A Guide to Understanding and Applying Graphics to Common Smooth and Textured Wall Surfaces

NOTE: Some tools and processes in this bulletin are described and claimed in 3M Patents and pending Patent applications.

NOTE: Headlines are color-coded to indicate whether the information applies to smooth, textured or both types of surfaces.

Quick Start Tools
for the Customer and 3M Sales Representative

Smooth Indoor Walls
• Pre-Installation Worksheet—page 2
• Customer Checklist—page 3

Textured Indoor and Outdoor Walls
• Pre-Installation Worksheet—page 4
• Customer Checklist—page 5

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### SMOOTH Indoor Walls Pre-Installation Worksheet

- Pre-Installation Worksheet: Summarize the type of wall graphics you will be applying.
- Customer Checklist: Review and understand the key factors required for a successful applications.

#### Today’s Date

<table>
<thead>
<tr>
<th>3M Sales Representative</th>
</tr>
</thead>
</table>

#### Customer Information

<table>
<thead>
<tr>
<th>Installation Site Information</th>
</tr>
</thead>
</table>

#### Contact Name

<table>
<thead>
<tr>
<th>Business Name</th>
</tr>
</thead>
</table>

#### Business Name

<table>
<thead>
<tr>
<th>Address</th>
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</thead>
</table>

#### Address

<table>
<thead>
<tr>
<th>City/State/Zip</th>
</tr>
</thead>
</table>

#### City/State/Zip

<table>
<thead>
<tr>
<th>Wall location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check only one.</td>
</tr>
<tr>
<td>Indoor</td>
</tr>
<tr>
<td>Outdoor (Call Tech Service for assistance, 800-328-3908)</td>
</tr>
</tbody>
</table>

#### Area Code/Phone

<table>
<thead>
<tr>
<th>Graphic Construction/Installation Information</th>
</tr>
</thead>
</table>

- **Print platform**: Check only one.
  - Electrostatic (ES)
  - Solvent Piezo Inkjet
  - UV Piezo Inkjet
  - Screen Print
  - Offset

- **Basic indoor wall construction**: Check only one.
  - Wallboard
  - Smooth CMU (concrete block)
  - Vinyl wall covering
  - Texture, other than already described in this list (if needed, see Worksheet for Textured Surfaces on page 4.)
  - Other (describe): ______________________

#### Graphic sizes

<table>
<thead>
<tr>
<th>Graphic sizes</th>
<th>List all. List additional on a separate sheet, if needed.</th>
</tr>
</thead>
</table>

1. _______________________square feet
2. _______________________square feet
3. _______________________square feet
4. _______________________square feet
5. _______________________square feet
6. _______________________square feet

#### Length of time since wall was constructed or the surface finish (such as paint) applied

<table>
<thead>
<tr>
<th>Years</th>
<th>Months</th>
</tr>
</thead>
</table>

#### Length of graphic will be installed

- Less than 90 days
- 90 days to one year
- One to three years
- Longer than three years

#### Describe the wall texture

<table>
<thead>
<tr>
<th>Check only one.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMOOTH. Little or no surface variation.</td>
</tr>
<tr>
<td>UNSMOOTH TEXTURE. Has high spots and low spots. (If this box is checked, see Worksheet for Textured Surfaces on page 4.)</td>
</tr>
</tbody>
</table>

#### Graphic exposure conditions

<table>
<thead>
<tr>
<th>Check all that apply.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant temperature and humidity</td>
</tr>
<tr>
<td>Temperature changes</td>
</tr>
<tr>
<td>Direct sun</td>
</tr>
<tr>
<td>Heating or cooling ducts or water source behind or in close proximity</td>
</tr>
<tr>
<td>Graphic may be exposed to physical contact with people, animals or equipment</td>
</tr>
</tbody>
</table>

#### Test strip identification

- **Test Strip IJ3555 (RG 3555, 8655C**) |
- **Test Strip 8652C** (RG3552C**) |
- **Test Strip 160-30** (IJ160-10, 8640C**) |
- **Test Strip 180-10** (IJ180-10, 8620C**) |
- **Test Strip 3662-10** (8662*) |
- **Test Strip 1 (Custom)**

#### Adhesion value (gm/in) per test

- __________
- __________
- __________
- __________
- __________
- __________

* Includes overlaminate 8519 or 8620

**Films with air release channels are not usually recommended for walls

Film number in bold is included, but other numbers listed are equivalent in adhesion.
SMOOTH Indoor Walls

Customer Checklist

This checklist is a companion, not a substitute, for understanding and following all 3M recommendations as described in this Instruction Bulletin for applying film to smooth indoor walls.

Failure to use the recommended 3M products and instructions will void any warranty offered in the base film’s Product Bulletin for wall applications.

1. Wall Surface Texture

   - The required wall texture for successful graphic application and adhesion is SMOOTH, properly primed, painted and cured wallboard that has little or no surface variation. We recommend gypsum board finish level five.
   - Too much surface texture allows adhesive contact only with the high points of the wall, which does not provide sufficient contact for a good smooth wall application. Try a film designed for textured surfaces.
   - Graphics laminated with a stiff overlaminate, such as graffiti-resistant overlaminate, cannot conform to even slight wall texture and must not be used.

2. Wall Surface Preparation and Painting

   - Repair any existing wall damage (holes, loose wallboard joints, chipped or peeling paint) to return it to like-new condition.
   - Clean the wall prior to priming and painting.
   - Prime the wall with a primer that is compatible with the top paint coat. Two coats may be required.
   - Paint the wall with a quality, semi gloss top coat. Do not use matte paint or paint with silicone, graffiti-resistant or texturizing additives.
   - Use a short nap (1/4 inch) roller.
   - Allow the final coat of paint to dry for at least five days before applying graphics to the wall.
   - Do not apply graphics to any wall that does not have excellent paint-to-substrate bonding. Do not apply to wallpaper.

3. Perform the Adhesion Test

   - An adhesion test should be performed on the wall of each location in which a graphic will be applied.
   - Clean an area on the same wall (properly painted and cured) on which the graphic will be applied. Use a clean cloth that has no cleaning agents.
   - Use the 3M Wall Test Kit.
   - Be aware that the soundness of any wall may vary from spot to spot and no test can assure of consistent results over the entire application area.

4. Graphic Application

   - Clean the wall immediately prior to applying graphics.
     - For newly painted walls, use a soft, clean, lint-free cloth to thoroughly remove all dust.
     - For existing walls, wash with 1 ounce of synthetic detergent per gallon of lukewarm water. Avoid soaps or preparations that contain waxes, oils, lotions or conditioners. Allow to dry thoroughly (at least one hour) before proceeding.
   - Use a DRY application method.
   - Apply the film using a stiff nylon brush or a 3M Rivet Brush Applicator RBA-1.
   - Use straight (non-arcing), overlapping strokes and use the brush to push the graphics into the texture of the wall to ensure good adhesion.
   - To avoid an exposed edge, which are prone to picking and other damage, trim graphics 1/4 inch from inner or outer wall corners.
   - ALWAYS finish the graphic by working the brush in small circles around the entire outer 3 inches of the graphic.
   - A Troubleshooting table is at the end of this bulletin.

5. Limitations and Warranty

   - The color and/or shape of any underlying graphics may be visible after application of the new graphic. Choosing a film with a gray adhesive increases hiding power for color bleed only.
   - Under-cured paint may continue to outgas and cause bubbles in graphics that appears to be well applied right after application.
   - The user understands that 3M provides only a Basic Product Warranty only for unused material; no warranty is implied or offered for the adhesion, printed or applied appearance or durability.
   - The user understands that 3M does not warrant damage to the substrate or its surface finish caused by removing film from a textured wall. See page 27 for details.
# Pre-Installation Worksheet

- Pre-Installation Worksheet: Summarize the type of wall graphics you will be applying.
- Customer Checklist: Review and understand the key factors required for a successful applications.

## Today’s Date
3M Sales Representative

## Customer Information
<table>
<thead>
<tr>
<th>Contact Name</th>
<th>Business Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Installation Site Information
<table>
<thead>
<tr>
<th>Address</th>
<th>City/State/Zip</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Wall location
- **Check only one**
  - Indoor
  - Outdoor (see Cautions on page 6)

## Graphic Construction/Installation Information

### Print platform
- [ ] Electrostatic (ES)
- [ ] Piezo inkjet

### Basic textured wall construction
- [ ] CMU (concrete block)
- [ ] Poured concrete
- [ ] Tile with mortar joints (see page 25 for special instructions)
- [ ] Industrial stucco
- [ ] Brick
- [ ] Other (describe) ______________________

### Graphic sizes
**List all. List additional on a separate sheet, if needed.**

1. _______________________square feet
2. _______________________square feet
3. _______________________square feet
4. _______________________square feet
5. _______________________square feet
6. _______________________square feet

### Length of time since wall was constructed or the surface finish (such as paint) applied
- [ ] ___________Years ___________Months

### Does the wall surface have any coating applied?
- [ ] No
- [ ] Yes, kiln-fired glaze or finish
- [ ] Yes, paint
  - check type of paint
    - [ ] Water base
    - [ ] Oil base
    - [ ] Other describe ______________________
  - check type of finish
    - [ ] Matte/Eggshell
    - [ ] Satin
    - [ ] Semi-gloss
    - [ ] Gloss

### Length of time graphic will be installed
- [ ] Less than 30 days
- [ ] 30 days to 90 days
- [ ] Up to 1 year

### Describe the wall texture
Check only one.
- See page 6.
- Medium unsmooth. Relatively equal distribution of moderately high and low spots.
- Heavy unsmooth. Irregular and severe high spots and/or low spots.
- Other unsmooth. Brick, concrete block, stucco, tile, mortar joints, grooves.

