

Technical Bulletin

3M™ Scotchlite™ Reflective Material

Topic

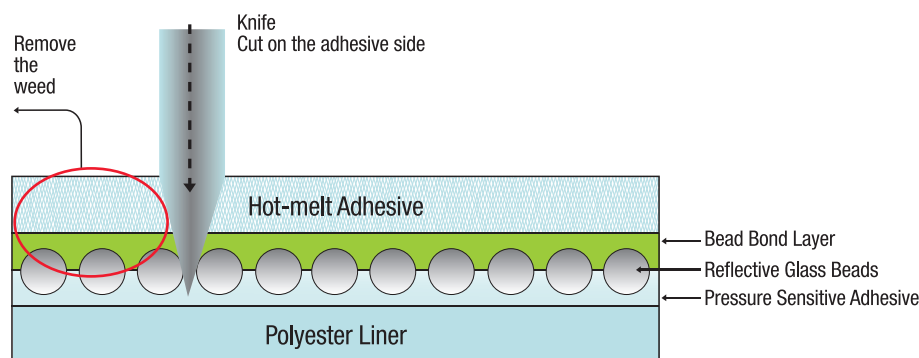
Guidelines for electronic cutting (plotter cutting) of 3M™ Scotchlite™ Reflective Material.

What is Electronic Cutting?

Electronic cutting is used to describe the cutting of a film by computer-driven knives. Electronic cutting is both an art and science. While we are able to give guidelines, we are not able to provide specific conditions as they will vary with machines, graphics, and substrates being used. It is important that you experiment with your equipment to determine its optimal settings.

3M™ Scotchlite™ Reflective Material – Silver Transfer Films

3M™ Scotchlite™ Reflective Material – 5807 Custom Cuttable Transfer Film was specifically designed for use in electronic cutting. The reflective film consists of exposed high performance glass lenses bonded to a polymer layer which is then bonded to a clear heat reactive hot melt adhesive. The reflective film is provided on a pressure sensitive adhesive coated polyester film which is suitable for electronic cutting. There is no liner on the adhesive side of the film.



Graphics Software

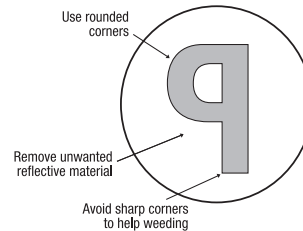
In addition to the design software that comes with the cutter, Adobe® Illustrator® and CorelDRAW® are programs that can be used to design complex graphics or logos, such as the examples below.



Design Factors

A well designed graphic will reduce the time required to weed a logo. Since this is a transfer film, all graphics must be cut as a reverse (mirror) image. Before designing a graphic for electronic cutting, consider these factors:

- Cutting capabilities of equipment
- Font characteristics
- Substrates and fabrics to which the graphic is applied
- Rounded edges are preferred over sharp corners
- Minimize large areas where weeding is needed
- Although small letters can be cut, weeding requires more care when the letter height becomes less than 5.1 mm (0.2 inch) and Helvetica medium font is used
- Although fine lines can be cut, weeding requires more care if the line width is thinner than 3 mm (0.12 inch)
- The number and size of letters and lines affect weeding efficiency
- The converter is responsible for testing and determining acceptable minimum dimensions



Types of Cutters

Friction Fed Cutters: This is the most commonly used electronic cutter for our films. A two wheel drive system is used to move film in a variety of widths. The film is driven by being pinched between two wheels. The film in these cutters may slip, requiring more care to make accurate cuts or long runs.



Flatbed Cutters: Flatbed cutters evolved from garment and box cutters and are common in the graphic sign industry. Typically vacuum is used to hold the film during the cutting. Some smaller cutters may require double coated tape to hold the film down. They cut very accurately since the film does not move. They are more expensive as compared to other cutters and do require a larger work area.

Sprocket Fed/Pin Fed Cutter: Both edges of the film are punched with a hole pattern that match pins on the drive wheels of the cutter. These wheels traverse the film through the cutter. Our film is not supplied with punched edges.

Types of Knife Blades

There are several types of knife blades used in cutting standard electronically cuttable films. Refer to the instruction manual for each cutter to determine the type of blade to be used. A single knife blade with an angle of 45° degrees is typically used on our material. It is important to keep the blade/knife sharp. Cutting 3M™ Scotchlite™ Reflective Material dulls blades faster than normal vinyl cutting. Dull blades can create a serrated look on the edge of the cut film.

Cutting Depth

Proper cutting depth should result in the liner being lightly scored. Most cutters have a “test plot” feature to help determine this depth. Cutting too deep causes the liner to split increasing knife wear and potentially jamming the cutter. Cutting too lightly causes incomplete cutting of the film leading to difficulty in weeding. Changing cutting conditions (i.e. increasing knife pressure) may be required as the blade dulls.

