



Application

Wet Method for Translucent, Screen Printed and Cut Graphics

1. Product Description

| | |
|--------------------------------------|----|
| Description | 1 |
| Compatible Products | 1 |
| Health and Safety | 2 |
| Tools and Materials | 2 |
| Application Temperature | 2 |
| Application Tape | 3 |
| Registration Marks | 3 |
| Color Matching | 3 |
| Substrate-Specific Information | 3 |
| Key Application Tips | 4 |
| Application Procedure | 5 |
| Film Overlaps | 7 |
| Cutting and Weeding | 9 |
| Warranty Information | 9 |
| 3M Related Literature | 10 |
| Bulletin Change Summary | 10 |

2. Description

This Bulletin shows you the general wet (detergent and water) application method for applying films to a variety of flat surfaces. Use these instructions in conjunction with any other related Product and Instruction Bulletins.

The application technique described in this bulletin is not recommended for any vehicle applications or for compound-curved, textured, rough or ribbed surfaces.

The techniques described in this Bulletin are required when applying a 3M warranted graphic, but are also practical recommendations when using intermediate materials for non-warranted graphics.

For information about making backlit signs with digitally-printed graphics, refer to [Instruction Bulletin 4.26](#).

3. Compatible Products

For complete details about graphic construction options, recommended uses and durability or expected performance life, refer to the Product Bulletin for the base film or substrate you are using. See **3M Related Literature** at the end of this Bulletin.

A. Cut Film Decoration

- 3M™ Scotchcal™ Translucent Graphic Film Series 3630
- 3M™ Scotchcal™ Translucent Graphic Film Series 3632GPS
- 3M™ Scotchcal™ ElectroCut™ Graphic Film Series 7725SE
- 3M™ Scotchcal™ Translucent Graphic Film Series 230
- 3M™ Scotchcal™ Special Effects Graphic Film Series 210

B. 3M Substrates

- 3M™ Panaflex™ Awning and Sign Facing 945GPS
- 3M™ Panagraphics™ III Wide Width Flexible Substrate

C. Non-3M Substrates

- Glass
- Acrylic
- Polycarbonate
- Copolyester sign sheet
- Butyrate
- Fiberglass
- Other 3M films; see the film's Product Bulletin for any restrictions.

D. Graphic Protection Options

- 3M™ Scotchcal™ Gloss Overlamine 3640GPS
- 3M™ Scotchcal™ Matte Overlamine 3642GPS
- 3M™ Scotchcal™ Luster Overlamine 3619
- 3M™ Scotchcal™ Matte Overlamine 3620
- 3M™ Scotchcal™ Matte Overlamine 8520
- 3M™ Scotchcal™ Ultra Matte Overlamine 8915

4. Health and Safety



CAUTION

When handling any chemical products, read the manufacturers' container labels and the Material Safety Data Sheets (MSDS) for important health, safety and environmental information. To obtain MSDS sheets for 3M products go to 3M.com/MSDS, or by mail or in case of an emergency, call 1-800-364-3577 or 1-651-737-6501.

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



CAUTION

Ventilation

Always provide adequate ventilation to remove emissions that may result from the use of heat. Failure to provide adequate ventilation can result in operator exposure.



CAUTION

Physical Comfort

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 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.
-



CAUTION

Heat or Open Flames

Heat or open flames may contribute to a flash fire or burns. Follow these precautions when using a heat source for flame treating.

- Read and follow the instructions supplied with the heat source.
 - Avoid personal contact with the heat source. Wear heat-resistant gloves and safety glasses.
 - Do not use heat sources near solvent mixtures or residues, or where solvent vapors may be present.
-

5. Tools and Materials

- 3M™ Applicator PA-1 (Blue or Gold)
- 3M™ Air Release Tool 391X
- Scotch™ Masking Tape 232
- Razor Blades/Cutting Knives
- Small container of mild, non-concentrated detergent (such as Dawn®) containing no lotions, soaps, oils, waxes or enzymes.
- Spray Bottle or Plastic Garden Sprayer
- Large, High-Quality Window Squeegee (*recommended for large graphics.*)

6. Application Temperature

Apply the film when the air and application surface temperature is at least and within the application temperature range specified in the film's Product Bulletin. Typical temperatures are:

- Translucent films: 60° -100° F (16° - 38°C)
- Special effects films: 60° -100° F (16° - 38°C)

7. Application Tape

The type of application tape to use depends on the particular construction of your graphic. See your film's Product Bulletin and Instruction Bulletin 4.3 for details on selecting and using application tapes.

