Description

3M™ ElectroCut™ Film Series 1170C Clear, 3M™ Premium Protective Film Series 1160i, and 3M™ Premium Protective Film Series 1160iA (the "Films") are used in combination with prismatic reflective sheeting that have been digitally imaged.

The Films fulfill the clear overlaminate requirement of the 3M™ MCS™ Warranty for Traffic and 3M™ MCS™ Warranty. See the 3M Sign Warranty Bulletin and imaging method specific warranty matrix listed at the end of this document for matched component requirements and warranty details.

The Films are compatible with the following 3M reflective sheetings:

- 3M™ Engineer Grade Prismatic Reflective Sheeting Series 3430
- 3M™ Advanced Flexible Engineer Grade Reflective Sheeting Series 7300
- 3M™ High Intensity Prismatic Reflective Sheeting Series 3930
- 3M™ High Intensity Prismatic Reflective Digital Sheeting Series 3930UDS
- 3M™ Diamond Grade™ DG^3 Reflective Sheeting Series 4000
- 3M™ Diamond Grade™ DG^3 Prismatic Reflective Digital Sheeting Series 4000UDS
- 3M™ Diamond Grade™ Translucent DG^3 Reflective Sheeting Series 4090T

Specifications

Sheeting overlaminated with 1160i, 1160iA, or 1170C conforms to all current performance requirements of ASTM D4956 for Type I, Type IV, Type IX, and Type XI sheeting.

Applying Overlaminate

Laminator Specifications

NOTE

Read the manufacturer's operating manual carefully and follow all prescribed procedures when using any equipment.

Printed images must be cured before being overlaminated with 3M™ ElectroCut™ Film Series 1170C Clear Overlaminate or 3M™ Premium Protective Overlay Film Series 1160i/1160iA.

Selection of the optimal lamination settings, including (but not limited to) heat, lamination speed, and lamination pressure can prevent or minimize silvering of printed graphics, especially when printed with UV inks. In general, silvering can be mitigated by increasing lamination temperature, decreasing lamination speed, or increasing lamination pressure.

3M recommends performing lamination using a laminator that meets the following criteria:

- Roll to roll laminator
- Minimum 48 in. wide
- Maximum 65 in. wide
- Pneumatically controlled nip preferred
- Rubber covered nip rolls capable of a minimum nip pressure of 7 pounds per lineal inch (i.e a 48 in.-wide nip roller requires 80 psi)
- Rollers with hardness as defined in Table B
- Speed variable from 3 to 5 feet per minute
- One unwind shaft for printed sheeting
- One unwind shaft for overlaminate
- One rewind shaft for finished product
- One rewind shaft for overlaminate liner

For UV-printed signs (Durst 163TS/HS and EFI H1625RS) there is an additional requirement:

- Top nip roll capable of being heated to 150°F

NOTE

1160i/1160iA anti-graffiti overlaminate films are thinner and stretchier than 1170C. Consider reducing the unwind tension when using these films to reduce overlaminate stretching during application to the reflective sheeting.

NOTE

1160i has a premask layer which increases the rigidity of the film to aid in application, especially hand application. The premask should be removed after the overlaminate is applied to the imaged sign. 3M recommends re-running the sign through a roll applicator after the premask is removed to ensure good adhesion between the sheeting and the substrate.

Roller Hardness

Table A. Roller Hardness Requirements

Roller	Two Rubber Roll Laminators	One Rubber Roll Laminator
Upper Roll	30 to 40	50 +/- 5
Lower Roll	50 to 60	Steel

Roll Lamination

- Avoid flexing the Films excessively when handling it. Flexing the Film may cause it to release from the liner.
- 3M does NOT recommend splicing the Film.

NOTE

Inspect the rollers prior to starting use to ensure they are clean and in good condition.

Cold Roll to Roll Lamination Procedure

This cold roll to roll lamination procedure can be used for most sign faces. The instructions reference overlaminates, but application tapes can work similarly.