3M™ Scotchlite™ Reflective Material		
Product	Overall Typical Thickness	Typical Thickness of Reflective Film
5807 Custom Cuttable Transfer Film	9.5 mil (0.24 mm)	6.0 mil (0.15 mm)

3M™ Scotchlite™ Reflective Material for Electronic Cutting

3M™ Scotchlite™ Reflective Material – 5807 Custom Cuttable Transfer Film was specifically designed for use in electronic cutting and is the preferred product for this application. 3M™ Scotchlite™ Reflective Material – Transfer Films that incorporate a white paper liner have been used in electronic cutting but with difficulties during lamination. When applying (laminating) the weeded graphic, the exposed white paper liner may adhere to certain fabrics at our recommended lamination temperatures.

Stacking of Graphics

The polyester liner used in 3M™ Scotchlite™ Reflective Material – 5807 Custom Cuttable Transfer Film contains a low release coating on the backside, allowing the weeded graphic to be stacked on top of each other for storage or shipping.

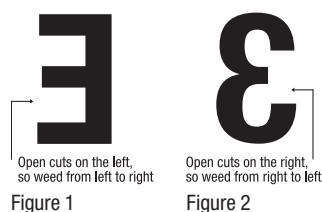
Applying Graphics to ANSI 107 or ANSI 207 High Visibility Apparel

When applying graphics to ANSI/ISEA 107 or ANSI/ISEA 207 high visibility safety apparel, please check to ensure that the amount of remaining background material still meets the area requirements of the apparel's classification. Customers should also consider the area of remaining background material when applying graphics to apparel covered by other standards.

Weeding

Weeding is the removal of unwanted film from the graphic. Before weeding, inspect each element (letters, numerals, etc.) to determine which side has the most open cuts and start from that side. For example, on mirrored graphics, most letters have open area on the left side, so weed from left to right (see Figure 1). Conversely, most numerals have open area on the right side so weed from right to left (see Figure 2). Plan to weed based on these recommendations to reduce unnecessary waste:

- Inspect each element to determine that the film is cut completely before starting (see Figure 3)
- Place the graphic on a flat surface with the adhesive side up and remove the weed by lifting one corner and pulling back at about 135° angle in a continuous motion (see Figure 4)
- Start weeding from the side where the graphic elements have the most open cuts
- Weeding graphics in a diagonal motion, avoid blunt sides. For example; if weeding from the left to right, start at the upper left corner and weed toward the lower right corner. In many cases it is helpful to alternate this direction from lower right corner to upper right corner in repeating motions during the weeding process
- During the weeding process, if the clear adhesive film starts to separate from the colored polymer layer, reduce your weeding angle. The clear adhesive film will bond to the colored polymer layer during the heat lamination step and will not affect the product's overall performance



Caution

When using any equipment, always follow the manufacturers' instructions for safe operation.

Storage and Shelf Life

Store in a cool, dry area and use within one year after date of receipt. Store rolls in original shipping cartons. Return partially used rolls to the carton or suspend horizontally through the core. Cut pieces should be stored flat.

Manufacturers of Electronic Cutters

This information is provided for customer convenience only. 3M does not recommend any specific equipment manufacturer. Customers are solely responsible for choosing equipment suitable for their needs and for ensuring that all equipment meets all applicable workplace safety requirements.

Roland DGA Corporation*

www.rolanddga.com

Gerber Scientific Company

www.gspinc.com

Graphtec

www.graphteccorp.com

Ioline Corporation*

www.ioline.com

*Roland and Ioline are available from www.stahls.com

Important Notice to User

WARRANTY, LIMITED REMEDY AND DISCLAIMER: 3M warrants that 3M™ Scotchlite™ Reflective Material that is stored, maintained and used in accordance with 3M's written instructions will meet the applicable 3M product specifications. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE. If any Scotchlite reflective material does not conform to this warranty, then the sole and exclusive remedy is, at 3M's option, replacement of the 3M product or refund of the purchase price.

LIMITATION OF LIABILITY: Except where prohibited by law, 3M will not be liable for any loss or damage arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.

PRODUCT USE: Because of the variety of factors that can affect the use and performance of Scotchlite reflective material, user is solely responsible for evaluating the product and determining whether it is fit for a particular purpose and suitable for user's method of application. User is solely responsible for determining the proper amount and placement of the product. While reflective products enhance visibility, no reflective product can ensure visibility or safety under all possible conditions. 3M may change the product, specification and availability of the product as improvements are made; therefore, user should contact 3M for latest information before specifying the product.



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