### Graphic exposure conditions
Check all that apply.
- [ ] Constant low-to-moderate temperature and humidity
- [ ] Outdoor; rainfall or high humidity
- [ ] Temperature changes
- [ ] Direct sun
- [ ] Heating or cooling ducts or water source behind or in close proximity
- [ ] Graphic may be exposed to physical contact with people, animals or equipment

### Adhesion Testing
Due to the wide variation and irregularities in textured surfaces and mortar lines, no kit is available for testing adhesion. We recommend testing film 8624 ES with overlaminate 8519, or film IJ8624 with overlaminate 8524. An effective test procedure is described on page 13.
TEXTURED Indoor or Outdoor Walls

Customer Checklist

This checklist is a companion, not a substitute, for understanding and following all 3M recommendations as described in this Instruction Bulletin for applying film to textured indoor or outdoor walls.

**No graphic warranty is implied or offered for finished or applied graphics on textured walls.**

1. **Wall Surface Texture**  
   See page 6 for details.
   - Conforming film to textured walls requires adequate heat, special 3M applicator tools and specific techniques.
   - 3M’s textured surface application tools and techniques may expand the range of suitable substrates and degree of texture for successful application.
   - Graphics laminated with a stiff overlaminate, such as graffiti-resistant overlaminate may not be compatible with smooth wall installation techniques. However, especially when using film IJ8624, the stiffness of overlaminate 8524 enhances most applications.

2. **Wall Surface Preparation**  
   See page 21 for details.
   - Repair any existing wall damage to return it to like-new condition.
   - Brush away loose mortar with a stiff brush.
   - For the best results clean all contaminants, including dirt, grease, ketchup, mustard, etc., from the substrate prior to film application. Rinse and dry thoroughly.
   - If the wall was recently painted, make sure the paint is fully cured (at least 5 days) and dust the wall before film application.
   - Do not apply graphics to any wall that does not have an excellent paint/finish-to-substrate bond.

3. **Testing Film Adhesion**  
   See pages 13 for details.
   - Apply a piece of test film to each different type of textured wall at each location where you will be installing graphics.
   - If feasible, leave the film in place for one week, then return to check for good adhesion and removability before proceeding.
   - Be aware that the soundness of any wall may vary from spot to spot and no test can assure of consistent results over the entire application area.

4. **Graphic Application**  
   See page 21 for general details.
   - Use a DRY film application method.
   - Apply the film using a 3M™ Textured Surface Applicator tool (TSA-1, TSA-2, or TSA-3), or 3M™ Power Grip Magic Pad Rivet Applicator CMP-1 and heat.
   - Work at a consistent speed.
   - Work straight across the graphic, and always to an open edge to allow air bleed. Overlap each pass by 50-75%.
   - To avoid an exposed edge, which are prone to picking and other damage, trim graphics 1/4 inch from inner or outer wall corners.
   - A troubleshooting table is at the end of this bulletin.

5. **Limitations and Warranty**
   - Under-cured paint may continue to outgas and cause bubbles in graphics that appear to be well applied right after application.
   - Water can accumulate behind the graphics applied to textured outdoor walls, or any walls subjected to excessive moisture. This can cause the film to lift and may damage the substrate. There is also the potential to develop mold or mildew on the back, which could be a health concern for some individuals, especially during graphic removal.
   - The user understands that 3M provides only a Basic Product Warranty; no warranty is implied or offered for the adhesion, printed or applied appearance or durability or damage to any substrate caused by applying or removing film from a substrate. See the film’s Product Bulletin for details.
Indoor and Outdoor Walls are Different: Smooth or Textured

Some sections in this bulletin differentiate between smooth indoor walls and textured walls. Be sure you are using the appropriate information for your wall type.

Common Indoor Wall Applications

This bulletin helps you identify and deal with the most common smooth or textured indoor walls. Because architectural construction techniques and finishing options are changing constantly, it is not possible to cover all options. It should also be noted that there may not be a good film option for every wall surface.

The graphics manufacturer and installer must fully understand the end user’s requirements and expectations, and then identify a suitable graphic film through their own testing and approval.

Outdoor Wall Applications

Outdoor wall graphics are subject to a variety of environmental conditions that require different considerations than indoor walls. Applying 3M’s textured wall film usually works well for short-term outdoor textured walls (less than 30 days) in moderate climates, but be aware of the potential for mold or mildew development.

Wall Textures and Composition: Smooth or Textured

Understanding each type of wall texture you have to work with helps you select the right film for the job.

Definitions

Application surface. The actual product to which a graphic is applied. This may be the finish—paint, varnish, wallpaper—a composite material or the bare substrate.

Substrate. The supporting structure of a wall, such as wood framing members covered by wallboard, or hard surfaces such as brick, concrete block, stucco, etc.

Texture. This is the visual or tactile feeling that every surface has. Texture can be as smooth as glass or as rough as heavily textured concrete—and everything in between. Whether it is smooth or rough, texture has a significant affect on film choice, ease of application, adherence and removal. These descriptions provide a way to generally categorize texture but are subject to interpretation. Used them in combination with the photos of various textures to better understand the texture of your wall surfaces.

- Smooth texture. Little or no surface variation. Provides the easiest application since the adhesive can make contact with the entire surface.

      Do not use a film designed specifically for textured surfaces, such as films 8624 ES and IJ8624, on a smooth surface. Doing so may seriously reduce the quality of the installation.

- Unsmooth texture. Has moderate high spots and low spots, which range from just a little texture (like fine sand paper) to heavy texture (like brick). Extra effort and more time-consuming application techniques are needed to conform the film to the texture. The following are general texture descriptions. The amount of variation in texture changes throughout any given textured substrate, and your results using the same measuring tool could vary. The purpose is to help differentiate textures using the terms we have defined to related to our films.

      - Medium unsmooth texture. Relatively equal distribution of moderately high and low spots.

      - Heavy unsmooth texture. Irregular and severe high spots and/or low spots.

      - Other unsmooth texture. Brick, concrete block, stucco and tile.

Caution

Risk of Damage to Outdoor Application Surfaces

Do not apply film 8624 ES or IJ8624 to outdoor surfaces that are expected to reach freezing temperatures before the graphic is removed. Moisture trapped behind the film could damage masonry surfaces upon freezing.

Salts passing through masonry may be trapped behind the film. Salt collection on the masonry surface for extended periods may cause staining or discoloration.

Always check and follow your local building codes. 3M is not responsible for damage caused by using this product outdoors.

Caution

Be aware that graphics installed outdoors can develop mold or mildew on top of or behind the graphic, which may be a health concern for some individuals, especially during graphic removal.
Common Indoor Wall Composition
This describes the wall's substrate material.

Brick. A kiln-dried, hard clay surfacing material, thicker than tile, for indoor or outdoor walls. Inherently smooth, but may be patterned or textured before firing. Usually has mortar lines.

Concrete. A building material made from a mixture of portland cement, water, fine and coarse particles. Texture can range from smooth to heavy.

Concrete masonry (CMU). A usually hollow building block made with concrete. May be painted or unpainted. Texture is usually medium. Usually has mortar lines.

Mortar (grout) joints. A concrete or composite product used to hold together building materials such as concrete blocks and brick. Such joints can range greatly in width, depth, profile and texture. 3M film for textured surfaces works best if the mortar joints are not more than about 1/8 inch deep, and are flush, concave or V-shaped. Excessive rough texture, excessively steep elevation change—such as Raked, or an undercut profile—such as Weathered or Struck, generally provide challenging applications that may not have the results you desire.

Stucco. A cement or plaster mixture that is hand or machine applied to indoor or outdoor walls. Our example is between smooth and medium texture, although texture can range from smooth to heavy.

Tile. A kiln-dried, thin, hard clay surfacing material for indoor or outdoor walls. May be glazed or unglazed. Texture is usually smooth or a smooth base with an irregular pattern of light texture. Usually has mortar lines.

Common Wall Finishes
Vinyl or paper wallcovering. A thin to heavyweight material used to cover indoor walls. Texture can range from smooth to heavy and may have little to significant pattern. These materials may contain plasticizers that migrate to the surface and can cause premature adhesion failure for a graphic applied over it.

NOTE: Application of film designed for textured surfaces to any vinyl or paper wallcovering, or wallboard, even those with texture, will most likely pull off both the wallcovering and the paper of the wallboard. Use at your own discretion.

Paint. Refer to the Paint and Primer section, page 9.

Glaze, varnish or other surface sealant. A product applied to a surface to provide color, gloss, protection and/or cleanability.

Photos of Textures
Use the previous descriptions and the photos on the following page to determine both the texture and wall composition of common wall surfaces. These characteristics are important in selecting and using the right film as well as determining if the wall is suitable for a successful graphic application.

Painted wallboard. Common indoor wall surface, primed, painted and thoroughly dried. Texture varies depending on paint technique.

We recommend gypsum board finish level five wallboard, which is described in the National Gypsum Construction Guide, 9th Edition, Rev 8/04, page 121. This product has the highest quality finish. A primer and final coating is recommended. When using graphic films, that final coating should be semi-gloss or enamel paint only.
Painted Wallboard – Smooth Texture
☐ Use Smooth Wall Film

Vinyl Wallcovering – Heavy Unsmooth Texture
☐ Use Textured Surface Film

Concrete – Heavy Unsmooth Texture
☐ Use Textured Surface Film

Painted Wallboard – Medium Unsmooth Texture
☐ Use Smooth Wall Film

Vinyl Wallcovering – Heavy Unsmooth Texture
☐ Use Textured Surface Film

CMU/Concrete Block, Painted/Unpainted Medium Unsmooth Texture
☐ Use Textured Surface Film

Painted Wallboard – Heavy Unsmooth Texture
☐ Contact Technical Service for special information

Glazed Tile – Smooth Texture with Mortar Lines
☐ Contact Technical Service for special information

Medium Unsmooth Texture Brick
☐ Use Film for Textured Surfaces

Vinyl Wallcovering – Smooth Texture
☐ Use Smooth Wall Film

Poured Concrete – Smooth Texture
☐ Use Smooth Wall Film

Industrial Stucco – Medium Unsmooth Texture
☐ Use Textured Surface Film

Vinyl Wallcovering – Medium Unsmooth Texture
☐ Use Textured Surface Film

Concrete – Medium Unsmooth Texture
☐ Use Textured Surface Film
Painted Walls: Paint and Primer Recommendations: Smooth and Textured

Choosing and using the right primer and paint, and making sure it is well cured, has a significant affect on film adhesion.