1. Load and thread the medium to be laminated according to the laminator's operating instructions. The medium should be on the bottom of the laminator with the image side facing up toward the upper laminating roll.
2. Thread the overlaminate, with the take up roll receiving the liner, according to the laminator's operating instructions. (When using application tape, thread the application tape similarly, though without taking up any used liner.) Ensure the adhesive makes contact with the image side of the medium and line up the edges of the medium and overlaminate rolls.
3. Set the laminator speed to 2 ft/min (0.6 m/min) or the laminator's slow setting.
4. Lower the roll to set the nip pressure between the medium and the overlaminate to 80%, or whatever is recommended by the laminator's operating instructions.
5. As the sign face moves out of the nip rolls, ensure there are no wrinkles in it. If there are wrinkles, adjust the brakes or tension dials per the manufacturer's instructions until the desired tension and wrinkle free graphics are achieved.
6. Increase the laminator speed to a desired output based on the project's needs. 3M recommends a lamination speed in the range of 3 ft/min to 5 ft/min (0.9 m/min to 1.5 m/min).
7. When lamination is complete:
   a. Open the nip rolls.
   b. Remove the sign face.
8. Remove the cores, used liner, and other items from the laminator and ensure the rollers are no longer in contact.

Cold Roll to Sheet Lamination Procedure for non-UV Inkjet and Colored Film Graphics

This cold roll to sheet lamination procedure can be used for most graphics, including solvent, eco-solvent, latex, and inkjet printed graphics and colored, pigmented graphics. The instructions refer to overlaminates, but application tapes can work similarly.

1. Load and thread an extra piece of film or liner on the bottom nip according to the laminator's operating instructions. This protects the nip rolls from the overlaminate adhesive when the two nip rolls are brought together.
2. Thread the overlaminate with the take up roll for the liner according to the laminator's operating instructions. (When using application tape, thread the application tape similarly, though without taking up any used liner.) Ensure the adhesive makes contact with the extra piece of film or liner and lines up with the film or liner's edges.
3. Set the laminator speed to 2 ft/min (0.6 m/min) or the laminator's slow setting.
4. Lower the roll to set the nip pressure between the medium and the overlaminate to 80% or whatever is recommended by the laminator's operating instructions.
5. As the film or liner comes out of the nip rolls, ensure there are no wrinkles in it. If there are wrinkles, adjust the brakes or tension dials on the laminator per the manufacturer's instructions until the desired tension and wrinkle free graphics are achieved.
6. Hand feed the sign face into the nip rolls, ensuring the sheets line up with the overlaminate.
7. Increase the laminator speed to a desired output based on production needs. 3M recommends a lamination speed in the range of 3 ft/min to 5 ft/min (0.9 m/min to 1.5 m/min).
8. When lamination is complete:
   a. Open the nip rolls.
   b. Remove the sign face.
9. Remove the cores, used liner, and other items from the laminator and ensure the rollers are no longer in contact.

Hot Roll to Roll Lamination Procedure for UV Inkjet Printed Graphics

3M recommends using hot roll lamination for UV inkjet printed graphics to help minimize silvering, a silvery appearance caused by air trapped between the overlaminate and the UV ink.

1. Load and thread the medium to be laminated according to the laminator's operating instructions.
2. Adjust the temperature of the upper roll against the printed graphic to at least 150°F (65.6°C). The roll should heat the liner of the UV-printed graphic.
3. Proper tension control is crucial whenever the upper roll is heated. This is to prevent the overlaminate from softening and stretching during lamination, which may cause curling in the sign face.
4. Thread the overlaminate with the liner take up roll according to the laminator's operating instructions. Line up the medium with the overlaminate.
5. Set the laminator speed to 2 ft/min (0.6 m/min) or the laminator's slow setting.
6. Lower the roll to set the nip pressure between the medium and the overlaminate to 100% or whatever is recommended by the laminator's operating instructions.
7. As the sign face moves out of the nip rolls, ensure there are no wrinkles in it. If there are wrinkles, adjust the brakes or tension dials per the manufacturer's instructions until the desired tension and wrinkle free graphics are achieved.
8. Increase the laminator speed to a desired output based on production needs. 3M recommends a lamination speed in the range of 3 ft/min to 5 ft/min (0.9 m/min to 1.5 m/min).
9. Remove the sign face from the laminator.
10. Remove the cores, used liner, and other items from the laminator and ensure the rollers are no longer in contact.

Flatbed Applicator Lamination for Application Tapes

For graphics using application tapes, a flatbed applicator can work well. Overlaminates can be used with these machines, but additional steps must be taken with regards to used liner. A general procedure is outlined below.

