

Converting Tips For Sign Films

Instructional Bulletin #2.10 (Revision 5)

Dated: 06/26/18

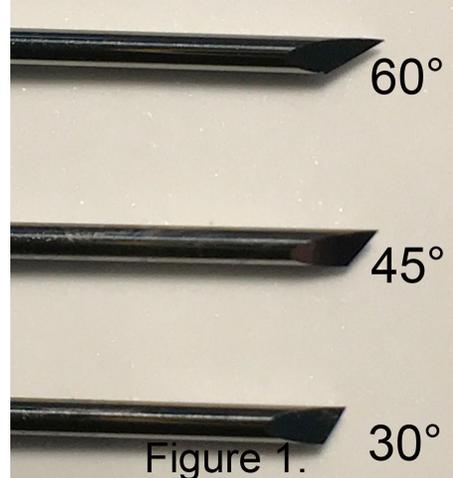
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This bulletin will provide is intended to provide assistance in the successful processing of Avery Dennison's films on computer sign cutting equipment, the following tips are provided:

1.0 Blade Selection

- The first step is to choose the correct blade angle. The blade angle can be changed to be optimized for the type of media used. Changing the blade angle to match the media will optimize the quality of the cut. Without a nice, clean cut, the result will be a graphic that is difficult to weed. The blade angles available vary by manufacturer. The three most common are 30, 45 and 60 degree angles.
- *Figure 1 shows a close up of the 30, 45 and 60 degree blades. The 30 degree blade has the lowest angle with the least amount of blade exposed. The 60 degree blade has the sharpest angle and has more cutting surface on the blade, making it ideal for thicker materials. When choosing blade angle, the goal is to select one that will cut through the material and adhesive. If the blade angle isn't high enough, the blade can actually drag through the material and create "vinyl ears," causing a poor quality cut. Inversely, using a 60 degree blade on everything is a waste of a blade; because not all of the blade's cutting area is used, you will also need to change blades more frequently since the sharper angle blade will dull faster.*



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- *Figure 2* is a diagram showing the rationale of choosing a lower angle blade for thinner films and a higher angle blade for thicker films.
- A good rule of thumb is to use a 30 degree blade for films that are in the 1-2 mil range. A 45 degree blade would be good for films that are 2 mil up to around 5 or 6 mil, and then a 60 degree blade is good for films that are thicker than 6 mil. Films like Avery Dennison beaded (V4000) or prismatic (V8000) reflective films are best cut with a 60 degree blade.
- If you switch a lot between 2 mil cast films and 3-4 mil calendered films, the 45 degree blade might be a good all-purpose blade for everyday use.
- It is important to note that when blade angle is changed in your cutter, be sure to also change the offset. This information is generally noted on the blade package. *Figure 3* shows a box of Roland blades. Note the offset of the blades.

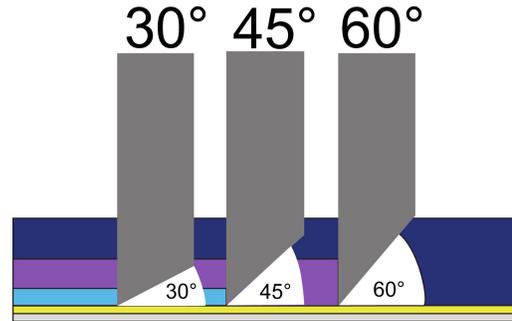


Figure 2.



Figure 3.

2.0 Blade Adjustment

- When the blade is placed in the holder, you must manually adjust how much of the blade protrudes from the blade holder. It is a common mistake to have too much of the blade exposed. A good starting point for blade depth adjustment is approximately $\frac{1}{2}$ of the thickness of a credit card. *Figure 4* is a close up of how the blade depth is set on my cutter. The most important thing is to have enough blade exposed so that it can cut cleanly through the film and adhesive. If you are cutting thicker materials, you may have to expose slightly more blade.