Note: The information in this section is appropriate for any wall surface that is painted, whether it is smooth or textured.

When possible, we recommend using primer and paint from the same manufacturer, since the products are usually designed to work together. The goal is to achieve a good bond between the substrate, primer and paint.

Laboratory tests on wallboard using Pittsburgh® Paints and Sherwin-Williams™ Paints have provided acceptable film adhesion and removability characteristics on sound surfaces, although paint from other manufacturers may be satisfactory. 3M does not endorse any particular paint manufacturer.

Outgassing
As a wall finish dries, it releases certain gases until it is fully dried and cured. Applying a graphic before the finish has cured can result in lifting, bubbles and premature graphic failure.

Paint and Primer Application Tips
- Use two coats of primer, if necessary, to get good coverage.
- Use a roller or high pressure spray system to apply primer and paint. These tools provide better coverage than a brush. A short nap (1/4 inch) paint roller generally creates a smooth surface. A long nap roller tends to create a heavier texture.
- Always allow at least 5 days for the final coat of paint to dry before applying graphics to the wall. Graphics applied to insufficiently dried paint may lift or fall off.

<table>
<thead>
<tr>
<th>Primer</th>
<th>Type of Primer</th>
<th>Considerations</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil based, high quality</td>
<td>Good coverage</td>
<td>Kilz® brand primers have shown excellent results</td>
<td></td>
</tr>
<tr>
<td>Tinted primers</td>
<td>May bleed through certain films or be stained by the film’s adhesive</td>
<td>Use the highest quality paint to reduce staining or bleed through problems</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Paint</th>
<th>Type</th>
<th>Considerations</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solvent based</td>
<td>Good film adhesion</td>
<td>Perform standard paint/primer adhesion tests</td>
<td></td>
</tr>
<tr>
<td>Latex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Powder-coated*</td>
<td>Excellent film adhesion and removability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urethane</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baked enamel paints</td>
<td>Best universal painted surface</td>
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Paint Additives

<table>
<thead>
<tr>
<th>Type</th>
<th>Film-to-Paint Adhesion Characteristics</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low luster, matte or satin</td>
<td>May inhibit good film adhesion</td>
<td>Determine if matting agents reduce bonding characteristics. Perform both paint/primer tests.</td>
</tr>
<tr>
<td>Silicone or graffiti-resistance agents</td>
<td>May inhibit good film adhesion</td>
<td>Perform standard paint/primer adhesion tests</td>
</tr>
<tr>
<td>Migrating particles*</td>
<td>May inhibit good film adhesion, may stain</td>
<td></td>
</tr>
</tbody>
</table>

Textured paint
Select a film designed for the amount of texture on your surface. Test surface for acceptable initial adhesion results. For assistance, contact us at 1-800-328-3908.

*Waxes used in powder coatings negatively affect adhesion; always test for acceptable film adhesion.

*Some particles in a paint’s chemistry can migrate over time. Although it is difficult to know if this will be a problem until the graphic is removed, you should be aware of it.
All Walls - Adhesion Characteristics

Adhesion is the ability of the film’s adhesive to bond to the substrate. The amount of both initial and final adhesion varies with the type of adhesive used on the film, the substrate/surface, and the application temperature and application techniques. The adhesive bond builds with time. Film may never achieve its full bond if the graphic is poorly applied or you are using the wrong film/adhesive combination for the substrate.

- **Adhesion, final.** The maximum amount of bond achieved by a film, usually in 24 to 48 hours after application except in cool temperatures.
- **Adhesion, initial.** The amount of bond needed to hold the graphic in place during application.
- **Size of graphic.** The larger the graphic, the greater the initial and final adhesive bond to the wall must be to support the weight of the graphic.
- **Imaging method.** This can affect adhesion characteristics. Refer to the film’s Product Bulletin for approved methods.

**Stretching the film.** Film stretched during application may later shrink. This decreases wall adhesion and the graphic may fall off prematurely.

Effect of Overlaminate on Adhesion

Finished graphics must retain some flexibility in order to achieve maximum adhesion. Do not use a stiff or thick overlaminate on the graphic, such as 3M’s Scotchgard™ Graphic and Surface Protection Film 8991.

Refer to the base film’s Product Bulletin for the recommended graphic protection options. The most common constructions are:

- **Smooth walls:** One of the recommended films (see page 2) with overlaminate 8519
- **Textured walls:** Film 8624ES with overlaminate 8519
- **Textured walls:** Film IJ8624 with overlaminate 8524.

***SMOOTH*** Walls Film Adhesion Test

Testing a film’s ability to adhere to a wall is the first step in successful wall applications. It’s not a definitive test, but gives you a reasonable idea of the film’s suitability.

Contact Technical Service (see page 32) if you need help in performing or evaluating adhesion results.

**Pro’s Tip**

Limitations of Test

This test may not detect problems with pre-existing variations in the substrate or poor paint-to-substrate bond. Such problems may result in poor long-term adhesion as well as surface damage upon attempted removal of a graphic. 3M cannot be responsible for the results of wall applications.

This test does not guarantee clean graphic removal, even if you are using a removable or changeable film.

• **Poor paint-to-substrate bond.**
  - This may be visible by signs of peeling, lifting or bubbling of the paint.
  - Sometimes it is not visible, such as if there are multiple layers of paint on the substrate, the bond of one or more layers to another layer may not be adequate, or if the paint is not properly cured.

• **Dirty or contaminated surface.**

**Test Parameters**

Purpose of Test

This test is designed to show initial adhesion capability of selected 3M films to fairly smooth indoor wall surfaces.

Before Doing the Test


Test Conditions

The test wall should be a recently cleaned, smooth, semigloss painted wallboard that is located in an environmentally controlled area. For a newly painted wall, the final coat of paint must be dried for at least 5 days before testing. Always select an inconspicuous area.
3M Wall Test Kit

- 10 strips of 5 different film/overlaminate combinations: each is marked with its respective film name.
- Spring scale
  0-500 grams, part number 8002-MA (less than $10)
  0-1000 grams, part number 8003-MN
  0-2000 grams, part number 8004-MA
- Scotch-Brite™ High Performance Cleaning Cloth
- Scotch-Brite™ Heavy Duty Scour Pad
- 3M™ Rivet Brush RBA-1* and RBA-3**

Making Your Own Film Test Strips

To test a different film, prepare three, 1 inch (± 0.01 inch) by 10 inch strips using the same film and overlaminate as your intended graphic. Note this construction on the test strip and on the appropriate Worksheet.

Procedure

1. Wipe the wall where the test will be conducted. We recommend using a Scotch-Brite cloth. If the wall is more than just dusty, see Substrate Cleaning and Preparation, page 16.

2. Make a measured reference guide. Mark a piece of paper with reference lines at 1/2 inch increments for 0 to 8 inches. Tape it on the cleaned test wall area at eye level.

3. Remove at least two inches of the liner from the punched end of the film strip. Fold and align the two pre-punched holes A, adhesive to adhesive, to make a tab on the test strip.

4. Remove the rest of the liner from the film. Use your thumb to adhere the film to the cleaned wall, adjacent to the measured reference guide.

5. Working in the long direction of the test strip and using the rivet brush, use firm pressure and a circular motion to go over the strip three times to firmly adhere.

6. Repeat steps 3 to 5 for two more test strips of the same film, placing them a couple of inches apart.

7. Wait a full 15 minutes before proceeding with the test.

8. **READ THIS STEP THOROUGHLY BEFORE REMOVING THE TEST STRIP.**
   a. Make sure the spring scale is reset to 0. To do this, hold the scale upright (logo at the top) and push or pull the aluminum tab at the top of the tool.
   b. Hold the scale so the gauge faces you.

---

**Important Note**

You will be testing THREE samples of the same film and comparing the results.
c. Slide the scale’s S hook through the punched hole in the test strip.

d. Using the scale, pull down on the test strip at a slight angle, keeping the scale as parallel to the wall as possible without any portion of the scale or your hand contacting the wall during the test.

e. Pull at a steady rate of about 1 inch in 5 seconds, using the measured reference lines as a guide. DO NOT STOP once you have started.

f. As you pull off the test strip, take note of:
- the release characteristics as the film pulls away from the wall;
- the grams/inch registering on the scale.

g. Repeat for the other test strips.

9. Next, see Adhesion Test Evaluation.

Adhesion Test Evaluation

Averaging Test Results
If two or three out of three strips of the same film perform the same way, those are the characteristics by which you judge the suitability of that particular film for your wall.

