



Making Thermal Ink Jet Graphics

- **3M™ Scotchcal™ Opaque Imaging Media 8522**
- **3M™ Scotchcal™ Instant Dry Translucent Imaging Media 8544**

Compatible Products and Equipment

To fabricate a ink jet graphic that is covered by the MCS warranty, you must be a 3M Ink Jet Graphics Registered Fabricator, and you must use the products and equipment recommended in this bulletin.

Imaging Media

- 3M™ Scotchcal™ Opaque Imaging Media 8522
 - 7 mil, white, changeable film with pressure sensitive adhesive
 - For opaque graphics printed first surface
- 3M™ Scotchcal™ Instant Dry Translucent Imaging Media 8544
 - 7 mil, translucent, changeable film with pressure sensitive adhesive
 - For backlit graphics printed first surface

Overlaminates

- 3M™ Scotchcal™ Luster Overlamine 8519
- 3M™ Scotchcal™ Matte Overlamine 8520

Printers and Ink Systems

- HP DesignJet CP Printers
 - 2500CP and 2000CP
 - 2800CP and 3800CP
 - 3500CP and 3000CP
- HP DesignJet CP Ink System UV (pigment-based)

Applications and End Uses

Opaque imaging media 8522 and translucent imaging media 8544 are intended only for ink jet printing and for use with the listed Compatible Products and Equipment and the following applications. Any other application is NOT warranted by 3M or covered by the worldwide 3M™ MCS™ Warranty unless 3M gives its prior written approval for the application.

See Product Bulletin 8522 and 8544 for details.

Opaque Imaging Media 8522

For ink jet printing of first surface images for interior and exterior posters, signs and banners.

Translucent Imaging Media 8544

For ink jet printing of first surface, laminated images (the image is on top of the film) for indoor backlit applications.

Application Surfaces and Substrates

Application Surfaces

- For flat or simple curved surfaces used in vertical ($90^{\circ} \pm 10^{\circ}$) applications

Warranted Substrates

- Rigid substrates for opaque imaging media 8522
 - Some substrates may “out-gas”, resulting in tiny bubbles throughout the surface of the graphic. For maximum performance, be sure the substrate you select is properly cleaned and prepared as recommended by the manufacturer. See Instruction Bulletin 5.1 for additional information.
 - Alodine (anodized aluminum)
 - Automotive panels (automotive painted steel)
 - Fruehauf (painted aluminum)
 - FRP (fiberglass reinforced plywood)
 - Glass
 - Imron® (polyurethane-painted metal panel)
 - Acrylic
 - Sintra™ board
- Rigid substrates for translucent imaging media 8544
 - Glass
 - Plexiglas™ (acrylic)
 - Polycarbonate
- Flexible sign facing for translucent imaging media 8544
 - 3M™ Panaflex™ Awning and Sign Facing 945 GPS

Continued on page 2.

Note: For the full product names of the 3M products listed on this page, please see page 1.

Non-Warranted Substrates

- Banner Materials for Imaging Media 8522
Any flexible banner material may be used on a customer test and approve basis.

Keep in mind that the plasticizer in some banner materials may migrate. This may cause the edge of the graphic to peel or lift off of the banner. For optimum performance, follow the guidelines in the section, **Creating A Laminated Overlap**, on page 4.

Note: Other substrates should be tested prior to use to ensure acceptable performance.