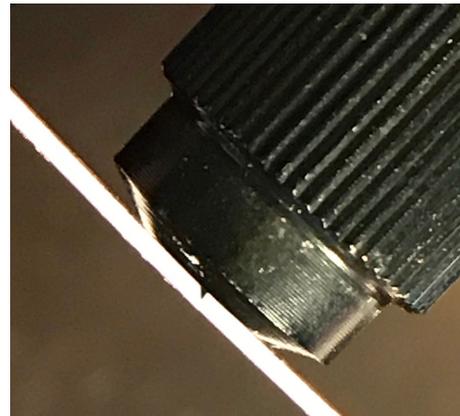


Figure 4.

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- Once the blade depth is adjusted the blade can be put back into its holder and then the blade pressure will need to be adjusted. Since every cutter is different and pressure will vary based on blade age and angle.
- A very sharp blade is essential. If you are experiencing cutting problems with Avery Dennison™ vinyl, try a new blade. Market research indicates that most blades are made from carbide (carbide stays sharper longer than plain steel). There are also ceramic blades on the market that give a nice cut but seem to wear out quickly.
- It is recommended to start with the default settings recommended by the cutter manufacturer and adjusting from there. You can use the test cut that is embedded in the cutter software. There is usually a “cut test” option. The objective is to set pressure where the blade is going through the film and adhesive layer, but not cutting into the liner.
- If the blade pressure is too high, you can score the silicone release layer on the liner. When this happens, the adhesive may grab or adhere to the paper fibers and cause the paper to split at the release layer. This can be seen in *Figure 5*. If this happens, the pressure needs to be reduced.
- Start by using the test cut feature on your plotter. You should be able to weed away the square and leave the triangle behind without lifting any of the corners of the triangle. Note in *Figure 6* that while the square pulled away cleanly from the triangle, when the cut depth was tested with a felt tipped marker, the silicone layer had been scored. Note how the ink bled through to the paper. Several adjustments were made reducing the pressure each time until the film did not weed properly. Then, the settings were moved back to the last setting that cut well. Each cut with was tested with the felt tipped marker to see if ink was bleeding through the paper. Ideally, the blade should only leave a slight indentation in the silicone layer.



Figure 5.

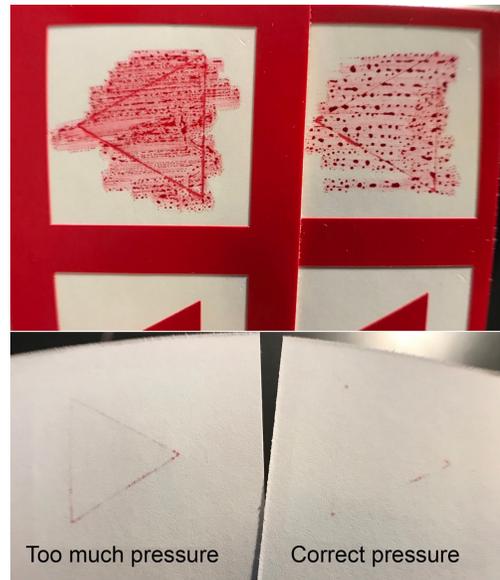


Figure 6.

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3.0 Speed Adjustment

- As with the blade pressure, the actual number for speed is likely to vary by plotter model as well as age and angle of the blade. My recommendation is to start with the default setting and if you notice the blade skipping or edges lifting, you should decrease the speed.
- If you go through this process and just cannot get a good cut, I recommend trying a fresh blade and going through the setup process again. It is also important to note that you should run a test cut each time you put in a new roll of film to ensure you have the cutter set up properly.

4.0 Weeding

- Since the "open side" of most letters are on the right side, it is recommended that the matrix be weeded using a rocking motion from right to left.
- When weeding large letters/graphics (larger than 5 in. or 13 cm height), there may be a large, hard-to-handle matrix area to deal with. Cut matrix into sections before weeding, this will make weeding process less cumbersome.

