



ElectroCut™ Film

Series 1170

Product Bulletin 1170

July 2007

Replaces PB 1170 dated January 2004

Description

3M™ ElectroCut™ Film Series 1170 is a durable, transparent, acrylic colored film coated with a transparent, pressure-sensitive adhesive that is protected by a removable liner available in the following colors.

<u>Color</u>	<u>Product Code</u>
Yellow	1171
Red	1172
Orange	1174
Blue	1175
Standard Green (Worboy)	1176
Green	1177
Black (Opaque)	1178
Brown	1179

Series 1170 is intended for use on 3M Reflective Sheeting as part of 3M's Matched Component System™ for signing. Series 1170 E.C. Film has a clear pressure-sensitive adhesive compatible with all the following 3M reflective sheetings used in permanent signing:

3M™ Reflective Sheeting

Engineer Grade Series 3290
High Intensity Grade Series 3870
High Intensity Prismatic Series 3930
Diamond Grade™ Series 3990 VIP
Diamond Grade™ Series 3970 LDP
Diamond Grade™ Series 3990T Translucent
Diamond Grade™ DG³ Series 4000

E.C. Film is designed with a special film liner for kiss-cutting on electronic cutting machines. Rolls are available prepunched for sprocket fed cutters or unpunched for flatbed or friction fed cutters. Colored E.C. Film is often used instead of silk

screened inks to provide transparent colored background copy for retroreflective street name signs and other traffic control signs. Various film widths are available to fabricate single sign panels up to 48" wide. For single panel signs requiring more than a single piece of sheeting or for multipanel signs such as guide signs, be sure to follow 3M color matching procedures in Information Folder 1.10 to achieve satisfactory results. **(For best color uniformity on a colored multipanel sign, make all panels from the same lot of E.C. Film.)**

Properties

Standard colors of series 1170 E.C. Films conform to appropriate retroreflective sheeting specifications – Federal Specification FP-96, Section 178.01 (a) and ASTM D4956 when applied over 3M™ Diamond Grade™ Reflective Sheeting Series 3970, 3990, 3990T or 4000, 3M™ High Intensity Grade Sheeting Series 3870 or 3930, or 3M™ Engineer Grade Sheeting Series 3290.

Due to the high transparency of 3M acrylic E.C. Films, retroreflective signs made with these E.C. Films give equal or better retroreflective performance than sheetings screened with transparent inks. Transparent blue, green, red, and yellow E.C. Films applied to white 3M™ Reflective Sheeting can be expected to give performance comparable to integrally colored reflective sheetings. The coefficient of retroreflection of the colored areas of E.C. Film signs will depend on both the overlay film transparency and the brightness of the white reflective substrate.

Table 1 gives the minimum and maximum coefficient of retroreflection (R_A values) for each transparent 1170 Series film as a percentage of the R_A of the white reflective background on which it is applied.

Table 1

Coefficient of retroreflection R_A * for colored E.C. Films applied over white retroreflective sheeting (expressed as % of white retroreflective sheeting background)

Transparent (R_A color/ R_A white background) x 100%		
Color	Minimum	Maximum
Green	13.0	20
Blue	6.5	20
Red	14.0	24
Yellow	60.0	80
Orange	30.0	-
Brown	5.0	-
Standard Green (Worboy)**	8.0	14

* R_A (cd/lux/m²) measurements shall be made at 0.2° observation angle, -4° entrance angle, and 0° rotation, per ASTM E-810.

**Standard green color for U.K., Australia, and New Zealand

Film Liner

Series 1170 films have a transparent film release liner designed to aid the cutting process and the removal of the film weed after cutting. The rolls of film come edge weeded on punched rolls to prevent adhesive build-up on sprocket fed cutters.

Storage

Store in a cool, dry area 65-75°F (18-24°C), 30-50% relative humidity, and use within one year from date of receipt.

Fabrication – Cutting and Application Procedures

Important Note: It is recommended that inside radius corner fonts be used when cutting series 1170 film. Read and follow the manufacturer's operating manual carefully for proper use of cutting equipment.

- Adjust knife pressure to cut cleanly through the film without cutting into the liner. A 30 degree blade works best. Spacing between letters or numbers should be adjusted to the aesthetic preference of the user. Consult the operating manual for instructions on how to regulate spacing. **Note:** Do not cut at high speed on variable speed machines.
- Avoid sharp bends when cutting and handling film as this may cause film to release from the liner.
- After cutting is complete, lay sheets flat, face to face, back to back. Always store sheets in this manner until the sheeting has been weeded and transfer tape has been applied to sheeting.
- Use a stripping tool designed for weeding films that has a blunt (not a sharp) edge.
- After weeding is completed, store sheets flat, face to face and back to back, until transfer tape is applied.
- TPM-5 Clear Transfer Tape is recommended for best results. SCPM-3 Application Tape is also satisfactory for use on small signs. Other transfer tapes are not recommended.
- Transfer tape can be applied either by hand using a plastic squeegee or through a hand squeeze roll laminator. If applying the transfer tape by hand, care must be taken to **always** squeegee from the center to the outside in both directions. If applying the transfer tape through the HSRA, the “lead” edge must be cut square and fed into the nip very carefully to avoid wrinkles in the E.C. Film.
- Series 1170 film may be applied to the sheeting either before or after the sheeting has been applied to the substrate. Series 1170 film can be applied to Engineer Grade sheeting series 3290, High Intensity Grade sheeting series 3870 and 3930, Diamond Grade™ sheeting series 3970, 3990, 3990T and 4000. Use of a hand squeeze roll laminator is recommended to ensure satisfactory results. Use the “split liner method” – start in the middle of the sheet and remove half the liner to ensure proper alignment.
- After series 1170 film and sheeting have been applied, remove the transfer tape by carefully removing the tape at as low an angle as possible.
- IMPORTANT!** When the transfer tape has been removed, reroll the sign through the laminator to ensure good adhesion.
- A clean cutting blade is required. To remove adhesive build-up use a soft cloth dampened with mineral spirits, isopropyl alcohol or 3M Natural Cleaner.

Health and Safety Information

Read all health hazard, precautionary and first aid statements found in the Material Safety Data Sheet and/or product label of chemicals prior to handling or use.

General Performance Considerations

All existing field performance warranties for the reflective sheetings remain in effect when series 1170 film is applied over recommended Reflective Sheetings.

FOR INFORMATION OR ASSISTANCE

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