable to the United States Government for a civil penalty of not more than \$5,000 for each violation. A separate violation occurs for each motor vehicle or item of motor vehicle equipment and for each failure or refusal to allow or perform an act required by any of those sections. The maximum penalty under this subsection for a related series of violations is \$15,000,000.

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3.0 Recommended Films

The following films are recommended and approved for use on buses for temporary bus graphics:

3.1 Solvent Inkjet Applications

- MPI 2528, 2728, or 3528 Perforated Window Film with DOL 1560 Perforated Window Film Overlamine
- MPI 1005 EZ Cast Vinyl Film
- MPI 1005 EZ RS Cast Vinyl Film
- MPI 2005 EZ Calendered Vinyl Film
- MPI 2005 EZ RS Calendered Vinyl Film
- MPI 2122 Calendered Vinyl Film
 - *Other than Window Perforated Films, ALL materials must be laminated with DOL 1060, 1080 or, 1360 Vinyl Overlamine or recommended clearcoat*
 - *Some tenting may occur with MPI2005 series or MPI2122*

3.1.1 Recommended Solvent Printers and Inks

- Reference Instructional Bulletin #5.80 “OEM Qualification Matrix, Durability Reference, & Troubleshooting Guide”.

3.1.2 Recommended Clear coats

- Reference Instructional Bulletin #5.80 “OEM Qualification Matrix, Durability Reference, & Troubleshooting Guide”.

4.0 Processing Procedures

For processing procedures of the materials listed in section 3.1 refer to one of the following Instructional Bulletins:

- Instructional Bulletin #5.80 “OEM Qualification Matrix, Durability Reference, & Troubleshooting Guide”
- Instructional Bulletin #6.10 (Section 3.0) “Perforated Window Graphics Film”

5.0 Pre-Application Examination

Transit vehicle graphics are designed to adhere to the painted bus side and bus windows for up to one year in duration. The graphics will remove cleanly after the service life from undamaged original equipment manufacturers (OEM) prepared surfaces. Transit vehicle graphics are not designed to adhere to rubber or plastic, and areas such as window molding; vents etc. should not be covered with graphics.

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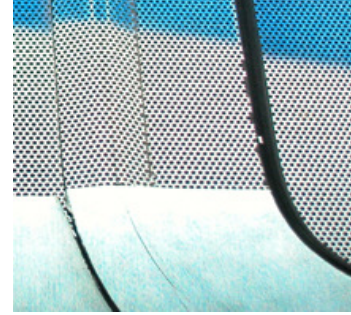
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Window Trim

Good



Bad



Vent Trim

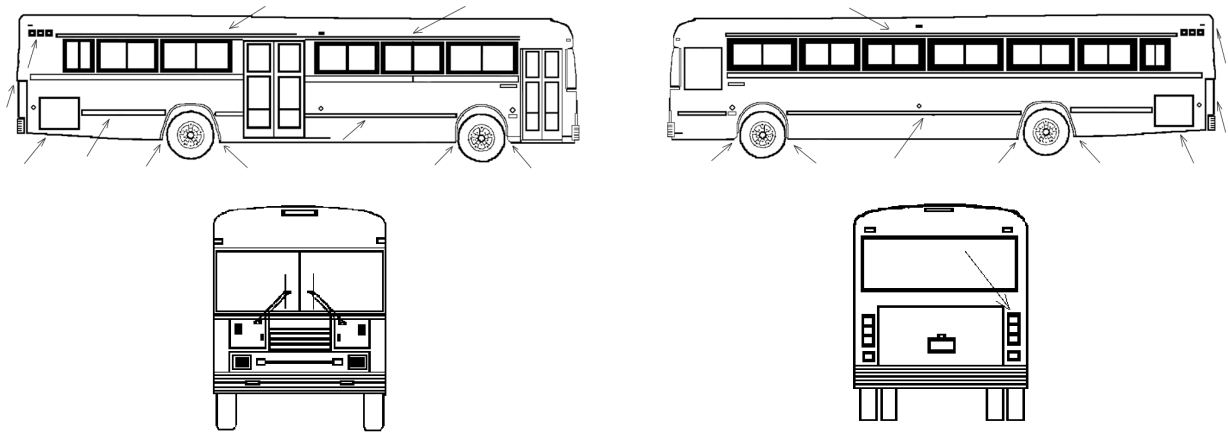


All transit vehicles must be inspected before application of these graphics to evaluate paint integrity, and locate any potential troublesome areas on the vehicle. Areas with chipped paint, rust spots, dents etc. have a high probability of paint damage upon removal of the graphics. Additionally, areas of the transit vehicle that have been repainted with a non-OEM system (including proper primer, dry times and temperatures) risk paint removal upon graphic removal.