- Premasking is not required with a wet application; however, if you choose to premask the film, use a compatible premasking tape. Please see Step 12 on page 6 for additional important details.
- Use a compatible prespacing tape when applying graphics that are prespaced on a liner.

8. Registration Marks

If the film is not premarked for registration, you can make your own registration marks using a lead pencil, marking pen, or small pieces of masking tape.

Note: DO NOT use chalk, chalk line, or a grease pen. Film will not adhere to chalked areas or those marked with a grease pen.

9. Color Matching

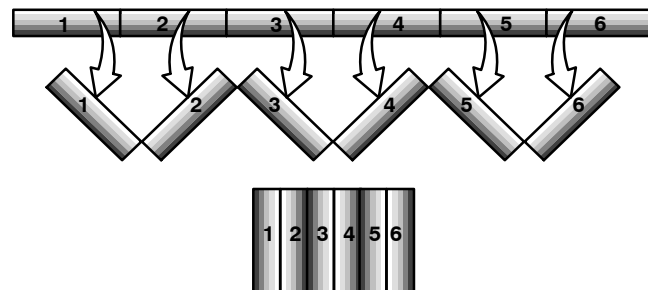
Whenever two or more pieces of the same color translucent film are seamed together as a continuous band of color, they should be matched to assure uniform daytime color and transmitted night appearance.

Material from a single roll or lot must be used on a single graphic or sign for identical color matching.

In general, translucent film from a roll can be matched as shown in FIGURE 1. The dark line represents one edge of the film.

Note: The matching edges are always swung to meet each other. Panels 1 and 2 are a matched set. Pieces 1, 2 and 3 are matched, etc. By following this method you can match as many sheets from a roll as are required for any size sign. Exact color match between different run numbers should not be assumed.

FIGURE 1
Color Matching



10. Substrate-Specific Information

A. Usage on Glass

Important Note!

The risk of glass breakage, which is not covered by any 3M warranty, increases when large, dark-colored areas of glass are exposed to direct sunlight.

Avoid using large areas of black, duranodic, or other dark colors on glass that is exposed to direct sunlight.

B. Polycarbonate

Before applying film to a polycarbonate substrate, make sure the substrate is oven dried according to the manufacturer's recommendation. If polycarbonate is not oven dried, it may emit moisture that can cause the film to bubble.

C. Film Applied over Film

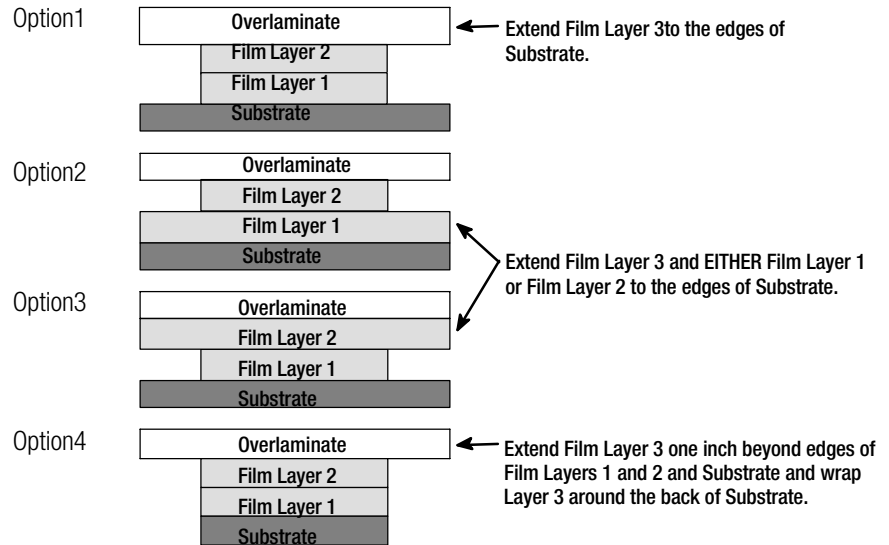
Important Note!