Health and Safety

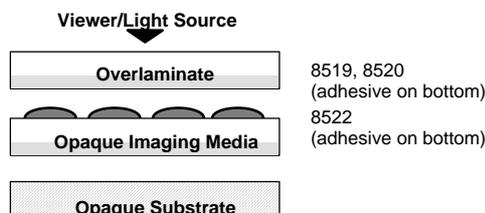
 Caution
<p>When handling any chemical products, read the manufacturers' container labels and the Material Safety Data Sheets (MSDS) for important health, safety and environmental information.</p> <p>To obtain MSDS sheets for 3M products:</p> <ul style="list-style-type: none"> • By fax, call 1-800-364-0768 in the US and Canada or 1-650-556-8417 for all other locations. • Electronically, visit us at http://www.3M.com/MSDS. • By mail, or in case of an emergency, call 1-800-364-3577 or 1-651-737-6501. <p>When using any equipment, always follow the manufacturers' instructions for safe operation.</p>

Graphic Construction Options

Opaque (Reflective) Graphics for Imaging Media 8522

Opaque graphics are printed as a first surface image on opaque imaging media 8522. These graphics require luster overlaminate 8519 or matte overlaminate 8520 and an opaque substrate.

Construction Example



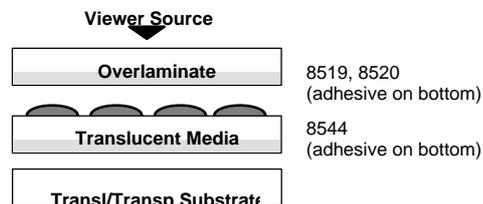
Backlit Graphics

A backlit graphic can be printed on the first surface of translucent imaging media 8544. An overlamine is applied and the image is then mounted to a transparent or a translucent substrate.

The light shining through a backlit graphic can make the image appear too light. Therefore, you may need to compensate for that when printing. The best color correction in digital technologies occurs while you are manipulating the image on the computer, before the data is sent to the printer. Here are some guidelines for improving the appearance and color density of a backlit graphic.

- Develop a color table for the specific pairs of ink and media, and for each system of scanner, computer, printer and application.
- Darken a backlit graphic at your computer. Generally you cannot simply tell the printer to lay down more ink. Try one or more of these options:
 - Decrease the brightness.
 - Increase the saturation.
 - Increase the contrast.
- When using the HP DesignJet 2500CP or 3500CP printer, you can select a higher ink laydown for a darker image. Try the **Custom Media D** setting if you want to darken the image.

Backlit Graphics Construction Example



Shelf Life and Storage

- The media described in this Bulletin have a shelf life of 12 months.
- Storage conditions (new and partially used rolls). For optimum performance, use the middle of these ranges:
 - Original packaging, including plastic wrap
 - Relative humidity of 20% to 80%
 - Temperature of 33° to 104°F (0° to 40°C)
 - Away from direct sunlight
- Do not stack unprotected rolls or lay sharp or heavy objects on them.

Note: For the full product names of the 3M products listed on this page, please see page 1.

Fabrication Conditions

Different combinations of shop temperature and humidity can affect the handling of the media, the protective finish and the printed graphic. For optimum performance, use the *middle* of each of these ranges whenever possible.

- Shop temperature
Acceptable: 60° to 95°F (15° to 35°C)
Optimum: 65° to 73°F (18° to 23°C)
- Shop humidity
Acceptable: 20% to 80%
Optimum: 45% to 60%

Conditioning the Media

Condition the media before using it. These steps are especially important if you are operating outside the conditions recommended under Fabrication, above.

- Leave the media in its original packaging until you are ready to condition and use it.
- The day before you need it, remove the media from the box and remove the plastic.
- Condition the media for 24 hours in the same environment as the printer.
- For optimum performance the printing environment should have a relative humidity of 45% to 60% and an ambient temperature of 65° to 73°F (18° to 23°C).

At the End of the Day

- Unthread the web from the printer and tape the roll closed at the center. It is not necessary to remove the roll from the printer.
- If the media will not be used for a few days, remove it from the printer and rewrap it.

Storing Open Rolls of Film

When an open roll of film is not being used:

- Cover the roll with plastic to protect it from contaminants.
- If you are storing it on end, use an end plug and tape down the edge to prevent damage to the edge of the roll.
- Do not lay sharp or heavy objects on unprotected rolls and do not stack them.

