

TECHNICAL BULLETIN 5.10

Application of Avery Dennison® PVC-free Wrapping Film

Issued: 04/2020

Avery Dennison films have to be applied in the best possible manner in order to ensure that the product will perform as intended and designed. Successful application results in an adequate bond between adhesive and substrate. Please read the instructions for surface preparation of the substrate prior to application. **Not being a PVC film, our MPI 1405 Easy Apply RS, MPI 1440 Ultra Clear and DOL 6460 behave slightly different from our cast vinyl films. It is very important to follow these application guidelines to achieve a successful application result.**

Prior to application or lamination, prints must be sufficiently dried in order to prevent negative influence on film properties or adhesion properties. **It is of utmost importance to use dedicated ICC profiles to print the MPI 1405 Easy Apply RS and MPI 1440 Ultra Clear to achieve best possible results. Please find the respective ICC profiles on the download client on our website.**

In general a drying time of 24 hours (full solvent) or 48 hours (eco-/mild solvent) will be sufficient. In case a lot of ink is deposited, materials may need up to 72 hours in order to be sufficiently dry.

When drying, material should **not** be tightly wound on a core, as the solvents are then unable to evaporate. The materials should be left to dry loosely, wound on a core or stacked in racks as sheets.

Properly dried images are always needed in order to benefit from each product's specific feature.

Note: Due to its ultra-conformability, MPI 1440 Ultra Clear laminated with itself can also be used as wrapping film. Main difference to MPI 1405 EA RS is the Easy Apply and RS functionality, therefore the application section of this bulletin will focus on how the film needs to be handled differently. For general handling during printing & lamination there is no significant difference between the films.

Surface preparation

The surface has to be cleaned by:

1. Washing with a mild detergent solution, after which the surface should be rinsed and dried with a lint-free cloth.
2. Larger flat shaped surfaces can be cleaned with Avery Dennison Flat Surface Cleaner
3. More critical shaped substrates (corrugations, complex curves or more demanding substrates) must be cleaned with Avery Dennison Surface Cleaner.

Many commercially available cleaning/degreasing products exist: the applicator should establish the suitability of a product prior to actual use. In addition, the following factors should be considered prior to any application:

Car wax and polish residues must be **completely** removed.

Paint surfaces must be completely dry, hardened and free of scratches. On most baked paints, films can be applied immediately after cooling down. Air-dried and car repair paints require at least one week to dry out before films should be applied. Solvent residues in painted substrates may adversely affect film adhesion and might cause excessive shrinkage or blistering. Application needs to be done on original OEM paints (not older than 3 years). The surface must be in good condition to ensure good removability of the film after the lifespan of application. Note: The paint surface needs to be checked as prior damages may have been repaired, this may influence the repositionability and removability of the film.

Painted substrates for self-adhesive films should be prepared according to the paint manufacturer's instructions. Here, too, it is important to avoid solvent retention. Paint system components which are not compatible or do not adhere properly to each other may cause paint to be lifted when films have to be removed after use.

Special attention should be given to critical areas such as edges, corners, welding seams, rivets, corrugations and the like. These areas must be thoroughly cleaned and dried before application.

Print preparation

Before printing, it is required to have the right media profile installed and selected in your print server. The media profile contains a combination of information on printer / rip / ink / media. The right media profile not only produces the best colors but will also reduce the amount of ink deposited on the material, resulting in less influence of the solvent on the material properties. Media profiles are available via the Avery Dennison website.

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In case of solvent printing, films need to be fully dried before an overlamine can be applied. In general a drying time of 24 hours (full solvent) or 48 hours (eco-/mild solvent) will be sufficient. In case if a lot of ink is deposited, materials may need increased drying time in order to be sufficiently dry. When drying, material should **not** be tightly wound on a core, as the solvents are then unable to evaporate. The materials should be left drying loosely wound on a core, or stacked in racks as sheets.

Lamination

After printing the film is recommended to be overlaminated. Please refer to Technical Bulletin 5.4 Processing Tips for Avery Dennison DOL films.

Note: DOL 6460 is extremely flexible. It is very important to monitor temperature and tension;

Heat used during lamination could easily allow the film to be stretched. "Brake" or resistance on the roll of laminate when unwinding in the laminator could also cause the film to elongate. Increased temperature and/or higher winding tension could lead to unwanted elongation of the overlamine when laminated onto the print film, potentially causing defects after the combination has been applied to a substrate. Therefore temperature and winding temperature should both be kept at an appropriate (low) level, ideal conversion temperature is at room temperature of approximately 21°C.

Application method for MPI 1405 EA RS & DOL 6460

Avery Dennison MPI 1405 Easy Apply RS has a high degree of conformability and shows excellent results on 3D-shaped surfaces. The use of an industrial hot-air tool is needed to improve the ease of application. After application it is absolutely necessary to re-heat those parts exposed to stretch, strain or other deformations to obtain their final shape. Re-heating will eliminate the applied tensions in the film. Always respect the minimum application temperatures as specified in the technical datasheets.

Avery Dennison MPI 1405 Easy Apply RS is designed for dry application on prepared surfaces. The application tape can be laminated over the graphic for ease of positioning and to protect it against stretching and scratching. The risk of damaging the car paint can be reduced by use of cutting tape.