A third layer of film on any one surface is warranted *only* if the top layer is overlaminated and no more than two layers of any film are even with the edges of the substrate.

NEVER place an overlap over an existing overlap, which creates four layers.

- A new opaque film graphic can be applied over one layer of existing film as long as the existing film is in good condition and is prepared as directed.
- Never apply translucent graphic film over an existing graphic or film.
- Do not apply new film over more than one layer of existing film, except as noted in FIGURE 2.
- A third layer of film on any one surface is warranted *only* if the top layer is one of the overlaminates specifically recommended in the base film's Product Bulletin. In addition, no more than two layers of any film can be even with the edges of the substrate (see Options 2 and 3, FIGURE 2).

FIGURE 2
Three Film Layer Constructions



D. 3M Flexible Substrates

If you plan to mechanically tension the sign facing, you can tension it before or after you apply the film. If you are applying the film before tensioning, extend the film beyond the point where the substrate will contact and be secured around the attachment hardware to ensure that the film does not lift off during tensioning.

Refer to [Product Bulletin 945GPS](#) or [Product Bulletin P3](#) for additional application information specific to the sign facing.

E. Sign Boxes and Frames

Constant rubbing of retainers or other parts of a sign body may tear the film: you can reduce damage by removing a 1/8 inch (3.18 mm) or wider border of film around the edges of the substrate or by applying a clear protective tape to the edges.

11. Key Application Tips

- Clean work area. Make sure the work surface and surrounding area are properly cleaned to avoid contaminating the graphics.
- Temperature. Make sure the film, air and surface temperatures are at least 60°F (16°C) and are within the application temperature specified in the film's Product Bulletin. If you are applying a graphic at or near the minimum application temperature, the adhesive bond will develop more slowly than in higher temperatures. Thoroughly resqueegee the graphic as directed in the application procedure.
- Handling paper liners. If you are using film with a paper liner, DO NOT allow the liner to get wet before removing it from the film. A wet liner is difficult to remove. Refer to the film's Product Bulletin to find out whether the film has a paper liner.
- Air bubbles. Puncture air bubbles with an air release tool or pin as described on page FIGURE 7. Do not use a knife or razor.
- To remove an application tape, if used, always remove it at an angle as close as possible to 180 degrees and immediately re-squeegee the film.
- Cut and weed soon after application as adhesion builds with time. See page 9.
- Keep newly fabricated sign faces out of direct sunlight for at least 24 hours. This allows any remaining moisture to dry evenly without wrinkling the film.

- Seams and overlaps. Seams can be made using the overlap method. See page 7.
- Squeegeeing tools and techniques. Use plastic applicator PA-1 that is smooth and not nicked. A large window squeegee may be used to remove the water solution. However, an applicator PA-1 with a low friction sleeve SA-1 must be used with firm, overlapping strokes. Re-squeegee the graphic after 24 hours.

12. Application Procedure

A. Prepare a Detergent-Water Solution

Prepare a solution of 1/3 teaspoon (2 ml) of non-concentrated detergent, containing no lotions, soaps, oils, waxes or enzymes, for each 1 quart (1 liter) of clean, cool water. One quart of solution is usually enough to complete a single small- or medium-sized graphic.

After mixing the solution, pour some or all of it into a spray bottle.

B. Clean and Prepare the Substrate

Refer to [Instruction Bulletin 5.1](#) for details on how to clean and prepare the type of substrate you plan to use.

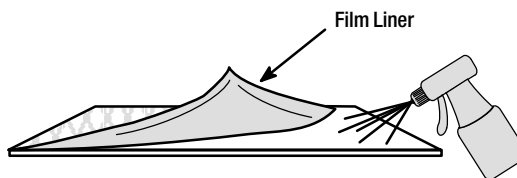
C. Apply the Film

Note: This procedure does not provide information about overlaps. If you need to overlap multiple pieces of film, read through the Film Overlaps section beginning on page 7 before you start applying the film.

