Overview

This instruction bulletin covers the general wet application method and dry application method for applying graphic films to building glass, including both the cleaning and application processes.

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Glass Care Concerns

NOTE

Only use stainless steel blades when cutting graphics on glass or cleaning glass surfaces, to reduce the potential for scratching the surface.

NOTE

All perforated film installations on glass must be edge sealed. 3M also recommends edge sealing all dry applied window graphics.

⚠ **WARNING**

A glass surface covered by a film with areas of high opacity or dark-colored ink will absorb more heat than other glass surfaces when exposed to sunlight. Heat absorption can create thermal expansion that could result in glass breakage or cracking.

To reduce the risks of personal injury and/or property damage associated with glass breakage, do NOT use a film with areas of high opacity or dark-colored ink on glass surfaces with significant exposure to sunlight.

Compatible Products*

* Product availability varies by region. Contact a local sales representative or application engineer for details.

Wet Application Films

- 3M™ Dusted and Frosted Crystal Glass Finishes
- 3M™ Scotchcal™ Graphic Film Series 50
- 3M™ Scotchcal™ Clear View Graphic Film IJ8150
- 3M™ Scotchcal™ Graphic Film Series 5525 SE
- 3M™ Scotchcal™ Graphic Film Series 5525C SE
- 3M™ Scotchcal™ ElectroCut™ Graphic Film Series 7125
- 3M™ Scotchcal™ ElectroCut™ Graphic Film Series 7725

Dry Application Films

- 3M™ Window Graphic Film 8170-P50
- 3M™ Window Graphic Film 8170-P40
- 3M™ Controltac™ Print Film 40C
- 3M™ Controltac™ Graphic Film with Comply 180mC

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Edge Sealers

- [3M™ Edge Sealer 3950](#)
- [3M™ Edge Sealer 4150S](#)
- [3M™ Edge Sealer Tape 8914](#)

Tools

Tools for Wet Installation

- 3M™ Hand Applicator PA-1 (Blue or Gold) with 3M™ 5491 PTFE tape applied to the edges of the hand applicator
  - The gold applicator is most commonly used. It is stiffer than the blue applicator, which allows maximum application pressure.
- 4 in. (10.2 cm) window scraper with stainless steel replacement blades
- White Scotch-Brite™ Light Cleansing Hand Pad 7445
- 8 in. (20.3 cm) window cleaning squeegee with replacement rubbers
- Razor blade knife with stainless steel replacement break-away blades
- Ruler with nick-free edges
- Scotch™ Masking Tape
- Clean, lint-free paper towels
- Drop cloths (absorbent)
- 3 gal. (11 l) plastic pressure spray tank with 8 to 10 ft (2 to 3 m) of plastic hose
- Water
- Baby shampoo
- A mixture of 70% isopropyl alcohol (IPA) and 30% water
- Blade disposal container
- Step ladders and extension ladders
- Scaffolding or access equipment as required

Tools for Dry Applications

- 3M™ Plastic Applicator PA-1 (Blue or Gold) with 3M™ 5491 PTFE tape applied to the edges
  - The gold applicator is most commonly used. It is stiffer than the blue applicator, which allows maximum application pressure.
- Razor blade knife with stainless steel replacement break-away blades
- Scotch™ Masking Tape, 1 in. (2.5 cm) or wider
- Ruler with nick-free edges
- A mixture of 70% isopropyl alcohol and 30% water
- Clean, lint-free paper towels
- 1/4 in. (0.6 cm) paint brush for applying edge sealer
- Blade disposal container
- Step ladders and extension ladders
- Scaffolding or access equipment as required

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Pre-Installation Preparation

Color Matching

Whenever two or more pieces of the same color translucent film are seamed together as a continuous band of color, they should be matched to ensure uniform daytime color and transmitted nighttime appearance. See 3M Instruction Bulletin Production: Graphic Design, Handling, and Storage for details.

Prepare the Application Solution

Prepare a solution of 1 tsp (5 ml) of baby shampoo per gallon (3.8 l) of water to use for applying the finish. Pour this solution into a sprayer.

> **NOTE**
>
> The application solution may require higher concentrations of baby shampoo when applying film in higher temperatures or in direct sunlight.

- Higher detergent or baby shampoo concentrations cause the applicator and finish to slip, resulting in insufficient application pressure.
- Lower detergent or baby shampoo concentrations cause the finish to stick or prevent the squeegee from traveling smoothly across the film, resulting in an inconsistent application and leaving excess water behind.

Prepare the Installation Area

- Protect the areas around the installation from application solution overspray and drips, using masking tape and/or drop cloths as appropriate.
- Turn off or cover heating or air conditioning units and ventilation ducts in the application area prior to starting the installation if possible.
- For the best bonding conditions, 3M recommends an application temperature of 54°F to 100°F (12°C to 38°C). At the lower end of this range, additional application pressure on the graphic can encourage better adhesive bonding. Attempting to install the window graphic at temperatures below the recommended range can cause the adhesive to become so firm that it will not develop maximum contact with the application surface.
- Wet application MUST be conducted when the glass temperature is above freezing.