Printer Settings for Optimum Quality

Refer to your Hewlett Packard printer manual for detailed operating instructions.

Opaque imaging media 8522 and translucent imaging media 8544 have been specifically designed for use with the HP DesignJet CP printers listed on page 1. These printers have print mode options that are programmed specifically for these media. The following chart shows the various modes and printing dpi, and the quality results you can expect. We recommend that you print the same image at all of these settings so that you can determine the acceptable print and productivity for your needs.

Keep in mind that the highest quality settings are usually desirable for backlit applications.

Mode	dpi	Results
Best	600	Excellent quality
Best	300	Very good quality Slightly higher productivity
Normal	300	Good quality Greater productivity
Fast	300	Lower quality Highest productivity

The correct media selection makes most other necessary adjustments to the printer.

- For opaque imaging media 8522, select the **Opaque Vinyl UV** setting.
- For translucent imaging media 8544, the **Opaque Vinyl UV** setting may be adequate. However, for additional ink laydown for backlit applications, try **Custom Media D**. You may also want to run the same sample on all six **Custom Media** settings to determine the best look for your application. For images that required the most exacting quality, you may want to try **UV Custom Media A**.

Drying Guidelines

Opaque Imaging Media 8522

Opaque imaging media 8522 dries quickly when used with the designated printers and inks. Usually, the media can be laminated within 10 minutes after printing. However, especially in high humidity conditions, we recommend waiting 15 to 30 minutes before laminating.

Use care when handling graphics that have not been laminated to avoid scratching and abrasion.

Graphics made with this media and ink combination typically may be wound directly on a take-up roll after printing.

Translucent Imaging Media 8544

Translucent imaging media 8544 dries instantly and is scratch resistant when used with the designated printers and ink. The image can be laminated immediately following printing.

Graphics made with this media and ink combination may be wound directly on a take-up roll after printing.

Note: For the full product names of the 3M products listed on this page, please see page 1.

Lamination

Luster overlaminate 8519 or matte overlaminate 8520 is required for the finished graphic to be covered by the 3M MCS warranty. The required overlaminates are described in the chart on page 1 of this bulletin. Refer to the appropriate Product Bulletins for warranty details. Even if you are not interested in the warranty, an overlaminate is recommended whenever you use 3M imaging media for weatherable applications.

A typical laminator threadup pattern is shown in Figure 1.

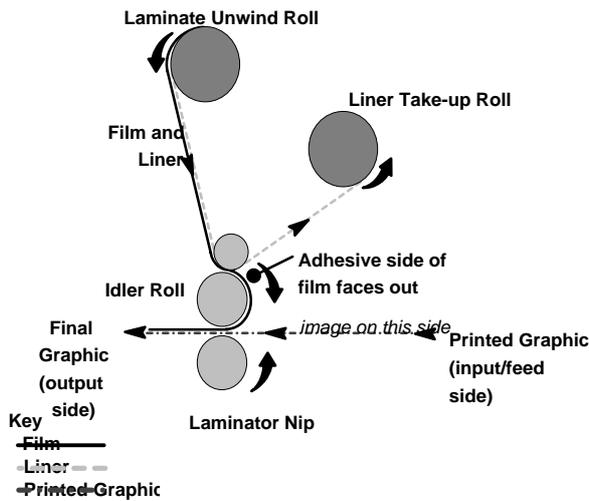


Figure 1. General Laminator Thread-up (side view) for Laminate Films on Liner

Creating a Laminated Overlap

Creating a laminated overlap helps ensure that the graphic does not peel or lift away from certain banner materials that may be subject to plasticizer migration. This method may also be used for flat, rigid or flexible sign applications.

1. Print the graphic as usual.
2. On all sides of the graphic, score *the film only* to the correct, final graphic dimension *without cutting through the liner*.

Weed away the excess film, leaving the bare liner exposed around the graphic. See Figure 2.