Note: If you are using a film with a paper liner, keep the liner dry until you are ready to remove it.

1. Lay the substrate application-side-up on a clean surface.
2. Spray the substrate with solution.
3. Wipe off the film with a clean, lint-free cloth.
4. Lay the film, liner side up, in a dry location near the wetted surface.
5. Lift one corner of the liner while spraying the solution onto the exposed adhesive. See FIGURE 3.

FIGURE 3
Lift Corner, Spray Solution

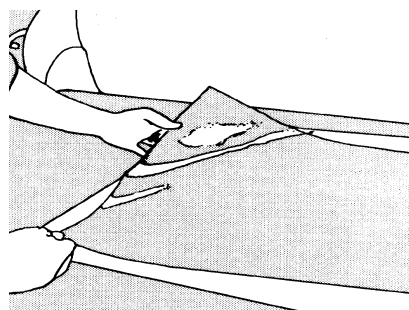


6. Continue to remove the liner and spray the solution. By the time the liner is completely removed, the entire adhesive surface should be wet. Spray on more solution, if necessary.

Note: Depending upon the size of the graphic, you may need another person to help you complete the next step.

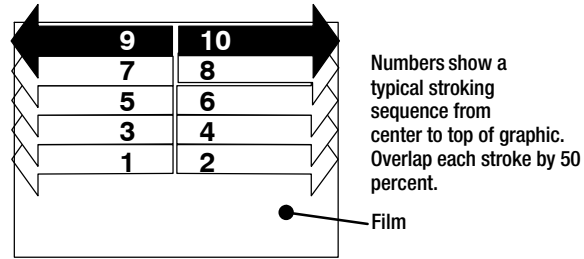
7. Lift and turn over the film, adhesive side down, onto the wetted substrate and correctly align with any registration marks. See FIGURE 4.

FIGURE 4
Align Registration Marks



8. If the film does not have a premask on it, thoroughly spray the top of the film with the solution to reduce friction when you squeegee the film.
9. To smooth out wrinkles or bubbles on a small section of film, use gentle, overlapping strokes of the plastic applicator and sleeve from the center of the graphic out to the edge. See FIGURE 5.

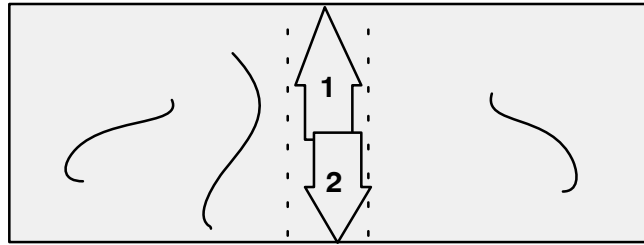
FIGURE 5
Overlapping Strokes



10. To smooth out wrinkles on a large section of film:

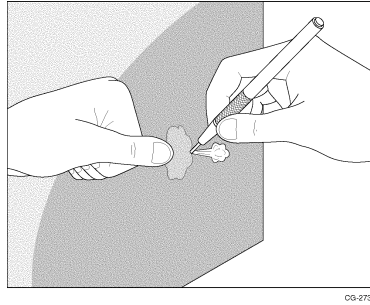
- d. Use a large window squeegee and very light pressure to smooth out the entire graphic, starting at the center and working toward the edge, in the order shown in FIGURE 6. When you finish this step, the film should be flat on the substrate and most of the water pushed out.