Check the Application Surface for Coatings

Many glass surfaces have invisible coatings on them that interfere with adhesion. Use the following procedure to identify if a coating is on the glass. There are times this coating is a part of the glass and cannot be removed. Ensure the customer understands and agrees with this procedure.

1. Place drops of water on several areas of the application surface. Water beads indicate that the glass or plastic has a coating that must be removed to allow for adequate product adhesion.
2. Clean the application surface with a lint-free paper towel saturated with a mixture of 70% isopropyl alcohol and 30% water.
3. Wipe the application surface clean with a lint-free paper towel before the IPA evaporates.
4. Check again for water beading. If there is no beading, proceed with application surface preparation. If water beading still occurs, repeat Steps 1 through 4 until beading no longer occurs.

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Instructions for Wet Application

Clean the Application Surface

1. Place drop cloths and/or plastic sheeting to protect areas near the application area.
2. Spray the application solution on the application surface.
3. Scrape the glass with the 4 in. (10.2 cm) window scraper to remove dirt and other contaminants.

   NOTE

   Do NOT scrape plastic surfaces as this will cause scratches that may show through the applied product.

4. Thoroughly rinse the application surface using the sprayer.
5. Squeegee the entire application surface, wiping the squeegee after each stroke.
6. Dry the application surface edge and frame thoroughly.
7. Apply the graphic per the instructions in the "Apply Product" section on page 4 immediately after cleaning the application surface. Any dirt or contaminates which settle on the application surface after cleaning will inhibit adhesion and may be visible after application.

Remove the Liner and Wet the Adhesive

1. Generously spray the application surface with the application solution as shown in Figure 1.
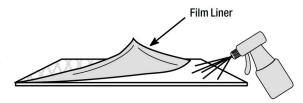2. Lay the front side of the graphic against the application surface so the liner faces you.

   NOTE

   Leave at least 1/4 in. (6.4 mm) of film overlapping the edges of the application surface. This improves the film's adhesion, and the excess film will be trimmed after the film is squeegeed.

Figure 1. Peel back some liner and spray the adhesive.

3. Peel back a few inches of the liner. Always pull the liner away from the graphic, rather than the graphic from the liner, to avoid stretching the graphic.
4. Generously spray the exposed adhesive with the application solution.
5. Continue peeling back the liner and spraying the adhesive with the application solution until the liner is completely removed.
6. Flip the graphic over and position it on the wet application surface so the adhesive contacts the application surface.

Apply Product

1. Recheck the alignment to ensure the graphic is level and placed in the desired location.
2. Spray the surface of the film with application solution to reduce friction and avoid stretching the film.
3. Apply the film using an application squeegee.
4. Starting at the top of the film, use firm and consistent pressure to apply the film, working from the center to the edges. See Figure 2. The goal is to push the water out the edges so the adhesive makes good contact with the application surface.
5. Keep working down the rest of the film, continuing to work from the center to the edges, overlapping strokes by 50%.
6. Trim the film edges back 1/4 in. (6.4 mm) from all window gaskets or silicone joints. The graphic will NOT adhere to these surfaces and will fail over time.
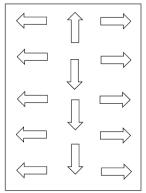7. Wipe the film edges with a clean, lint-free towel to remove any drips.

Figure 2. Application Arrows

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Instructions for Dry Application

Clean the Application Surface

1. Clean the application surface with a lint-free paper towel saturated with a mixture of 70% isopropyl alcohol and 30% water.
2. Wipe the application surface with lint-free paper towels before the IPA evaporates from the substrate, discarding used paper towels as they become dirty.
3. Ensure the substrate is completely dry.
4. Apply the graphic immediately. Dust and contaminants prevent the film's adhesive from performing as expected.

Removing the Adhesive's Liner

Pull the liner away from the graphic at an 180 degree angle with a smooth continuous motion. See Figure 3. Always remove the liner from the graphic rather than the graphic from the liner. This method helps minimize stretching or wrinkling of the graphic.

1. Lay the graphic liner side up against a flat, clean surface.
2. Flick a corner of the film with a finger or bend the corner to separate the liner from the adhesive. If the liner is scored, bend at the score.
3. Keep fingers away from the edge of the adhesive as much as possible while removing the liner. Contamination on the adhesive edges may cause the film edges to lift after application. See Figure 3.
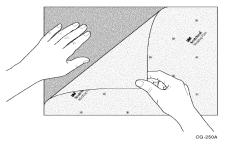

Figure 3. Pulling Off a Liner

Dry Applying a Small Graphic

A graphic is considered small if it is less than 4 ft^2 (0.4 m^2).

1. Remove the entire liner.
2. Gently tack the top edge of the graphic in place with your thumbs. See Figure 4.
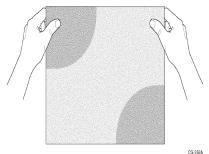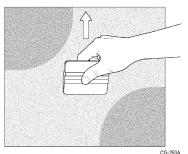

Figure 4. Tack one edge of the graphic.