All vehicles should be inspected prior to application to identify any possible compromised areas. Any areas that may be damaged by graphics removal should be noted on the following schematics, and the examination report signed by both the applicator and bus owner. Photographs of the defective areas should also be taken and attached to the examination report for future reference. Paint damage to areas noted as suspect will not be covered by any Avery Dennison warranty or guarantee, express or implied.

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NOTE: It is the graphic printers responsibility to ensure that the listed signatures are obtained. Misrepresentation of the worthiness of the bus' paint surface on the Pre-Application Examination form voids the limited warranty.

6.0 Consult Product Data Bulletin

Before starting the application consult the appropriate product data bulletin for information regarding minimum and maximum application temperatures, recommended substrates, and immediate service conditions before and after application. These factors are critical to a successful application and future decal performance. Once assured that all factors are understood with respect to the product, and all factors comply with the product recommendations, cleaning and surface preparation can begin. NOTE: Documentation of application date, material lot number, and application conditions (temperature, etc.) is required to support warranty claims in the event of decal failure.

7.0 Surface Preparation

NOTE: Complete the Pre-Application checklist at the end of this document, prior to beginning the installation. A completed, dated, and signed Application Examination is necessary for any warranty claims.

All application surfaces must be considered contaminated and must be cleaned according to Instructional Bulletin #1.10 "Surface Cleaning and Preparation". The surface must be completely dry. Check all seams, rivet heads, and corrugations for any remaining moisture or solvent. If moisture or solvent is present, a heat gun or propane torch may be used to dry the surface completely.

Caution: Take care not to burn paint or rubber seals when using heat gun or propane torch.

NOTE: Always ensure the painted surface has been properly processed per the paint manufacturer's specifications or recommendations. The drying or curing period of the paint system must be followed. Failure to adhere to the above can result in poor decal performance and difficult removal characteristics.

8.0 Application Tools

- Squeegee
- Heat Gun or Propane Torch
- Razor Knife
- Rivet Brush

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- Masking Tape
- Tape Measure
- Marking Pencil
- Air Release Tool (Straight Pin)
- Surface Temperature Thermometer / IR Thermometer
- “610 Tape” for Snap Tape Test

9.0 Temperature

Ambient Air Temperature - Air temperature of environment

Surface Temperature - Substrate temperature of vehicle or surface

The markings can be applied if the ambient air and substrate surface temperature are between the minimum and maximum application temperature specified in the appropriate Product Data Bulletin. If the substrate surface temperature is below minimum requirements. If the surface is too cold, it is recommended to move the bus into a heated environment where the minimum application temperature can be reached. If the bus surface is too hot, move the bus into a cooler environment such as shade or indoors.

10.0 Overlap of Multi-Panel Graphics

Use a pencil, pen, or marking tape, to mark the decal location on the application surface. If a chalk line has been used, replace all chalk marks with pencil or pen lines. Remove the chalk dust before applying decal. When overlapping multi-part decals, apply individual sections beginning with the rear of the vehicle and working towards the front and/or beginning with the bottom of the vehicle and working toward the top. The actual overlap should be at least 0.5 in.(13mm).

11.0 Key Application Tips Before Proceeding

CAUTION: Application of film to areas of vehicle that will impair driver’s vision or violate any federal, state, or local ordinances, is not recommended.

- Surfaces must be completely clean and prepared according to Avery Dennison Instructional Bulletin #1.10. This is a critical first step toward successful decal application.
- Follow the guidelines toward minimum and maximum application temperatures and required service conditions before and after application.
- Do not use application fluid or the “wet method” during installation. Water or application fluid not properly squeezed out from underneath the film can remain between the substrate and the decal thereby reducing ultimate adhesion.

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- Before starting the application tape up all panels to ensure graphic size and position



- The decal must be squeegeed before and after premask removal. During premask removal, decals are exposed to potential edge lifting. In order to eliminate this, re-squeegee the decal (especially the edges) after removing the premask. Use a felt squeegee or wrap a clean, soft, damp rag around the squeegee to prevent potential damage to the decal.
- All smooth body seams or edges must be cut flush with the edge, and be free of caulk, and sealant. The decal must be re-squeegeed along the cut edge to prevent potential edge lifting.
- When applying to corrugations, film should be cut along top and bottom of each corrugation. This will prevent tenting of the graphic.