FIGURE 6
Squeegeeing Large Piece of Film



- e. Use a small squeegee and firm, overlapping strokes to resqueegee from the center of the graphic to the edges. When you finish this step, all of the water and as many bubbles as possible should be removed.
 - f. Wipe dry the entire surface.
11. If the film does not have a premasking tape on it:
- a. Spray the entire top of the film with more solution.
 - b. Use the applicator to apply firm pressure to the entire graphic, beginning in the center and working toward the edges in overlapping strokes.
12. If the film has premasking tape on it:
- a. Use the applicator to apply *firm* pressure to the entire graphic, beginning in the center and working toward the edges in overlapping strokes as in Step 9.
 - b. Wait 15 to 20 minutes, depending upon the substrate temperature, for adhesion to build.
- Note: Do not leave the premasking tape on the graphic for more than 24 hours after application.
- c. Begin at a corner and carefully pull away the premask from the film at a 180 degree angle.
 - d. Use the applicator to apply firm pressure again to the edges of the film.
- Note: When you remove the premasking tape from a graphic, the pulling force loosens the adhesive at the edges of the graphic, particularly when the graphic is applied at or near the minimum application temperature. It is imperative that you resqueegee the edges after removing the premasking tape.
13. Remove any remaining bubbles from the film:
- a. Puncture the film at one end of the bubble with the air release tool or a pin. Do not use a razor or blade.
 - b. Use your thumb to push the trapped air or wetting solution toward the puncture. See FIGURE 7.

FIGURE 7
Removing Trapped Air



14. If necessary, cut and weed the graphics as described on page 9 within 90 minutes. The adhesive bond builds with time and weeding becomes more difficult after 90 minutes.
15. Keep the newly applied graphic out of direct sunlight for 24 hours.
16. After 24 hours:
 - a. Spray the top of the film with the wetting solution.
 - b. Use a squeegee with a low friction sleeve to re-squeegee the film edges.

13. Film Overlaps

When it is necessary to join pieces of film, always use an overlap, not a butt seam, which can cause a light leak. The overlap will leave a scarcely noticeable darker line when viewed at a short distance. The recommended overlaps are:

- Film series 3632GPS: 3/16" to 1/4" (4.76 to 6.35 mm). Please refer to [Product Bulletin 3632GPS](#) for important Warranty Stipulations.
- All other films: 1/8 inch +1/16 (3.2 mm +1.6).

To create an overlap, use the following procedure.

Note: In a horizontal seam the upper panel should overlap the lower panel.

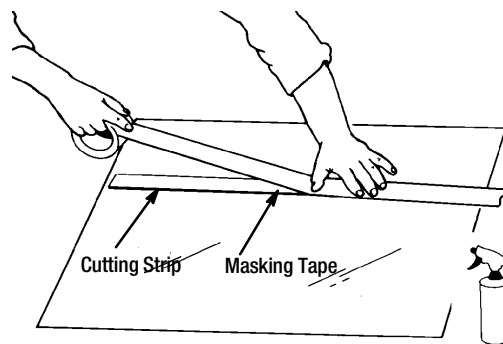
A. Materials Needed

- 2 inch (51 mm) wide Scotch masking tape 232.
- A cutting strip made from scrap plastic:
 - **Width:** 1 to 1-1/2 inches (25.4 to 38 mm)
 - **Thickness:** 1/4 inch (6.35 mm), which results in a 1/8 inch (3.2 mm) overlap
 - **Length:** as long as the seam
- Sharp knife or razor blade in a safety holder.

B. Procedure

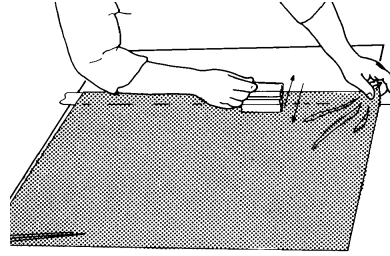
1. Determine where the film overlap will occur.
2. Lay the cutting strip on the sign surface at the film overlap location.
3. Tape the cutting strip to the sign surface with 2 inch (51 mm) masking tape 232. See FIGURE 8.