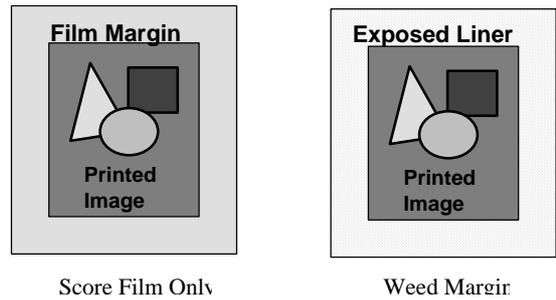


Figure 2. Trim and Weed Film Margin Only

3. Laminate the graphic as usual (see page 5), making sure that at least one inch of the bare liner is covered by the laminate. See Figure 3.

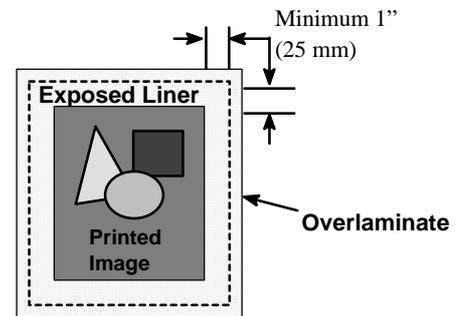


Figure 3. Apply Overlamine

4. Trim the graphic to its final dimensions, making sure to leave a margin of 1/4 to 1/2 inch (6 to 13 mm) laminated liner on all sides that require the laminate overlap. See Figure 4.

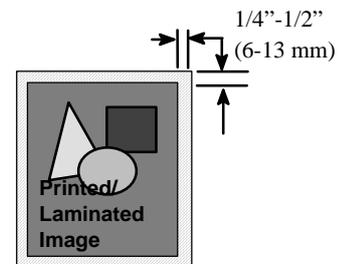


Figure 4. Trim, Leaving a Margin of Laminated Liner

Note: For the full product names of the 3M products listed on this page, please see page 1.

Mounting the Final Graphic

Note: Refer to the Compatible Substrates list on page 1.

Mounting Methods

Use the following guide to determine if you should mount the final graphic on its intended sign substrate by hand or with a laminator.

Hand	Laminator
<ul style="list-style-type: none"> • Thick or rigid graphics • Removable or positionable adhesive • Complex sign mounting surface • Small graphic mounted by 1 person • Medium to large graphic mounted with 2 people • Fleet graphics applied directly to the vehicle 	<ul style="list-style-type: none"> • All translucent signs* • Thin or flimsy graphics • Aggressive mounting adhesive • Flat sign mounting surface • Medium to large graphic mounted by 1 person

*Hand laminating a translucent sign often results in squeegee marks and air bubbles that are much more obvious when the finished sign is backlit. Therefore, mechanical lamination is recommended.

Procedure

Note: Imaging media 8544 should be applied using a dry method only.

1. Be sure the temperature of the air, graphic and surface to which you mount the graphic is 45° to 95°F (7° to 35°C).
2. Be sure the substrate is clean and dry. Contaminants prevent good adhesion.
3. If your substrate is susceptible to outgassing, treat it according to the manufacturer's recommendations before mounting the graphic. This avoids bubbling that may be unacceptable.
4. For hand lamination only: Put a low friction paper sleeve over a hard plastic squeegee. The sleeve helps prevent scratching the graphic surface.
5. Position the graphic on the substrate, leaving about a 2 inch (50 mm) margin all around the graphic.
6. Apply a 2 inch (50 mm) wide piece of masking tape across the top edge of the graphic.
7. Flip the graphic over. You can roll the graphic for easier handling, if desired.