Interpreting Scale Values

<table>
<thead>
<tr>
<th>Scale Value</th>
<th>Release Characteristics</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-250 grams/inch</td>
<td>Removes too easily; little or no resistance.</td>
<td>Unacceptable adhesion; try another film; see Enhancing Film Adhesion, page 12, for a possible remedy.</td>
</tr>
<tr>
<td>250-450 grams/inch</td>
<td>Smooth, consistent; no jerkiness.</td>
<td>Acceptable adhesion; some film may be successfully removed.</td>
</tr>
<tr>
<td>450+ grams/inch</td>
<td>Smooth, consistent; no jerkiness but more difficult to remove; sample may stretch or break.</td>
<td>Acceptable adhesion for a permanent graphic; not recommended for removable graphics.</td>
</tr>
<tr>
<td>450+ grams/inch then drops</td>
<td>Pulls inconsistently; seems jerky.</td>
<td>Unacceptable adhesion; try another film.</td>
</tr>
</tbody>
</table>

Factors in Unsatisfactory Test Results
- Test strip removes jerkily, unevenly:
  - Inconsistent or low adhesion value; due to high and low spots in the surface texture, the film’s adhesive does not make consistent contact.
  - Cold surface and air temperature, which doesn’t allow adhesive to flow or contact as it is designed.
- Test strip pulls paint off wall.
  If any paint or surface finish is pulled off with the test strip, the paint is not sufficiently bonded to the substrate and graphics should not be applied until the problem is corrected and the wall test is performed again with satisfactory results.
- Wrong film for the job.
  If the first type of film you tried does not perform acceptably, try a different film and repeat the tests.

Graphics That Require Greater Adhesion Level
- Graphics exposed to indoor environmental changes, such as direct sun light or close proximity heat sources.
- Overlaminated graphics.
- Films that have air release channels, such as in 3M™ Control-tac™ Graphic Film with Comply™ Adhesive, which are not recommended for walls.
- Larger graphics.

Enhancing Film Adhesion
There are two ways to improve film adhesion to a finished wall surface if the test strips show less than 250 grams adhesion. Use these techniques only with the agreement of the graphic customer and graphic installer.

1. Construct a secondary smooth surface. The secondary surface is attached to the existing textured surface and the graphic film is applied to the secondary surface.
2. Use a Scotch-Brite™ Heavy Duty Scour Pad to lightly roughen the wall surface. This technique may alter the surface gloss.
   a. Hold the pad lightly against the wall and wipe it up and down a couple of times. Then wipe it sideways. Do this for the entire graphic application area.
   b. Wipe the wall with a clean Scotch-Brite™ High Performance Cleaning Cloth to be sure all dust has been cleaned off.
   c. Retest the surface to confirm that adhesion has been enhanced.

TEXTURED Walls Film Adhesion Test

Test Parameters

Before Doing the Test
1. Complete the Textured Walls Pre-Installation Worksheet and Customer Checklist on pages 4 and 5.

Tools

These instructions provide an alternative to using 3M’s textured surface applicator tool, TSA-1, when such tools are not available to the person doing the test. 3M testing shows that for judging adhesion and appearance on a small sample, this test is adequate for textured surfaces.

- 3M™ Power Grip Magic Pad CMP-1 (widely available) or 3M™ Textured Surface Applicator TSA-1 or TSA-3

Note: Do not attempt this test using a standard squeegee. You will not be successful.

- Industrial heat gun with electronic readout, capable of achieving and sustaining 1000 °F. Models you may want to consider are:
  - Steinel HL 2010E LCD Display IntellTemp Heat Gun
  - Milwaukee 8988-20 Variable Temperature Heat Gun
  - Bosch BOS1944LCDK Programmable Heat Gun Kit

- At least a 1 square foot sample of film:
  - For electrostatically printed images: 3M™ Scotchcal™ Graphic Film for Textured Surfaces 8624 ES or 3M™ Controltac™ Graphic Film 8620 ES
  - For piezo inkjet printed images: Approximately 1 square foot of film IJ8624. The marketing sheet you may have received from your sales representative is made from film IJ8624 and may be used. Five yard rolls of film IJ8624 are also available.

- Heat resistant gloves

Limitations of Test

This test may not detect problems with pre-existing variations in the substrate or poor paint-to-substrate bond. Such problems may result in poor long-term adhesion as well as surface damage upon attempted removal of a graphic. 3M cannot be responsible for the results of wall applications.

This test does not guarantee clean graphic removal, even if you are using a removable or changeable film.

- Poor paint-to-substrate bond.
  - This may be visible by signs of peeling, lifting or bubbling of the paint.
  - Sometimes it is not visible, such as if there are multiple layers of paint on the substrate, the bond of one or more layers to another layer may not be adequate, or if the paint is not properly cured.

- Dirty or contaminated surface.

Substrate Preparation

Pre-cast concrete material can have an oily surface and be speckled with dust because of the production process. These characteristics inhibit good adhesion.

If you have poor adhesion, use TSP (tri-sodium phosphate) and water according to the manufacturer’s instructions, or use 3M™ All Purpose Cleaner and Degreaser, diluted as recommended. Scrub the surface with a brush. Vacuum with a wet-dry vacuum, then allow to dry until it both looks and feels dry to the touch.
Procedure

⚠️ Caution

When using any equipment, always following the manufacturer’s instructions for safe operation.

⚠️ Caution

To reduce the risk of a serious burn, we recommend always protecting the hand that is holding the applicator tool with a heat-resistant glove.

1. Application technique
   a. Perform the test in an inconspicuous place on each type of substrate you plan to use for each of the larger graphics.
   b. Work at a speed that allows the film to be heated enough to make it conformable. Overheating damages the film; under-heating does not permit conformability. Detailed troubleshooting is provided at the end of this bulletin.

2. Wear a heat-resistant glove on the hand that holds the applicator tool (TSA-1, TSA-3 or CMP-1).

3. If you are using TSA-1 or TSA-3 roller:
   a. Hold the heat gun about 1 inch above and immediately in front of the TSA-1 or TSA-3 roller.
   b. Start at an outside top corner and work straight across to the other side using this technique: Heat the film directly in front of the roller for about 1 second and then begin following closely with the roller, pushing firmly. Move at a slow, steady pace.
   c. Roll all the way to the edge.
   d. Move the roller down about 1.5 inches and repeat Step 3 until the film is fully applied.

4. If you are using CMP-1 pad:
   a. Heat the film for about 1 second and immediately press the film firmly the the CMP-1 pad for about another second to conform the film around the texture.
   b. Move to the next section of film—about 1/2 the width of the pad—heat the film and press firmly with the pad.
   c. Continue with this procedure across the width of the film sample and then start a new row, working in this manner until the film is fully applied.
   d. Do the next pass across the film by moving down about 1/2 the width of the pad. Repeat Step 4 until the film is fully applied.

5. If the film lifts immediately, the application technique may not have been satisfactory, or the texture is too smooth or too severe for the film. Do not attempt to go over the sample again; try another one.

6. If possible, leave the film in place for one week, then check for good adhesion and acceptable removal. Note that film 8620 ES typically shows more lifting than film 8624 ES.

Film Processing Conditions: Smooth and Textured

Processing methods and conditions may affect the film application and performance. Always refer to the film’s Product Bulletin for details.

The common methods for processing large format graphics include solvent-based screen printing, electrostatic imaging, and solvent-based piezo ink jet printing. Many films are designed exclusively for one processing method, while other films may be suitable for a variety of processing methods.
General Preparation: Smooth and Textured

Read all instructions before you start: this application may be different than you have done before.

Who Can Install Graphics?
Finished wallboard. Walls and poster-size graphics may be installed by a non-professional installer with relative ease. Two people are recommended to apply most graphics. Notice the two different pairs of hands in the Smooth Indoor Walls Application Methods Illustrations, pages 18-20.

Larger graphics are more difficult to handle and align, and multi-panel graphics require skill that is acquired through practice. We recommend contacting a professional graphics installer for assistance with larger graphics.

Textured walls. All graphics applied to textured surfaces must be installed by a 3M-trained installer who has access to the proper tools and has learned the special techniques required for success. Application with a typical squeegee is not effective.

Know the Film Used in Your Graphic
The type of wall surface and its texture affect how well film adheres, and if required for your job, how easily it may be removed. Be sure the graphics manufacturer tells the installer what film was used, and that the graphics are applied to the surface and texture for which that film is recommended. Refer to the base film’s Product Bulletin for recommended application surfaces.

Film Processing Conditions
Processing methods and conditions may affect the film application and performance. Always refer to the film’s Product Bulletin for details.

The common methods for processing large format graphics include solvent-based screen printing, electrostatic imaging, and solvent-based piezo ink jet printing. Some recommended films are designed exclusively for one processing method, while other films may be suitable for more than one processing method.

Know What’s Behind Application Surface
Moisture that has penetrated wallboard will destroy the painted surface when graphics are removed. Remember that, especially in remodeling jobs, wallboard may have been placed over windows, cooling pipes, etc., that may produce moisture that is transferred to the wallboard.

Make sure any block wall in front of equipment such as a pool are properly sealed.

Application Tapes
The use of application tape (commonly called premasking tape) is NOT RECOMMENDED on smooth walls.

If your application absolutely cannot be applied without a premasking tape, be aware that the premasking tape may have a greater adhesive bond to the base film than the base film has to the wall surface. Removing the premasking tape generally lifts the graphic from the wall surface and compromises the adhesive bond of the graphic. If premasking tape is used on smooth surfaces, you must thoroughly rework the entire graphic and all edges after removing it.

Typical Application Rate for Textured Surfaces
Typically, a good application rate is about 50 square feet per hour, so a 4’ x 8’ flat panel takes at least 20-30 minutes.

Dry vs. Wet Application Method
Dry application. All wall films must be applied using a dry application method.

Wet application. This method is NOT RECOMMENDED for walls.

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:
• 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 www.3m.com/msds.
• 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.

WARNING
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:
• Alternative your tasks during the application.
• Schedule regular breaks.
• Perform stretches or do exercises to improve circulation.
• Avoid awkward reaching.
**WARNING**

Risks of Using Heat Sources
- Read, understand and follow the safety instructions contained in both this 3M Instruction Bulletin as well as the heat-gun manufacturer’s manual.
- Do not use heat sources near solvent mixtures or residues, or in areas where solvent vapors may be present at hazardous levels.
- Never use an open-flame heat source in this process.