FIGURE 8
Applying the Cutting Strip



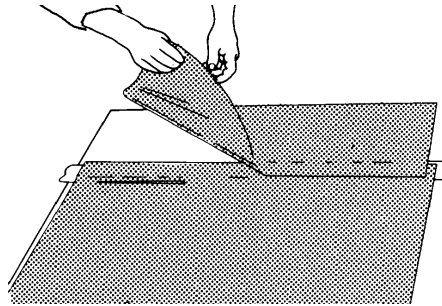
4. If the film pieces are premasked, remove the premasking tape in the overlap region (approximately the first 1 inch along the overlapped edges).
5. Using the wet application procedure (beginning on page 5), apply the first piece of film, making sure that it overlaps the cutting strip. See FIGURE 9.

FIGURE 9
Applying First Piece of Film



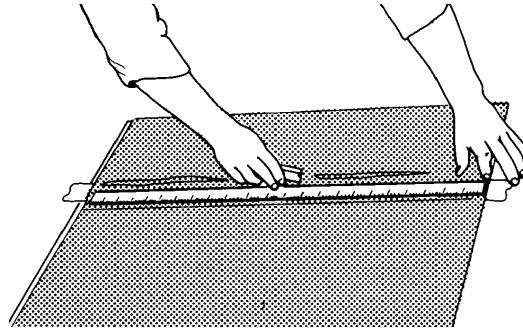
6. Apply the second piece of film, making sure that it is wide enough to overlap the width of the cutting strip. See FIGURE 10.

FIGURE 10
Applying Second Piece of Film



7. Squeegee both pieces together.
8. Using a sharp knife or razor in a safety holder and a straight edge, cut along the entire length of the overlap through both layers of film. See FIGURE 11.

FIGURE 11
Cut Overlap



9. Remove the top film weed.
10. Fold back the overlapped film so that the bottom film weed can be removed.
11. Remove the bottom film weed. See FIGURE 12.

FIGURE 12
Remove Excess Film

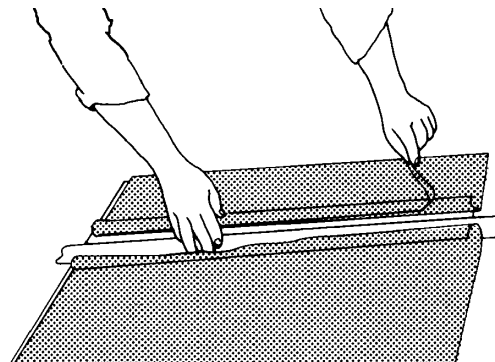
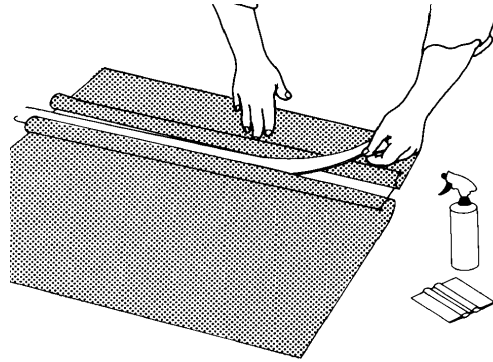


FIGURE 13
Remove Cutting Strip

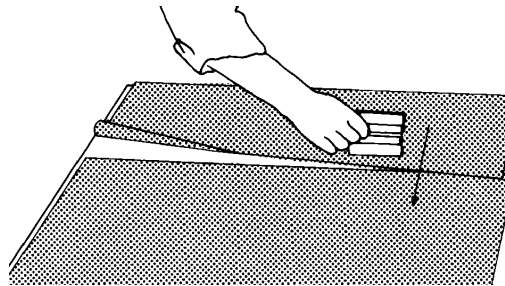
12. Remove the taped down cutting strip. See FIGURE 13.



13. Apply solution where the cutting strip has been removed.

14. Squeegee the first piece of film onto the substrate and then squeegee the second piece of film. A natural overlapped seam will be created. See FIGURE 14.

FIGURE 14
**Squeegee First Piece of Film,
Then Second**



14. Cutting and Weeding

If possible, cutting and weeding should be performed before application to prevent damage to the substrate. However, if necessary, you can cut and weed within 90 minutes after application. The adhesive bond builds with time and weeding becomes more difficult after 90 minutes.