1. Set the medium face up on the flatbed applicator table.
2. Load and thread the application tape per the manufacturer's recommendations. Ensure the application tape is wide enough to cover the medium on the table.
3. Lower the nip roll.
4. Pull the laminator roll across the medium, covering it with the application tape.
5. Raise the laminator roll.
6. Cut the application tape on the table.
7. Return the nip roll to its original position.
8. Cut the excess application tape from the table.
9. Remove the laminated graphic.
10. Repeat the process for additional sheets of media.

Finishing and Additional Processing

Trimming

Use a sharp cutting blade to trim the Film along sign edges. It may be helpful to grasp the edge of the unsupported overhanging Film to create tension on that portion of the Film while trimming. Angle the blade so no sheeting overhangs the edge of the sign.

Removing Premask

Remove the premask AFTER the Film has been applied to the sign by lifting an edge of the premask with a fingernail or knife, then pulling the premask back over itself at a very sharp angle using steady, even tension.

- Do NOT allow premask to be exposed to moisture.
- Premask must be removed before storing or shipping signs.
- Edge trim *before* removing premask.

NOTE

3M recommends users run the image back through the laminator after removing the premask to ensure a good bond between the overlaminate and the sign face without wrinkles.

Additional Processing

The Films are NOT designed to have any other inks, films, or sheetings applied over them. The application of any such materials is strictly on a user test-and-approve basis.

Other Product Information

Always confirm you have the most current version of the applicable product bulletin, information folder, or other product information from 3M's website at http://www.3M.com/roadsafety.

Literature References

- 3M PB 1160i 3M™ Premium Protective Overlay Film Series 1160i
- 3M PB 3430 3M™ Engineer Grade Prismatic Reflective Sheeting Series 3430
- 3M PB 3930 3M™ High Intensity Prismatic Reflective Sheeting Series 3930
- 3M PB 3930UDS 3M™ High Intensity Prismatic Reflective Digital Sheeting Series 3930UDS
- 3M PB 4000 3M™ Diamond Grade™ DG^3 Reflective Sheeting Series 4000
- 3M PB 4000UDS 3M™ Diamond Grade™ DG^3 Reflective Digital Sheeting Series 4000UDS
- 3M PB 4090T 3M™ Diamond Grade™ Translucent DG^3 Reflective Sheeting Series 4090T
- 3M PB 7300 3M™ Advanced Engineer Grade Reflective Sheeting Series 7300
- 3M PB 8900UV 3M™ Piezo Inkjet Series 8900UV Ink
- 3M Sign Warranty Bulletin
- 3M™ MCS™ Warranty for Traffic Matrix for EFI H1625-RS
- 3M™ MCS™ Warranty Matrix for EFI H1625-RS
- 3M™ MCS™ Warranty Matrix for Durst 163TS and 163TS-HS Printers
- 3M™ MCS™ Warranty for Traffic Matrix for Durst 163TS & 163TS-H
- 3M™ MCS™ Warranty Matrix for HP Latex 360/365 Printers
- 3M™ MCS™ Warranty for Traffic Matrix for HP 360/365 Printers
- 3M™ MCS™ Warranty Matrix for HP Latex 700/800 Series Printers
- 3M™ MCS™ Warranty for Traffic Matrix for HP Latex 700/800 Series Printers

Health and Safety

Chemicals

When handling any chemical products, read the manufacturers' container labels and the Safety Data Sheets (SDS) for important health, safety, and environmental information.

Follow this link to obtain SDS sheets for 3M products.

Follow this link to obtain information about substances of very high concern (SVHC) for EU products.

Tools and Equipment Usage

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

Warranty Information

Technical Information

Technical information, guidance, and other statements provided by 3M are based upon records, tests, or experience that 3M believes to be reliable, but the accuracy, completeness, and representative nature of such information is not guaranteed. Such information is intended for people with knowledge and technical skills sufficient to assess and apply their own informed judgment to the information. No license to any intellectual property rights is granted or implied with respect to this technical information.

Product Selection and Use

Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. Customer is solely responsible for evaluating the product and determining whether it is appropriate and suitable for customer's application, including conducting a workplace hazard assessment, reviewing all applicable regulations and standards, and reviewing the product label and use instructions. Failure to properly evaluate, select, and use a 3M product in accordance with instructions or to meet all applicable safety regulations may result in injury, sickness, death, and/or harm to property.

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