8. Strip back some of the liner, starting at the taped edge. Do not allow the adhesive to touch the substrate yet.
9. For hand lamination only:
 - a. While holding the graphic up with one hand, use the other hand to hold the squeegee.
 - b. Starting in the middle of the taped edge of the graphic, use smooth, overlapping strokes to each side of the graphic.
 - c. Stop immediately if you notice some wrinkling. Lift the wrinkled area and reposition. Then gently squeegee the wrinkle to finish smoothing it.
 - d. Pull back some more liner and continue squeegeeing the graphic. To finish the graphic, trim the substrate to the desired size.
10. For a laminator only:
 - a. Position the taped edge of the graphic into the laminator nip.
 - b. Start the laminator.
 - c. As the graphic is pulled through the nip, continue pulling off the liner.
 - d. To finish the graphic, trim the substrate to the desired size.
11. After applying the graphic, resqueegee all edges firmly. Premature lifting of the graphic may occur if the edges are not adequately laminated.

Care of the Finished Graphic

Avoid contact between the finished graphic and water or other liquids during production, handling, and application, especially before laminating.

Removal

Imaging media 8522 and 8544 are removable from most sealed surfaces for 1 year without the aid of chemical strippers or accessories, if applied to one of the Warranted Substrates listed on page 1.

Always test the substrate for removal before applying the final graphic. Paint that has poor adhesion to the substrate may be pulled off when removing the film. Aged surfaces with oxidation or chalking may leave adhesive residue on the substrate after the film is removed.

If the substrate surface is appropriately sealed, just lift an edge of the graphic and peel it back at a 180 degree angle; lesser angles may leave adhesive residue. No heat or chemicals are required.

Warranty and Limited Remedy

The information contained and techniques described herein are believed to be reliable, but 3M makes no warranties, express or implied, including but not limited to any implied warranty of merchantability or fitness for a particular purpose. 3M shall not be liable for any loss or damages, whether direct, indirect, special, incidental or consequential, in any way related to the techniques or information described herein.

3M Related Literature

Before starting any job, be sure you have the most recent product and instruction bulletins.

Listed below is related 3M technical literature that may be of interest. You may view and print these Bulletins from our Web site at www.scotchprint.com, or order them via our Fax-on-Demand (FOD) system. Call one of these phone numbers to order the desired bulletins, and specify the FOD document number provided in the chart.

United States or Canada: 1-800-364-0768
International: 1-651-732-6506

Subject	Bulletin No.	FOD No.
Product Bulletins		
3M™ Scotchcal™ Opaque Imaging Media 8522	8522	4506
3M™ Scotchcal™ Instant Dry Translucent Imaging Media 8544	8544	4509
3M™ Scotchcal™ Overlaminates 8519 and 8520	8519/ 8520	4524
3M™ Panaflex™ Awning and Sign Facing 945 GPS	945	4006
Instruction Bulletins		
Cold roll lamination	4.22	6522
Application, substrate selection, preparation and substrate-specific application techniques	5.1	7001
Application, general procedures for interior and exterior dry applications	5.5	7005

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Sintra is a tradename of Alcobond Technologies.

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Bulletin Change Summary

Remove CP designation from films 8544, 8522, 8519 and 8520. Removed sign facing 645EI, which is obsolete.



Fax-on-Demand document: 6523
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For the United Kingdom and Republic of Ireland

Health & Safety

Refer to the package label and the Material Safety Data Sheet for health, safety, and handling information on the products referenced in this bulletin. For 3M products, if necessary, you may contact our Toxicology/Product Responsibility Department on 01344 858000.

Important Notice to Purchaser

The 3M products described in this publication are covered by a 3M warranty and limitation of liability.

3M's warranty provides that if 3M finds that goods are defective in material or workmanship they will be replaced or the price refunded at 3M's option but note that 3M does not accept liability for other direct losses (except for personal injury or death) or consequential losses relating to defective products or from information supplied by 3M.

Purchasers and users of 3M products, and not 3M supplying companies, are always solely responsible for deciding on the suitability of the 3M product for their required or intended use.

Technical Assistance

For help on specific questions relating to 3M Commercial Graphics Division Products, contact your local Technical Service Representative.

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