12.0 Application Guidelines

12.1 Application of Buswrap Vinyl Films

For application procedures of Bus wrap Vinyl Films follow procedures listed below.

The following instructions show a step-by-step procedure for installing large premasked markings onto a bus. The method used is a Hinge Method. Other methods (such as center or vertical hinge method or no hinge method) can be used based on applicator expertise and design of the graphics. For questions regarding application procedures contact Avery Dennison's Customer Technical Support.

12.1.1 Application procedure large marking top hinge method – Avery Dennison Films

1. Make sure all emergency exit windows are operational.
2. Measure and position the graphic. Use masking tape to hold it in place. It is a good idea to mark the position of the panel in case the graphic comes loose. Make sure the graphic is completely smooth and taut.
3. Determine the best starting point based on shape the bus and graphic elements to be applied. At this point, the liner can be removed to expose the adhesive in the desired starting area. (It is not necessary to remove the entire liner all at once, in fact it is usually better to remove it a little at a time as you squeegee.)
4. Hold the decal smooth and taut, away from the application surface with one hand and squeegee horizontally from the center towards the outer edges. Continue squeegeeing, using firm overlapping strokes from the center out, working away from the starting point.
5. Re-squeegee the entire decal using very firm squeegee pressure, including all edges. Puncture any air bubbles with a straight pin and re-squeegee from the edge of the bubble towards the puncture. (NOTE: Avery Dennison films with the "EZ" feature do not usually require making a hole to eliminate bubbles, just squeegee the bubble(s) or apply pressure with a finger or thumb.)

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12.2 Application of Perforated Window Films

For application procedures of Perforated Window Films refer to Instructional Bulletin #6.10 “Perforated Window Graphics Film”

13.0 Professional Application Services

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. 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

Contact the Professional Decal Application Association at 800-451-4148 or 800-333-4335 for information on member applicators and services or visit the PDAA web site at WWW.PDAA.COM.

REFER TO AVERY DENNISON'S BUSWRAP SYSTEM POLICY AND LIMITED WARRANTY STATEMENT FOR MEDIA PRODUCTS FOR A COMPLETE DESCRIPTION OF THE LIMITED WARRANTY COVERAGE BY AVERY DENNISON. Avery Dennison EXPRESSLY disclaims all responsibility and liability for the improper installation of the bus wrap, which in any way compromises the operation of emergency exit windows.

Revisions have been italicized.

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Application Examination Checklist

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Pre-Application Examination

All vehicles should be inspected prior to application to identify any possible compromised areas. Any areas that may cause adhesion problems or that may be damaged by graphics removal should be noted on the following schematics, and the examination report signed by both the applicator and bus owner. Paint damage to areas noted as suspect will not be covered by any Avery Dennison warranty or guarantee, express or implied.

NOTE: It is the graphic printers responsibility to ensure that the listed signatures are obtained. Misrepresentation of the worthiness of the bus' paint surface on the Pre-Application Examination form voids the limited warranty.

Inspect transit vehicle and locate any potential troublesome areas on the vehicle, these troublesome areas have a high probability of paint damage upon removal of the graphics.

_____ Confirm that all of the emergency exit windows are functioning properly before applying decals. **(NOTE: The installer should take pictures to show that windows were operational before starting installation if windows are not operational Dennison will not be held liable and warranty will be void.)**

_____ Confirm that surface temperature is within specifications and record the temperature on the Application Examination form provided (page 3). Record temperature below.

Surface Temperature: _____ Ambient Temperature: _____ Relative Humidity: _____

_____ Locate and mark schematic where there is chipped paint, rust spots, dents, etc. (NOTE: The installer should take pictures to show these defects.)

_____ Locate and mark schematic where portions of the transit vehicle that have been repainted. . (NOTE: The installer should take pictures to show these defects.)

_____ Using the schematic as a guide, check paint anchorage of the indicated areas.*

*The paint anchorage test:

1. Using a plastic squeegee, firmly apply a strip of 610 tape or a 1" strip of the material being used over the areas indicated below and any areas that appear to be suspect. Allow tape to remain on the surface for 60 seconds.
2. Remove the tape by pulling it back upon itself using a rapid, firm pull.
3. No lifting of the paint should occur.
4. Make a visual inspection of any other spots that you believe may be a problem later. (i.e. dents, rust, chipping, etc.)

NOTE: Pictures with notes should be used in conjunction with notes on the schematics.