**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.

High Heat May Degrade Foam Rollers and Damage Substrate
High heat directed at the foam may degrade the foam. Always direct the heat toward the film, not the foam roller.

High heat may also damage the substrate: use with caution.

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**Application to SMOOTH Indoor Walls**

**Tools and Supplies**
- Scotch™ Masking Tape, 2 inch wide*
- Nylon bristle brush: Use a stiff nylon brush (e.g., household cleaning brush, floor brush) when applying graphics directly to wall surfaces. The brush should be kept to a maximum surface area of 18 square inches or about a 6 inch x 3 inch face.
- Scotch-Brite™ High Performance Cleaning Cloths*
- Scotch-Brite™ Heavy Duty Scour Pad*
- 3M™ Rivet Brush RBA-1* and RBA-3*
- 3M™ Air Release Tool 391X *
- Cutting tools, such as a razor blade with a safety holder
- Industrial heat gun; must be capable of attaining 500° to 750°F (260° to 399°C), or equivalent

*Available from 3M Commercial Graphics Division

**Pro’s Tip**

Using a plastic squeegee is not recommended since it is less effective when applying film to a surface with even slight texture.

**Substrate Cleaning and Preparation**

Clean the substrate immediately before applying film. Dust and other contaminants can collect quickly on the substrate and prevent the film from adhering properly.

- Contaminants. If the substrate has any contaminants—dust, dirt, grease, loose paint, food, etc.—the film will stick to that rather than the substrate, leading to graphic failure.

**Air Quality Regulations**

State Volatile Organic Compound (VOC) regulations may prohibit the use of certain cleaning solutions. For example, the California South Coast Air Quality Management District prohibits use of certain solvent-based solutions without a permit and other California AQMD’s prohibit use of certain solutions without a permit or a regulatory exemption. You should check with your State environmental authorities to determine whether use of this solution is restricted or prohibited.
Plan Your Layout
To minimize application problems, which waste time, test your lay- out by temporarily positioning the graphic on the substrate using masking tape. Plan so the edges are in the least vulnerable place possible.

Certain areas of your graphic applications are more prone to dam- age than others from people or equipment rubbing against the ed- ges. This includes areas around doors, openings such as vents, outside corners of walls and inside corners. To reduce the risk of damage and lifting, trim the graphic 1/8 to 1/4 inch from the edge. After application, rework all edges of the graphic to help ensure good edge adhesion.

Liner Removal Technique
Use two hands when pulling the liner from the film, using care not to stretch the film.

Note: Always remove the liner from the graphic rather than the graphic from the liner.

General Application Technique
- Pull the brush with your hand, don’t push it across the graphic, which stretches the film.
- Move the brush in a straight line—not in an arc.
- Use firm, overlapping brush strokes.
- Re-brush all edges after applying the graphic.

Finishing the Graphic Edges
Usually, the area with the least adhesive bond is the outer few inches of the graphic. Always re-brush the edges in small circular move- ments before you consider the job done. Always grasp the film as far into graphic as possible without wrinkling the film to avoid trans- ferring body oil and dirt to the adhesive, which can cause adhesion problems.

Application Method Options for Smooth Walls
Read and follow all General Instructions before proceeding. Then select the Application Method that best matches the orientation of your graphic and printing method.

<table>
<thead>
<tr>
<th>Graphic Orientation</th>
<th>Printing Method</th>
<th>Application Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical height greater than width</td>
<td>All printing methods</td>
<td>Method 1</td>
</tr>
<tr>
<td>Horizontal with tape width greater than height</td>
<td>All printing methods</td>
<td>Method 2</td>
</tr>
<tr>
<td>Horizontal without tape width greater than height</td>
<td>All printing methods</td>
<td>Method 3</td>
</tr>
</tbody>
</table>
SMOOTH Indoor Walls - Application Method 1: Vertical

Orientation: Vertical (graphic is taller than it is wide)
Imaging Method: Screen printed, Electrostatically printed, Offset printed

Please review the instructions on pages 15-17 before proceeding.

1. Wipe the wall, removing dust and any obvious contaminants.

2. Lay the graphic image side down on a flat surface. Pull back about 6 inches of the liner. Sharply crease the liner.

3. Align the graphic on the wall and use finger pressure to tack it in place.

4. Brush from the center to the right edge.

5. Return to the center and brush to the left edge.

6. Pull the liner down as needed, using two hands.

7. Move the brush down a couple of inches and continue stroking right and left, pulling the liner down as needed. Repeat to the bottom.

8. Re-brush the outer 3 inches of the entire graphic, using a small circular motion, to ensure good edge adhesion.
SMOOTH Indoor Walls - Application Method 2: Horizontal w/Tape

Orientation: Horizontal (graphic is wider than it is tall)
Imaging Method: Screen printed, Electrostatically printed, Offset printed

Please review the instructions on pages 15-17 before proceeding.

1. Wipe the wall, removing dust any obvious contaminants.

2. Align the graphic on the wall, and tape it in place as shown. Place a long strip of masking tape as shown.

3. Remove the short strips of tape from one side. Pull the film away from the liner all the way to the long strip of tape. Carefully cut off the liner.

4. Allow the part of the graphic near the center tape to lie against the wall. Gently hold the rest of the graphic away from the wall.

5. Begin at the center and brush up.

6. Return to the center, and brush down.

7. Move the brush about two inches left. Repeat Steps 6 and 7 across the graphic, allowing more of the graphic to lay against the wall as you work to the left.

8. Remove the remaining masking tape. Lift the right side of the film and remove the remaining liner.

9. Repeat Steps 5, 6, and 7 across the other side of the graphic.

10. Re-brush the outer 3 inches of the entire graphic, using a small circular motion, to ensure good edge adhesion.
SMOOTH Indoor Walls - Application Method 3: Horizontal w/o Tape

Orientation: Horizontal (graphic is wider than it is tall)
Imaging Method: Screen printed, Electrostatically printed, Offset printed

Please review the instructions on pages 15-17 before proceeding.

1. Wipe the wall, removing dust and any obvious contaminants.

2. Lay the graphic image side down on a flat surface. Pull back about 6 inches of the liner. Sharply crease the liner.

3. Bring the graphic to the wall and align it along the vertical edge. Use finger pressure to tack it in place. DO NOT USE TAPE.

4. Brush from the center to the bottom edge.

5. Return to the center and brush to the top edge.

6. Move the brush over a couple of inches and continue stroking center to top, center to bottom, as the helper pulls the liner away from the film.

7. Re-brush the outer 3 inches of the entire graphic, using a small circular motion, to ensure good edge adhesion.
Application to TEXTURED Walls: General Instructions

NOTE: Some tools and processes in this bulletin are described and claimed in 3M Patents and pending Patent applications.

Important Note
Application of this film requires the use of high heat, 3M’s textured surface applicator tools and unique application techniques. To help ensure a successful application, you will need to view the 3M DVD, “Textured Walls Application Video”, or arrange for a training class, in addition to using this Instruction Bulletin. Please contact your local 3M sales representative to assist you with either of these options.

Tools and Supplies
- Scotch™ Masking Tape, 2 inch wide
- Scotch-Brite™ High Performance Cleaning Cloths
- Industrial heat gun with electronic readout, capable of achieving and sustaining 1000°F. The following are examples of heat guns that meet the needed criteria.
  - Steinel HL 2010E LCD Display IntelliTemp Heat Gun
  - Milwaukee 8988-20 Variable Temperature Heat Gun
  - Bosch BOS1944LCDK Programmable Heat Gun Kit
- 3M™ Textured Surface Applicator TSA-1 Large Area Roller
- 3M™ Textured Surface Applicator TSA-2 Mortar Joint Roller
- 3M™ Textured Surface Applicator TSA-3 Edge Roller
- 3M™ Power Grip Magic Pad Applicator CMP-1

NOTE: We recommend storing all foam tools neatly in a rigid plastic box when not in use. Storing them carelessly with heavy or sharp objects or exposing them to contaminants, can all damage the foam and reduce the effectiveness of the tools.

- 3M™ Air Release Tool 391X
- Heat resistant gloves
- Cutting tools, such as a razor blade with a safety holder

Using a plastic squeegee or a brush is not effective when applying film to a textured surface.

Substrate Cleaning and Preparation
Clean the substrate immediately before applying film for the best adhesion. If the substrate has contaminants—dust, dirt, grease, loose paint, food, etc.—the film will stick to that rather than the substrate, leading to graphic failure. Pay extra attention to cleaning wall edges and corners.

Cleaning Most Walls
For the walls in most public facilities, we recommend washing the substrate with the cleaning solution recommended by the building maintenance for the facility. Always avoid soaps or preparations that contain waxes, oils or lotions as they impair graphic adhesion. Dry thoroughly.

Cleaning Concrete Block Walls
Concrete block walls may require power washing or hand washing with a stiff brush and a detergent cleaner followed by a clean water rinse to remove grease or exhaust contaminants. Allow the surface to dry thoroughly (at least 24 hours) before applying the graphics. Brush the substrate lightly immediately before film application to remove any dust that may have collected.

Cleaning Loose Mortar
Clean with a stiff bristled brush.

Graphic Layout
Underlying Images
3M’s film for texture surfaces has gray adhesive so it provides excellent hiding power for any color or painted images already on the wall. Do not apply this film over other film.

Positioning Graphics
To minimize application problems, test your layout by temporarily positioning the graphic on the substrate using masking tape. A good application relies on the texture of the wall holding much of the film away from the surface while you are positioning the graphic and allows air underneath the graphic a route of escape when heat and pressure are applied. Therefore, when initially positioning the film, use your fingers to lightly tack the film to the substrate or use the TSA-1 roller to roll on the film without heat. Then proceed with the heated application. A few bubbles or wrinkles in the film as you first tack it are rarely a problem since you will be heating and essentially shrinking the film to conform to the texture.