TB 1.4 Application methods for Avery Dennison self adhesive films will provide information on different methods, depending on the surface corrugations. Special attention in regards to use of MPI 1405 EA RS needs to be taken into account:

- MPI 1405 EA RS shows higher loop tack properties than MPI 1105 EA RS, therefore it may be noticeable that slideability is not exactly on the same level as known to MPI 1105 EA RS.
- It is recommended to avoid contact of overlamine on overlamine under warm conditions. Otherwise this may result in the surfaces sticking to each other and also with the help of heat it is not possible to separate them without damaging the overlamine. This is indicative for PU films.
- Having the adhesive sides touch each other during installation should be avoided. In case the film is bend - resulting in adhesive sides touching each other – it is recommended to separate the film from each other in a slow motion instead of rapid movements. This will decrease the risk of adhesive separation from the film.
- The tack of the adhesive on rubber (e.g. window framing of the car) is very high. In order to avoid adhesive residue it is recommended to avoid contact of the adhesive side with rubber surfaces during installation.
- Heat will make the film more conformable and therefore easier to use in deep corrugations. The recommended temperature is approximately 50°C.
- A re-heat temperature between 70°C and 80°C is sufficient to ensure the film is not lifting out of deep corrugations. Exceeding the temperature of 80°C is not recommended.
- The friction of the DOL 6460 is slightly higher than of DOL 1400 series overlamines. The use of a glove, water and soap will help to form the film into corrugations.
- Cutting the film may be experienced as slightly different from a cast vinyl, this is inherent to PU films.
- On deep concave corrugations, stress whitening of printed graphics may be seen. This depends heavily on the specific image and ink amount applied.

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Application of MPI 1440 Ultra Clear (overlaminated with itself)

Avery Dennison MPI 1440 Ultra Clear does not come with Easy Apply RS feature and requires a different application method. The use of an industrial hot-air tool is also recommended to improve the ease of application. After application it is absolutely necessary to re-heat those parts exposed to stretch, strain or other deformations to obtain their final shape. Re-heating will eliminate the applied tensions in the film. Always respect the minimum application temperatures as specified in the technical datasheets.

Avery Dennison MPI 1440 Ultra Clear is recommended to be wet applied. The application tape can be laminated over the graphic for ease of positioning and to protect it against stretching and scratching. The risk of damaging the car paint can be reduced by use of cutting tape.

Special attention in regards to use of MPI 1440 Ultra Clear needs to be taken into account:

- Prepare the wetting solution as the product is recommended to be wet applied. The wetting solution should contain water with detergent-free soap (such as Baby Shampoo). Use 4cc (~4 drops) soap per liter of water for slip solution. Any soap-free soap used should not contain additives such as lanolin or silicone that may affect adhesive bond strength.
- Ensure the surface is completely wet in order to allow for easy repositioning during application.
- It is recommended to avoid contact of overlaminates on overlaminates under warm conditions. Otherwise this may result in the surfaces sticking to each other and also with the help of heat it is not possible to separate them without damaging the overlaminate. This is indicative for PU films.
- Having the adhesive sides touch each other during installation should be avoided. In case the film is bent - resulting in adhesive sides touching each other - it is recommended to separate the film from each other in a slow motion instead of rapid movements. This will decrease the risk of adhesive separation from the film.
- The tack of the adhesive on rubber (e.g. window framing of the car) is very high. In order to avoid adhesive residue it is recommended to avoid contact of the adhesive side with rubber surfaces during installation.
- Heat will make the film more conformable and therefore easier to use in deep corrugations. The recommended temperature is approximately 50° C.
- A re-heat temperature between 70°C and 80°C is sufficient to ensure the film is not lifting out of deep corrugations. Exceeding the temperature of 80°C is not recommended.
- The friction of the MPI 1440 Ultra Clear is slightly higher than of DOL 1400 series overlaminates. The use of a glove, water and soap will help to form the film into corrugations.
- Cutting the film may be experienced as slightly different from a cast vinyl, this is inherent to PU films.

Cleaning final application

For general instructions on maintaining and cleaning graphics, please refer to Technical Bulletin 1.6.

Note: For cleaning fingerprints etc. from DOL 6460 and MPI 1440 Ultra Clear, it is not recommended to use fluids that contain hard solvents (such as Isopropyl Alcohols or IPA). Use of these fluids on the surface of the overlaminate may cause loss of gloss or accelerate degradation, especially when the surface is afterwards processed (stretched or pressure applied). Therefore, we recommend the use of our Wrap Care Cleaner. Use of non-recommended cleaning substances may result in permanent matt spots on the surface of the film.

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Removal of MPI 1405 Easy Apply RS

It is recommended to apply moderate heat (30-40°C) by means of a hot air gun to the edge of the applied film. Ensure to start removing the film from the edge of the panel at an angle of 60° to 90° from the substrate, reducing the chance of adhesive residue. At this elevated temperature the film is more flexible, allowing for easier removal and has less impact on the substrate.

Please note that exceeding the temperature recommendations may be counterproductive as it may result in more RS residue on the substrate, requiring more time for final residue removal.

Any leftover residue on the substrate after removal of the film may be removed with a cloth, soaked in a mild solvent or the Avery Dennison Adhesive Remover.

Removal of MPI 1440 Ultra Clear (laminated with itself)

Products with a permanent adhesive without Easy Apply RS feature are generally not as easy to remove. It is recommended to use moderate heat (30-40°C) by means of a hot air gun to the edge of the applied film. Ensure to start removing the film from the edge of the panel at an angle of 60° to 90° from the substrate, reducing the chance of adhesive residue. At this elevated temperature the film is more flexible, allowing for easier removal and has less impact on the substrate.

Any leftover residue on the substrate after removal of the film may be removed with a cloth, soaked in a mild solvent or the Avery Dennison Adhesive Remover.

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