5.0 Application Tape

- Using the proper premask is paramount in the successful conversion of the Avery Dennison sign maker films. A premask incorporating high enough adhesion strength to lift the legend from the liner is needed. At the same time, the premask adhesion cannot be so high as to lift the legend back off the ultimate application surface. Always test the premask for both adequate tack to lift the legend from the liner and to make sure the adhesion is not so high as to either damage or pull the legend back up from the ultimate application surface (especially if it is some type of paper or cardboard).
- The following premask have the characteristics necessary for the successful conversion of both large and small letters using Avery Dennison™ films. This is not an exhaustive list of premask.

Manufacturer	Premask Tape
American Biltrite	6600, 6700, 6760, 6782, 6792, 6798*, W-1311
Main Tape	GXP-600, GXP-625, GXP-650, GXP-675
R-Tape	4600, 4690, 4695, 4700, 4750, 4775, 4885

*NOTE: Premask NOT recommended for printing.

- Pressure must be used when applying premask. The use of either a squeegee or a roll laminator is recommended.

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- After applying the premask, turn the piece over so the liner is face up. Squeegee on the liner side to apply even pressure to the film. This even pressure facilitates removal of the film from the liner.
- The recommended method of removing graphics from the release liner is as follows:
 - Place the premask on the vinyl as recommended.
 - Turn the piece over so the vinyl is face down.
 - Grasp the edge of the release liner, holding the premask down with one hand.
 - Pull the liner off at 180° angle with the other hand.

NOTE: The wet application method, using an application fluid or water is not recommended *with reflective*. Manufacturer's recommendations must be followed when using application fluids.

6.0 Additional Notes

- Avery Dennison™ Sign Films can be run on pin-fed and friction-fed computer sign cutting equipment, as well as flatbed plotters.
- SC950 Cast, HP750 & PC500 Calendered and V4000 Perm Reflective films have all been designed for use on computer sign cutting equipment incorporating a knife cutting (blade) system. While both Cast and Calendered materials have been cut and weeded successfully on plotters incorporating a hot tip stylus, it will be important to use a very high tack premask for transferring. The use of a high tack premask, in conjunction with recommended premasking/transferring techniques, should help alleviate anticipated transferring difficulties.
- Cutting *beaded reflectives* film with a hot tip is not recommended; the complexity and thickness of these films inhibit clean cutting of these materials. NOTE: Special attention may need to be taken when computer sign cutting a film coated with a 90# polycoated liner. If problems arise, please refer to trouble-shooting checklist on the next page.
- Due to the nature of retroreflective material, graphics comprised of multiple pieces of film may show the perception of a color shift depending on the viewing angle and light source. This is not considered a defect in the material. To minimize this effect, cut large letters from a continuous piece of material or use material from adjacent portions of the roll. Also, a small overlap (<.25") or no overlap of the reflective film is recommended to maintain a consistent viewing angle.
- When cutting reflective film it is not recommended to cut letters smaller than 1".
- When cutting V4000 LTR with EZ RS it is not recommended to cut letters smaller than 2". NOTE: If the film is lifted off of the EZ liner it will not adhere to the liner.
- When cutting cast or calendered films it is not recommended to cut letters smaller than 1/4"

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7.0 Troubleshooting Checklist

Issue Resolution Table

Issue	Potential Resolution*
Face Film is tearing upon cutting	<ul style="list-style-type: none">● Replace used blade with new blade● Confirm or adjust blade angle to sharper angle● Reduce blade pressure/weight● Confirm liner type to be 90# StaFlat®● Reduce cutting speed
Blade is "skipping" over film producing perforations or a rough cut of the face film	<ul style="list-style-type: none">● Replace used blade with new blade● Confirm or adjust blade angle to sharper angle● Reduce blade pressure/weight● Reduce cutting speed
Blade is cutting into liner	<ul style="list-style-type: none">● Confirm or adjust blade angle● Reduce blade pressure/weight
Not completely cutting through the film	<ul style="list-style-type: none">● Replace used blade with new blade● Confirm or adjust blade angle● Confirm liner type to be 90# StaFlat®● Increase blade pressure/weight

Revisions have been italicized.

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