- Cut with a conventional fixed or swivel graphic knife or a sharp razor blade in a safety holder.
- You can make patterns on the surface of the applied film by pouncing with chalk or carbon dust. (Some carbon papers and marking pens permanently mark the film, so check suitability before using them.)
- Avoid or minimize over-cuts to eliminate or reduce light leaks.
- To weed, carefully hold a corner of the weed at a 90 degree angle and pull it with sharp, short jerks.
- If necessary, warm the surface slightly to ease weeding and reduce adhesive transfer to the substrate. Very little heat is required. For instance you can use a low-wattage heat gun or place the back side of the substrate on a 100° F (38° C) surface for 10 seconds.
- Remove any adhesive residue on the substrate by rubbing it with your thumb or finger.

15. Warranty Information

The warranted durability given in the Product Bulletin that is current at the time you purchased the film is the one that 3M will honor. **The warranties in the following table(s), given in years, are for finished graphics exposed in a vertical exposure in the United States except the Desert Southwest.** See the warranty sections following this table for additional information.

16. 3M Related Literature

Before starting any job, be sure you have the most [current Product and Instruction Bulletins](#).

The information in 3M Product and Instruction Bulletins is subject to change. Current Bulletins are available at 3Mgraphics.com. The following applicable Bulletins provide information and processes you need to properly make the graphics described in this Bulletin. Additional Bulletins may be needed as indicated in the 3M Related Literature section of other 3M components you use.

Bulletin types: PB = Product Bulletin; PB-IB = Product & Instruction Bulletin; IB = Instruction Bulletin

| Subject | Type | Bulletin No. |
|---|--|--------------|
| 3M™ Scotchcal™ Translucent Graphic Film Series 210 | PB | 210 |
| 3M™ Scotchcal™ Translucent Graphic Film Series 230 | PB | 230 |
| 3M™ Scotchcal™ Translucent Graphic Film Series 3630 | PB | 3630 |
| 3M™ Scotchcal™ Translucent Graphic Film Series 3632GPS | PB | 3632 |
| 3M™ Scotchcal™ Graphic Film Series 3650 | PB | 3650 |
| 3M™ Panaflex™ Awning and Sign Facing 945GPS | PB | 945 |
| 3M™ Panagraphics™ III Wide-Width Flexible Substrate | PB | P3 |
| 3M Graphic Protection Options | PB | GP-1 |
| Using 3M application tapes; premasking and prespacing for films | IB | 4.3 |
| Application, substrate selection, preparation and substrate-specific application techniques | IB | 5.1 |
| Application, special applications and vehicles | IB | 5.4 |
| Application, general procedures for indoor and outdoor dry applications | IB | 5.5 |
| Making backlit signs with 3M digitally imaged graphics | IB | 4.26 |
| Storage, handling, maintenance, removal | IB | 6.5 |
| 3M Commercial Graphics Warranty Brochure | go to www.3Mgraphics.com | |

3M, Panaflex, Panagraphics and Scotchcal are trademarks of 3M.

Dawn is a trademark of the Procter & Gamble Company.

17. Bulletin Change Summary

Added this change to the film overlap recommendation in Section 13: Film series 3632GPS: 3/16" to 1/4" (4.76 to 6.35 mm). Please refer to Product Bulletin 3632GPS for important Warranty Stipulations.



Commercial Graphics Division
 3M Center, Building 220-12E-04
 PO Box 33220
 St. Paul, MN 55144-3220 USA
 General Info. 1-800-374-6772
 Technical Info. 1-800-328-3908
 Fax 1-651-736-4233

www.3Mgraphics.com

3M Canada
 P.O. Box 5757
 London, Ontario
 Canada N6A 4T1
 1-800-265-1840
 Fax 519-452-6245

3M México, S.A. de C.V
 Av. Santa Fe No. 55
 Col. Santa Fe, Del. Alvaro Obregón
 México, D.F. 01210
 52-55-52-70-04-00
 Fax 52-55-52-70-22-77

3M Puerto Rico, Inc.
 Puerto Rico Industrial Park
 350 Chardon Avenue, Suite 1100
 San Juan PR 00918
 787-620-3000
 Fax 787-620-3018

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