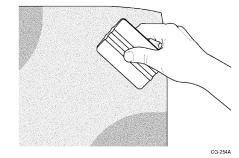**Figure 5.** Squeegee across the shortest distance.

Figure 6. Squeegee the previously lightly tacked area.

3. Install the graphic using firm, overlapping strokes from the plastic applicator. Start from the center of the graphic and always squeegee toward the shortest distance to the edge of the graphic. Hold the remaining film away from the surface during installation. See Figure 5.

   NOTE

   Pull the squeegee, as shown in Figure 5. Do NOT push the squeegee, as doing so can stretch the graphic.

4. Pull the film away from the substrate where you originally tacked it with your thumb and then squeegee those areas. See Figure 6. This prevents wrinkles.

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Dry Applying a Large Graphic

A graphic is considered large if:

- It has a positionable, pressure-activated adhesive, *and* is larger than 9 ft^2 (0.8 m^2); <u>*OR*</u>
- If it has a pressure-sensitive adhesive, *and* is larger than 4 ft^2 (0.4 m^2).

Top Hinge Method

1. Position the graphic on the application area, using strips of Scotch™ Masking Tape to attach the graphic to the substrate.
2. Apply a strip of masking tape 2 to 3 in. (5.1 to 7.5 cm) wide, horizontally across the top of the graphic. See Figure 7.
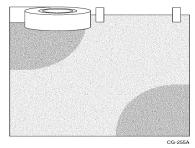3. Lift the graphic over the top of the hinge and peel the liner back a few inches. See Figure 8.

Figure 7. Making a Top Hinge

Figure 8. Lift the graphic and peel back the liner.
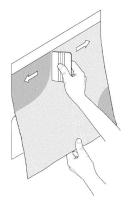
> **NOTE**
>
> The entire liner may be removed at this time, if desired. However, for very large graphics, especially those with a pressure-sensitive adhesive, leaving the liner in place until just prior to squeegeeing the graphic makes the graphic more controllable, keeps the adhesive clean, and reduces the possibility of stretching the film.
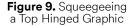
4. Hold the graphic at the center of the bottom edge using care not to stretch the graphic.
5. Squeegee the graphic beginning at the center of the tape hinge and working outward from the hinge to the closest edge.
6. Continue applying the film, working downwards and using firm pressure on the plastic applicator and overlapping strokes. See Figure 9.

> **NOTE**
>
> Pull the squeegee as shown in Figure 9. Do NOT push the squeegee, as doing so can stretch the graphic.

7. Keep the graphic away from the surface and use two hands to peel back the liner a few more inches. See Figure 10. Then, continue squeegeeing the graphic using the technique described above.
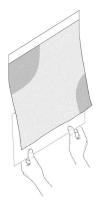8. Continue to gradually remove the liner and squeegee until the entire graphic is applied.

Figure 9. Squeegeeing a Top Hinged Graphic

Figure 10. Use two hands to remove the liner.

> **NOTE**
>
> Take care not to use too much pressure when installing perforated film on windows, as doing so will cause the overlaminate to adhere to the glass in the perforation holes. This will create dark streaks in the installation that last a few weeks.

9. Remove the tape hinge.
10. Squeegee the top edge.
11. Trim the graphic away from window gaskets or silicone. Graphics will not stick to these surfaces and will cause the graphics edge to lift.
12. Re-squeegee all edges.
13. Edge seal the graphic, following the instructions in <u>3M Product & Instruction Bulletin Edge Sealers</u>.

Film Overlaps

3M recommends using an overlap rather than a butt joint when joining pieces of film, since butt joints can result in light leaks. The overlap will leave a barely noticeable darker line when viewed at shorter distances, but it is nearly invisible from normal viewing distances. The recommended overlaps are:

- **Translucent films or printed graphics on clear films:** 1/8 in. +1/16 in. (3.2 mm +1.6 mm)
- **Opaque films can have larger overlaps:** 1/8 to 3/4 in. (3.2 mm to 19.5 mm)

> NOTE
>
> For horizontal seams the upper panel should overlap the lower panel.

3M Related Literature

Read the most current 3M product and instruction bulletins before starting any job.

The information in 3M product and instruction bulletins is subject to change. Current bulletins are available at 3M.com/graphics. The techniques described in these bulletins are required when applying a 3M warranted graphic, but are also practical recommendations when using promotional materials for non-warranted graphics. Additional bulletins may be needed as indicated in the 3M Related Literature sections of the product bulletins of all 3M components used.

- 3M Product & Instruction Bulletin Edge Sealers
- 3M Instruction Bulletin Production: Graphic Design, Handling, and Storage

Health and Safety

Tools and Equipment Usage

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

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.

⚠ **CAUTION**

Ergonomics

Any activity performed for a long period of time in an awkward position or with a high amount of force is potentially a risk for causing musculoskeletal strain, pain or injury. When applying or removing graphics, follow these practices to improve comfort and avoid injury:

- Alternate your tasks during the application.
- Schedule regular breaks.
- Perform stretches or do exercises to improve circulation.
- Avoid awkward reaching.

Warranty Information

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