Planning the Layout
- Outside corner of the graphic. Try to position the graphic so its edges are in the least vulnerable position possible.
- Mortar joints. Refer to the mortar joint information on page 7. Assess the mortar joints for the surface on which you will be working to determine the proper technique for handling them.
  - For most graphics, plan to bridge mortar or grout joints so that at least 1 inch of film extends beyond the mortar joint.
  - For mosaic-style graphics, you may align the first outside corner on the corner of the brick or tile next to the mortar joint.
- Overlaps. Plan a 1/2 inch overlap on all multi-panel graphics.
- Narrower panels are easier to work with, especially if you are working from a ladder.
Heat, Speed of Application, Pressure

Practice on each type of substrate to which you will be applying graphics, and practice to learn the proper speed of application. The biggest problem inexperienced applicators have is moving too quickly.

**Caution**

High Heat May Degrade Foam Rollers and Damage Substrate

High heat directed at the foam may degrade the foam. Always direct the heat toward the film, not the foam roller.

High heat may also damage the substrate: use with caution.

Insufficient heating of the film during application may result in a graphic that looks good immediately following application, but may lift days or weeks later.

Even after you have been trained, we encourage you to perform test installations on a wide variety of painted or sealed and unsealed textured surfaces to master the techniques, improve your efficiency, and give you the confidence to properly estimate jobs.

Through practice, you will learn the best position for holding the heat gun and the right speed. A good starting point is to hold the gun about 1 inch above the film and directly in front of the roller.

Direct the heat at the film, not the roller. Heat a band of film about 1.5 to 2 inches wide at a rate of about 2 inches per second. These conditions will vary based on film construction thickness and wall texture.

- The role of heat. High heat warms the film and adhesive to make it more conformable.
- The role of speed. The film must be conformed to the surface texture while it is still warm and pliable. Heat also relaxes lifting stresses within the film, resulting in a better looking and more durable application.
- The role of pressure. Firm, consistent pressure on the roller allows the foam to push the film into the texture. Since the film and adhesive cool very quickly when the heat source is moved away, adhesion occurs quickly.
Application to **TEXTURED** Walls: Standard Tape Hinge Method

1. Create a tape hinge 10 to 12 inches from the top of the film.

2. Roll the top of the film forward, carefully cut and remove that part of the liner.

3. Gently tack the top few inches of the film to the substrate. Use tapping motion with your fingers or lightly roll it, without heat, using the TSA-1 roller.

4. Direct the heat toward the top corner of the graphic. Heat the film in a 1.5 to 2 inch wide band until warm, which usually takes only about 2 seconds and immediately begin rolling the film with the TSA-1 roller. Notice that the roller is positioned about 2 inches above the top edge of the graphic for the first pass.

5. With the roller closely following the heat gun, move continuously at about 2 inches per second and completely past the outer open edge of the graphic.

6. Move the roller down 1.5 inches so that the next pass overlaps the previous one by about 70%. Notice in the photo below how the film conformed to the texture during the first pass.

---

**Pro’s Tip**

- The most common application error is moving too fast. Try moving at about 2 inches per second at first and adjust from there. A good application rate is about 50 square feet per hour.

- Quickly and lightly pass the TSA-1 tool and the heat gun over the edges of the film to set the edges, but do not conform the film; it is critical that air have an escape path during installation. This is especially recommended when using 8524 overlaminate.

- Always work toward an open edge (as shown in these photos) through which the trapped air can escape. NEVER work from the edge to the center or from an open edge to a sealed edged, such as at a panel overlap.
7. After you have applied a few inches of the graphic, take a moment to observe how well the film is conforming to the surface.
   a. In this example, notice how the film conforms well to the shallow, concave shape of the mortar joints of this wall.
   b. Blisters or burns: do the next pass a little faster.
   c. Bubbles: slow down a little and apply a little more pressure. Also see Step 11 for proper air release techniques when applying film to textured surfaces.

8. Remove the tape hinge and expose more film adhesive.
   a. Roll the film up, grasp a corner of the liner and gently pull it away from the film.
   b. While holding the film away from the substrate, evenly pull down about 12 inches of the liner.
   c. Release the film and give it a few seconds to recover from the stretching that occurs when you remove the liner.

9. Lightly tack the film in the area where the liner was just removed, just as you did in Step 1. Continue working down the graphic as described in the previous steps.

10. Immediately after applying the film, inspect the mortar joints. If the lines are very deep and sharp, it will not be possible to conform the film to the channel. See mortar joints on page 7.

11. To remove air bubbles.
   - Use an air release tool (never use a knife) to poke a hole near one end and close to the edge of the bubble.
   - Use a finger to push out the air as much as possible.
   - Repeat these steps until the air is pushed out.
   - Rework the area with the heat gun and TSA-1 roller to conform the film to the texture.
Mosaic Graphic Technique

Use this technique to create the appearance of an image that is kiln-fired onto the block or tile. It is time-consuming, but it creates a striking graphic and is also an excellent alternative when the mortar joints are too severe to conform the film into them.

1. Position the film so its outer top corner extends about 1/8 inch beyond the outside corner block. Use the film type and application method best suited for the substrate. There is no need to take into consider the texture, depth or contour of the mortar joints.

2. When then application is complete, use a very sharp razor in a safety holder to cut most of the film out of the mortar joints, leaving about a 1/8 inch margin around each block that you will later heat and conform.

   Getting smooth cut lines is important, which takes planning and practice. The first side of the mortar joint is usually easy to cut smoothly, but the opposite side is more challenging since the first cut releases the tension from the film that bridges the mortar line.

3. Cut away any “tabs” of film remaining at the corners of the blocks. Leaving any tabs at spectator level may detract from the kiln-fired appearance and invite picking.

4. Heat and roll all edges of each block to ensure good adhesion. The flexibility of the foam will conform the film around the edges. Inspect the edges for good adherence.

Direct the heat at the film and substrate, NOT the foam roller, to avoid degrading the foam.

Smooth Tile with Mortar Joints Technique

Apply graphic film for textured surfaces to the tile using a standard plastic squeegee without heat. Do not attempt to conform the film to the mortar joints with the squeegee.

Next, using the heat gun and the TSA-1 roller or the CMP-1 pad, heat the film at the joints and conform the film to the texture using the standard textured surface application techniques.

For further assistance with this technique, please contact Technical Service at 1-800-328-3908.
Conforming Film Over Protrusions Technique

Because this film is so flexible, you can conform it over many shapes of hardware, such as anchor bolts in a block wall. The technique is time consuming and requires patience to be successful.

1. Position the film and apply it with standard techniques, leaving about a 2 inch margin of the film unapplied in a circle around the protrusion.

2. In this step you will use the CMP-1 pad and conform the film around the protrusion in concentric circles that get smaller as you work toward the protrusion.
   a. Heat the film for about 1 second and immediately press the film firmly the the CMP-1 pad for about another second to conform the film around the texture.
   b. Move to the next section of film—about 1/2 the width of the pad—heat the film and press firmly with the pad. Move all the way around the protrusion in this manner.
   c. Use this same technique but move 1/2 pad width closer to the protrusion and continue around the protrusion.

3. When the film is well conformed around the outer edges of the protrusion, some air will be trapped in a bubble around the protrusion.
   a. Puncture the film in an unobtrusive spot and push the air out.
   b. Heat the film until it is conformable, remove the heat, and immediately use a gloved hand to conform the film around the protrusion.
Graphic Maintenance, Repair, Removal: Smooth and Textured

Edge Lifting: Causes and Repair

Edge lifting is generally caused by inadequate adhesion. It may be due to the wrong film being used, contaminants on the substrate, poor edge finishing during initial installation, abrasion by people or equipment, or environment. These options for reattaching lifted edges can extend the life of the graphic and improve appearance, but are aggressive and will probably damage the application surface.

- **Option 1**: Apply a strip of two-sided 3M™ Transfer Adhesive 950 (5 mil thick, 1/2" x 60 yard roll) to the back side of the graphic, close to the edge. Use a brush around the outer edges as shown in the last illustration of any of the illustrated Application Methods.
- **Option 2**: Use mechanical fasteners such as staples.

Disposal of Film Liners and Used Graphic Film

These products may be incinerated or may also be safely disposed of in a landfill per U.S. Environmental Protection Agency guidelines.

Cleaning

Refer to Instruction Bulletin 6.5 for detailed cleaning guidelines.

Note: The term “paint” also implies any other surface finish that may have been applied to the substrate.

Removal

**Pro’s Tip**

Removing a graphic can damage the wall’s finish, surface or substrate. You can reduce the risk of removal damage by following all recommendations and procedures in this Instruction Bulletin.

Determining Graphic Removability

**Important Note**

Due to the great variety of wall surfaces, there is no guarantee against damage-free graphic removal. Experience suggests that films that adhere to substrates having sound surface characteristics, including excellent bond between the surface finish and substrate, and are within the adhesion range of 250-450 grams/inch, should provide reasonable removal characteristics. Typically, the greater the adhesion level, the greater the risk for removal damage.

- Changeable or removable films. Some 3M films used for smooth indoor wall graphics have a removable adhesive that improves removability within a stated durability period and when removed as directed.
- Permanent films. Many films that are suitable for application to a wall have a permanent adhesive, may be very difficult to remove from a smooth wall surface and may result in surface damage.

Although 3M™ Scotchcal™ Graphic Film for Textured Surfaces 8624 ES and U8624 have a permanent adhesive, the films generally have good removal characteristics due to the textures on which they are used. The greatest risk to removal is:
- Loose mortar may be pulled off.
- Poorly bonded paint may be damaged.
- Film exposed outdoors for a long time.