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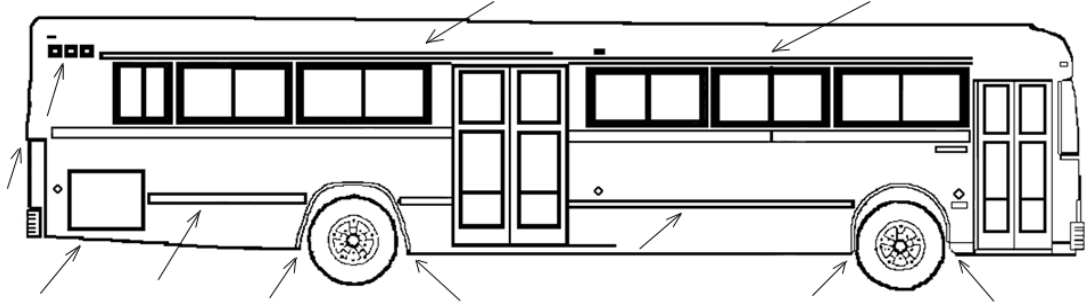


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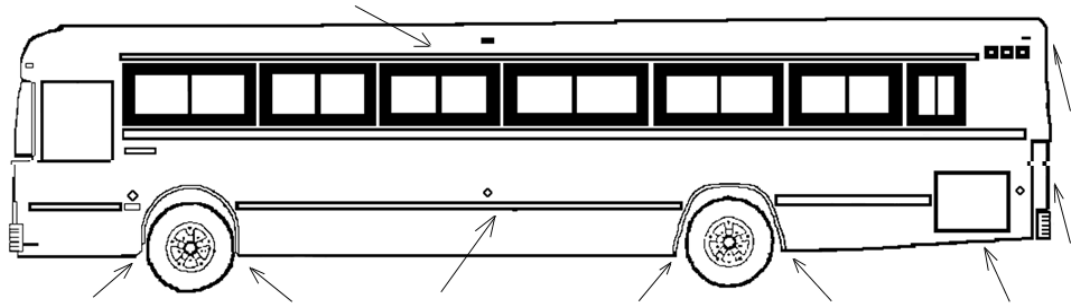
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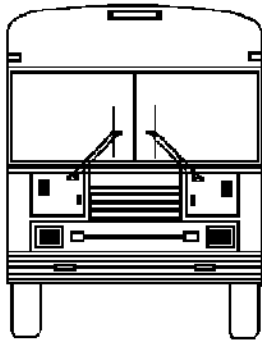
Curb Side:



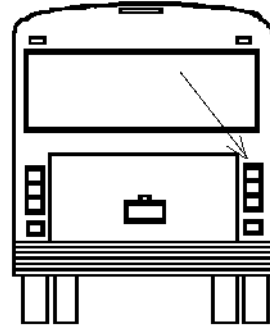
Driver Side:



Front:



Rear:



Post-Application Examination

- _____ Confirm that all of the emergency exit windows are functioning properly after applying decals. (NOTE: The installer should take pictures to show that windows were operational after completing the application. If windows are not operational Avery Dennison will not be held liable and warranty will be void.)
- _____ Confirm that the graphics were resqueeged after premask removal (if a premask was used).
- _____ Confirm that the graphics are not adhered to rubber or plastic, and areas such as window molding, plastic vents etc. (NOTE: If graphics were adhered to non-recommended areas the installer must make the customer aware of potential failure in these areas. Avery Dennison will not warrant the performance of Avery Dennison films to non-recommended surfaces.)

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Application Examination Form

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Job Description:	_____
Customer Name:	_____
Customer Address:	_____
Customer Contact:	_____
Phone Number:	_____
Printer Name:	_____
Printer Address:	_____
Printer Contact:	_____
Phone Number:	_____
Graphics Installer Name:	_____
Graphics Installer Address:	_____
Installer Contact:	_____
Phone Number:	_____

Bus Number: _____	Bus Make: _____
Bus Serial Number: _____	Bus Manufacture Date: _____
Did bus pass the pre-inspection?	Yes: _____ No: _____
Date of Installation: _____	Film Materials Used: _____
Coverage: Full: _____ Sides Only: _____ Waived Yes: _____ No: _____	:
Attach all photos of bus from pre and post installation inspection. These photos will be needed for any future warranty claims. Be sure that a photograph of the bus number is included.	

Signatures:

Installer:	_____
Agency Representative:	_____
Bus Owner / Operator:	_____
Date:	_____

All of the above signed have personally checked and verified that all emergency exit windows were functioning properly after the graphics were applied.

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