- Ease of removal depends on factors such as film properties, type of surface and substrate, initial adhesion test values, graphic imaging method and ambient exposure characteristics. However, wall texture is the most important factor in removability.
- Hidden problems. Cuts in the substrate, or moisture that has penetrated wallboard will destroy the painted surface when graphics are removed and may damage the substrate. Be aware of these common hidden moisture problem that can transfer moisture to the substrate:
  - Wallboard placed over windows, cooling pipes, etc.
  - Block walls without a moisture barrier.

Basic Removal Techniques

- Removing wall graphics is significantly different than removing graphics from semi-trailers and vehicles.
- Using two hands, start at the top of the graphic and pull it down slowly at a consistent 120 to 180 degree angle.
- If graphic is difficult to remove, cutting it into strips may ease the removal process. Do not cut the substrate.
- Do NOT use chemicals for indoor wall graphic removals.
- Heat may be helpful if the substrate is not wallboard. The heat softens the adhesive, which reduces the pull-off force, and it makes the film more elastic, reducing the tendency to tear.
- If the substrate appears stained after graphic removal, it is usually the result of one of the following: poor quality paint, exposure to heat and light, migrating particles in the paint, and adhesive residue.
- See Instruction Bulletin 6.5 for more details.
**Troubleshooting**

Every effort should be made to ensure that walls are in good condition before applying graphics. This generally reduces application time while improving graphic appearance, and if applicable, removal characteristics. Review all troubleshooting before deciding on a course of action.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Details/Causes</th>
<th>Recommended Solutions</th>
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</thead>
<tbody>
<tr>
<td>Pre-Installation Problems - All Walls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Potentially unsound walls or substructures.</td>
<td>Repair wall as appropriate.</td>
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<tr>
<td></td>
<td>Evidence of a loose, inconsistent or damaged surface finish, loose paint,</td>
<td>Reconsider applying a graphic at that location</td>
</tr>
<tr>
<td></td>
<td>mixed surface finishes, abrasion, gouges, etc.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Concrete substrate is below grade and not sealed.</td>
<td>Seal and cure thoroughly or do not apply the graphic there.</td>
</tr>
<tr>
<td>3</td>
<td>Any substrate that may have moisture behind it.</td>
<td>Watch for boarded up windows as well as walls that back up to cooling systems, water</td>
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<tr>
<td></td>
<td></td>
<td>pipes, overhead windows or water pipes that could create condensation or drip water</td>
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<tr>
<td></td>
<td></td>
<td>onto the graphic.</td>
</tr>
<tr>
<td>4</td>
<td>Extremely rough and/or loose/flakey mortar.</td>
<td>Clean with a brush and dust away debris. Additionally, consider simply bridging</td>
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<tr>
<td></td>
<td></td>
<td>mortar joints without conforming them, or cutting the film out of mortar joints for a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mosaic effect (see page 25).</td>
</tr>
<tr>
<td>5</td>
<td>Unclean substrate.</td>
<td>Dust, wipe or clean as appropriate; do not use cleaning solutions that contain</td>
</tr>
<tr>
<td></td>
<td>Surface contamination such as dust, dirt, grease, food, vehicle exhaust or</td>
<td>lotions, waxes or oils.</td>
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<tr>
<td></td>
<td>cleaning products.</td>
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<tr>
<td>Tool Problems - All Walls</td>
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<tr>
<td>6</td>
<td>Foam on the tool is falling apart</td>
<td>• Do not direct the heat from the gun at the foam, which causes it to degrade.</td>
</tr>
<tr>
<td></td>
<td>Foam has been exposed to too much heat.</td>
<td>• Do not rub the tool against the hot barrel of the heat gun.</td>
</tr>
<tr>
<td>7</td>
<td>Foam tools have been improperly stored</td>
<td>We recommend storing all foam tools neatly in a rigid plastic box when not in use.</td>
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<td></td>
<td></td>
<td>Storing them carelessly with heavy or sharp objects or exposing them to contaminants,</td>
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<td>can all damage the foam and reduce the effectiveness of the tools.</td>
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<tr>
<td>8</td>
<td>Tool is simply worn out</td>
<td>Replacement foam rollers are available for TSA-1. Contact Customer Service.</td>
</tr>
<tr>
<td>Installation Problems - All Walls</td>
<td></td>
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</tr>
<tr>
<td>9</td>
<td>Film does not adhere well.</td>
<td>If the texture is greater than just smooth, try a film intended for use on textured</td>
</tr>
<tr>
<td></td>
<td>The texture of the substrate is not well suited to the film being used.</td>
<td>surfaces. TIP: Some additives to paint can create too much texture for film</td>
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<tr>
<td></td>
<td></td>
<td>intended for smooth surfaces.</td>
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<td></td>
<td></td>
<td>If the texture is somewhere between smooth and medium unsmooth, try using film for</td>
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<tr>
<td></td>
<td></td>
<td>textured surfaces. TIP: A surface with too little texture prevents proper air bleed</td>
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<tr>
<td></td>
<td></td>
<td>during application, which is necessary for this type of film.</td>
</tr>
<tr>
<td>10</td>
<td>Film does not adhere well.</td>
<td>Be sure you are familiar with the walls finishes and any recent repairs.</td>
</tr>
<tr>
<td></td>
<td>Repaired walls areas were not properly sealed, primed, painted or cured.</td>
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</tr>
<tr>
<td>11</td>
<td>Film for textured surfaces does not conform in mortar joints</td>
<td>Refer to page 7 for more information on mortar joints.</td>
</tr>
<tr>
<td></td>
<td>Mortar joint has too much texture or too severe a profile for success.</td>
<td>Simply bridging mortar joints without conforming them, or cutting the film out of</td>
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<tr>
<td></td>
<td></td>
<td>mortar joints for a mosaic effect (see page 25) are good options.</td>
</tr>
<tr>
<td>12</td>
<td>Film melts or blisters.</td>
<td>• Move the gun and tool a little more quickly.</td>
</tr>
<tr>
<td></td>
<td>Heat was concentrated too long in one area.</td>
<td>• Decrease heat 50° to 100°F.</td>
</tr>
<tr>
<td>Problem</td>
<td>Details/Causes</td>
<td>Recommended Solutions</td>
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</tr>
</tbody>
</table>
| 13 | Film is not conforming well to texture. | Film was not heated enough. | • Increase the heat.  
• Slow down a little.  
• Use a little more pressure on the tool.  
NOTE: Most textured substrates do not hold heat well, and cause the film to cool more quickly than you might expect. |
| 14 | Film pops up from mortar joints. | The mortar joint was too deep. | Wall tools typically apply only light pressure to mortar lines that are deeper than 1/8”. First, work out any air bubbles, then try re-rolling the mortar lines with the TSA-2 tool. A contour gauge can be useful for visualizing mortar line depth. |
| 15 | | The mortar joint was too sharp. | It is usually not possible to get satisfactory conformation to square-cut (raked) and undercut mortar lines; the film requires more stretching and the tools do not reach the corners. Consider creating a mosaic effect. See page 25. |
| 16 | | The film was not heated properly and worked well into the mortar joints. | Refer to the following troubleshooting tips for this problem. Also, a heating rate of less than 50 square feet/hour with a heat gun at 1000°F to 1100°F is typical for textured surface application. |
| 17 | Film lifts excessively from textured areas where there are large temperature variations. | | Lifting is increased when the film construction is thicker. The most effective solution is to use film IJ8624 without an overlaminate. However, the film will be more susceptible to abrasion. |
| 18 | Printed film was not adequately dried prior to installation. | | Piezo inkjet printed film must be thoroughly dried before applying an overlaminate and before applying to the substrate. Dry the film racked, unrolled and unwrapped, for 2 to 3 days. |
| 19 | Wrong film was used. | | Use cast film/overlaminate IJ8624/8524 or 8624 ES/8519 for the best results. Calendered films are not suitable for textured surfaces. |
| 20 | Film lifts over caulked joints. | Film will not stick to silicone caulk. | Using an acrylic caulk (even over existing caulk) may improve adhesion. The best solution is to use the mosaic technique. See page 25.. |
| 21 | Film “pops” and leaks adhesive. | Printed film was not adequately dried prior to installation. | Piezo inkjet printed film must be thoroughly dried before applying an overlaminate and before applying to the substrate. Dry the film racked, unrolled and unwrapped, for 2 to 3 days. |
| 22 | Film folds onto itself at the edges. | Film has not been sufficiently set at the edges. | Quickly and lightly pass the TSA-1 tool and the heat gun over the edges of the film to set the edges, but do not conform the film; it is critical that air have an escape path during installation. This is especially recommended when using 8524 overlaminate. |
| 23 | Large bubbles appear behind the film | Film was not fully adhered during first pass of the tool. | Use enough pressure to press and conform the film into the lowest areas of the texture on the first pass with the heat and tool. Bridged areas (mortar lines) tend to lift more than the other areas. |
| 24 | Mortar line is excessively deep. | | The TSA-1 tool is less effective for mortar lines deeper than 1/8”. Try using the TSA-2 or CMP-1 tool. |
| 25 | Adhesive channels through which air escapes were sealed before film was fully applied. | | As you apply the film properly--working fully from one edge to the other and overlapping each pass--air is forced out the open edge of the film. If air becomes trapped, use standard air release techniques, then apply heat and re-roll using the TSA tool. |
| 26 | Film was applied to flat, glazed tile | For the best results, use film IJ8624 with overlaminate 8524. Use a flat squeegee and conventional vehicle application techniques. Then re-roll the grout lines using the TSA-1 or TSA-3 tool. Do not overtreat the substrate, which may crack the tiles. For very smooth tile with little surface texture or contour, consider using film UJ180 and finish grout lines with the TSA tools. |
| 27 | Bubbling and poor adhesion | Film was applied to a damp substrate | Heating the substrate to dry it may help, but for the best results, do not apply to a damp substrate or a substrate that cannot be adequately dried. |
| 28 | Difficulty wrapping textured columns | Wrong product. | Use cast film/overlaminate IJ8624/8524 or 8624 ES/8519 for the best results. This is generally flexible enough to wrap on a textured column. |
| 29 | Graphic is not level. | | Use a laser level to assure a level graphic. |
| 30 | Exposing too much adhesive at one time. | | Wrap the columns by working around the circumference, and pulling away only a foot or two of the liner at a time. |
### Installation Problems - Textured Walls Only

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<th>Problem</th>
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<tr>
<td>31</td>
<td>Printed film is gummy</td>
<td>Ink is not thoroughly dried before application.</td>
</tr>
</tbody>
</table>
| 32      | Film develops wrinkles during application | Film is too flexible. | • Apply overlaminate 8524 to film U8524 for a stiffer graphic.  
• If your film does not have an overlaminate, apply 3M™ Premasking Tape SCPM-19 to stiffen the graphic. Be sure to pull it off at a 180 degree angle after the film has been tacked to the substrate and prior to conforming to the textured wall. |
| 33      | Film is tunneling off the liner | Poor lamination of overlaminate. | • Set the minimum amount of pressure needed and unwind tension to obtain good lamination. This helps reduce the chance of the overlaminate tunneling as it is applied to the base film. However, tunneling will disappear when the graphic is applied with heat and pressure to a textured surface.  
• If possible, do not wind the overlaminate graphics onto a core, or use as large a core as possible (more than 6 inches diameter).  
• Using proper application techniques, the finished application generally turns out well anyway. |
| 34      | Poor printed graphic quality | Used UV-curable inks. | 3M does not recommend using UV-curable inks on graphics for textured surfaces. Cracking may occur in deep draw areas. |
| 35      | Used unapproved inks | | Refer to the film’s Product Bulletin for approved inks and printers. |
| 36      | Cold weather installation | Film has poor adhesion. | Temperatures below about 40°F do not allow the adhesive to flow sufficiently, even when heated, and heating the substrate may release trapped moisture. Two ways to test are:  
• Aim the heat gun at the substrate and see if the substrate appears to sweat. If it does, do not apply until the temperature is warmer.  
• Try finger tacking the film to the substrate. If it does not adhere, it is too cold to proceed. |
| 37      | Film is cracking | | Most vinyl films become brittle below 40°F. Applying an overlaminate such as 8524 can reduce cracking, it is best to wait until the weather and substrate are warmer. |
| 38      | Hot weather installation | Film is too sticky to apply. | An overlaminate such as 8524 adds stiffness to the film, which makes it easier to control. To avoid exposing too much adhesive at a a time, pull away only a foot or two of the liner at a time. |

### Post-Installation Problems - All Walls

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<th>Recommended Solutions</th>
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<tbody>
<tr>
<td>39</td>
<td>Edges of graphic lift prematurely</td>
<td>Poor application technique, or wrong tools.</td>
</tr>
<tr>
<td>40</td>
<td>Much of graphic lifts or falls off prematurely</td>
<td>Poor initial bond of paint/finish to substrate.</td>
</tr>
<tr>
<td>41</td>
<td></td>
<td>Under-cured paint/finish.</td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>Moisture behind wallboard causing wallboard paper to release.</td>
</tr>
<tr>
<td>43</td>
<td>The surface, or its paint, finish or wallcovering is damaged during graphic removal.</td>
<td>Poor bond of paint, finish or wallcovering to substrate.</td>
</tr>
<tr>
<td>44</td>
<td></td>
<td>Poor removal technique.</td>
</tr>
<tr>
<td>45</td>
<td>Cuts made to the graphic during the installation penetrated both the film and substrate.</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>Surface is poured concrete.</td>
<td></td>
</tr>
<tr>
<td>Problem</td>
<td>Details/Causes</td>
<td>Recommended Solutions</td>
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<tr>
<td><strong>Post-Installation Problems - Textured Walls Only</strong></td>
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<td></td>
</tr>
<tr>
<td>47</td>
<td>Film is bubbling and/or popping off the substrate the next day.</td>
<td>Heat a band of film no wider than 2 inches, and apply at a rate no more than 2 inches/second. Typically, a good application rate is about 50 square feet per hour, so a 4' x 8' flat panel takes at least 20-30 minutes.</td>
</tr>
<tr>
<td>48</td>
<td>Film was not heated enough.</td>
<td>See Installation Problems - Textured Walls Only, in this table.</td>
</tr>
<tr>
<td>49</td>
<td>Attempted to rework an area that didn’t go down well at first.</td>
<td>Make every effort to apply the film well during the initial application. Reheating and reapplying a day or two later is less effective.</td>
</tr>
<tr>
<td>50</td>
<td>Film was not heated evenly</td>
<td>Move the heat gun and the roller as unit, holding your hands together and moving together. Do not wave the heat gun in front of the roller or advance the heat gun faster than the roller.</td>
</tr>
<tr>
<td>51</td>
<td>Not enough heat was used.</td>
<td>Use a digital heat gun with an internal temperature of 1000°F to 1100°F. Hold the gun 1 to 2 inches from the surface being heated.</td>
</tr>
<tr>
<td>52</td>
<td>Wrong film or overlaminate used</td>
<td>3M approves only these product constructions, which have been developed and tested for success</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Film IJ8624 without an overlaminate</td>
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<tr>
<td></td>
<td></td>
<td>• Film IJ8624 with overlaminate 8524</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Film 8624 ES with overlaminate 8519</td>
</tr>
<tr>
<td>53</td>
<td>Too hot an environment</td>
<td>High environmental heat, such as locating the graphic on a hot sunny wall, may increase lifting.</td>
</tr>
<tr>
<td>54</td>
<td>Texture is too severe.</td>
<td>It is difficult to force film into cavities of deeply recessed texture or over sharp bumps. Experiment with increasing the heat and adjusting the application pressure, as well as trying a variety of tools such as TSA-1, TSA-2, TSA-3 and CMP-1. 3M textured wall films are most successful on moderately textured surfaces.</td>
</tr>
<tr>
<td>55</td>
<td>The substrate has poor cohesive strength</td>
<td>Power washing or scrubbing a substrate with an abrasive pad may remove enough loose finish to stabilize the surface. Refer to the cleaning procedures on page 21. Sometimes a sandy surface, broken or weak mortar or efflorescence on concrete may prevent a satisfactory graphic application.</td>
</tr>
<tr>
<td>56</td>
<td>Outdoor graphic appearance has degraded</td>
<td>The recommended films for application to outdoor textured surfaces have a suggested expected durability of 30 days. Exposure to extreme elements, variations in substrate chemistry, and water trapped or flowing behind the film through mortar joints may contribute to quick deterioration.</td>
</tr>
<tr>
<td>57</td>
<td>Graphic exposed to excessive heat</td>
<td>Exposure to very sunny location, and especially when also periodically wetted (rain or watering systems), may result in premature lifting.</td>
</tr>
<tr>
<td>58</td>
<td>Outdoor graphic caused substrate damage</td>
<td>Graphic subjected to freeze-thaw cycles</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moisture trapped behind the film in freezing temperatures may damage masonry surfaces upon freezing and then removing the graphic.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Salts that pass through masonry may be trapped behind film and result in staining or discoloration upon removing the film.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Always check and follow your local building codes. 3M is not responsible for damage caused by using this product outdoors.</td>
</tr>
<tr>
<td><strong>Removal Problems - All Walls</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>59</td>
<td>Difficult removal</td>
<td>Film is too cold</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Warm the film with the heat gun while slowly pulling the film from the substrate. 250°F may be sufficient heat.</td>
</tr>
<tr>
<td>60</td>
<td>No overlaminate on film</td>
<td>Film IJ8624 without an overlaminate is difficult to remove, even with heat. If clean, easy removal is a requirement of the job, we recommend using overlaminate 8524.</td>
</tr>
<tr>
<td>61</td>
<td>Substrate is being damaged as film is removed</td>
<td>Film is too cold.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Warm the film with the heat gun while slowly pulling the film from the substrate. 250°F may be sufficient heat.</td>
</tr>
</tbody>
</table>
# 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.

The 3M Graphics Market Center Warranty Brochure, in conjunction with the applicable film Product Bulletin, provide the details to any warranty offered for this 3M graphic products described in this bulletin.

# Technical Service

For assistance in reviewing your film qualification test results. Fax or mail the completed worksheet to:

Attn: Wall Surface Evaluation
Technical Service
3M Center
Building 207-1W-022
St. Paul, MN 55114-1000

For other questions regarding wall applications, call us at 1-800-328-3908.

## 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, as well as a list of all Bulletins updated within the last three months, are available at www.scotchprint.com or through our Fax-on-Demand system. Any warranty, if offered, is based on information in the appropriate Bulletin(s) that was current at the time you purchased the 3M products. The following Product and/or Instruction Bulletins provide the information and processes you need to properly make the graphics described in this Bulletin.

Fax-on-Demand phone numbers:
United States or Canada: 1-800-364-0768
International: 1-651-732-6506

<table>
<thead>
<tr>
<th>Subject</th>
<th>Bulletin No.</th>
<th>FOD No.</th>
</tr>
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<tr>
<td>Product Bulletins</td>
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<tr>
<td>3M™ Controltac™ Film Series 160</td>
<td>160</td>
<td>1001</td>
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<td>3M™ Controltac™ Graphic Film Series 180</td>
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<td>3662</td>
<td>1521</td>
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## Bulletin Change Summary

Information has been added throughout this Bulletin to discuss the new film U8624 and details about applying graphics printed with piezo inkjet ink. Other minor changes have also been made. All changes are marked with a black bar in the margin.