Quick Links
3M Graphics Warranties
Technical Information Selector
Safety Data Sheets (SDS)
Videos

Some of these links lead to web-based resources that are not product-specific.

Observe These Pre-Application Instructions

These are general methods to finishing rivets. Your specific application may require a different method. Minimize the amount of stretch of the film around rivets to ensure successful, durable graphic application.

- Maintain the trailer and ambient temperatures between 60-90°F (15-32°C).
- Ensure the application environment is clean and well lit.
- Sweep the work area clean to remove any lose dirt or particles.
- Do not place the graphics on the ground.
- Make sure the trailer is washed with a cleaner within a pH range of 3 to 11 prior to application.
- Ensure the trailer surface is completely dry.

Materials and Tools Required

- Lint-free cloths
- Solvent cleaner (e.g., 3M™ General Purpose Adhesive Cleaner, DuPont Prep-Sol™ Solvent Cleaner 3919S)
- Isopropyl alcohol (IPA) cleaner (70% rubbing alcohol or mix 2 parts IPA to 1 part water)
- 3M™ SILICONE LUBRICANT PLUS (Wet Type), PN 08877
- 3M™ SILICONE LUBRICANT (Dry Type), PN 08897
- Scotch™ Masking Tape - 1" to 2" roll
- WD-40® Spray Lubricant
- 3M™ Rivet Brush RBA-1 or RBA-3*
- Pin or 3M™ Air Release Tool 391X*
- 3M™ Power Grip Magic Pad Rivet Applicator CMP-1
- 3M™ Power Grip Multi-Pin Rivet Air Release Tool MPP-1
- 3M™ Squeegee PA1-G Gold (two-sided with squeegee/protected edge)
- Olfa® Utility Knife, X-Acto® Knife or 3M™ Knifeless Tape
- Industrial heat gun that is capable of attaining at least 500°F (260°C) or propane torch with appropriate tip
- 3M™ Roller Pro
- 3M™ Tape Primer 94
- 3M™ Adhesion Promoter 111
- 3M Specification of Products for Trailer and Vehicle Applications
- 3M Instruction Bulletin 5.4. Application, Fleet Trucks.

Health and Safety

CAUTION

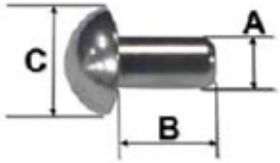
When handling any chemical products, read the manufacturers' container labels and the Safety Data Sheets (SDS) for important health, safety and environmental information. To obtain SDS sheets for 3M products, go to 3M.com/SDS, or by mail or in case of an emergency, call 1-800-364-3577 or 1-651-737-6501.

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

CAUTION

State Volatile Organic Compound (VOC) regulations may prohibit the use of certain chemicals with VOC's in graphic arts coatings and printing operations. 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 regulatory exemption. Check with your State environmental authorities to determine whether use of this solution may be restricted or prohibited.

Common Rivet Types

Rivet Type	Company	Example Image	Rivet Finishing Method	Primer or Adhesion Promoter
Etched Aluminum Rivet	Utility		Method 1	None
Aluminum Pan Etch Rivet	Utility, Hyundai		Method 2/3	Adhesion Promoter 111 or Primer 94 can be beneficial if film is not conforming around rivets as expected.
Aluminum Round Head	Great Dane		Method 1	Adhesion Method 5. Promoter 111 or Primer 94 can be beneficial if film is not conforming around rivets as expected.
Aluminum Post	Stoughton		Method 4	None
Low Surface Energy Plastic			Method 5.	Adhesion Promoter 111 or 3M Primer 94 is recommended.

General Methods

Note: Use a low-friction hand applicator if the graphic does not have an application tape or if the tape has been removed.

Removing the Application Tape

Note: Before removing the application tape, read about Rivets later in this section.

Application tape should not be left on the graphic. Prolonged exposure to sunlight will permanently adhere it to the graphic.

Remove the application tape from the graphic by pulling it back upon itself at a 180° angle. See Figure 1.

It is acceptable to tear the premask into smaller pieces.

Re-squeegeeing

IMPORTANT NOTE

Always re-squeegee after removing application tape because removal may loosen the edges of the graphic. Re-squeegeeing is a critical step for all graphics, but especially if the film is thick, or has pressure-activated adhesive, or if the substrate surface has any adhesive. Loose edges may lift and be damaged if this step is skipped. See Figure 2.

1. Use firm pressure to re-squeegee all rivets, graphic edges, substrate seams and film overlaps.
2. Give special consideration to graphics applied near the minimum application temperature.

   Graphics may not develop ultimate adhesion if they are applied near the minimum application temperature and then put immediately into service in the winter weather. To improve adhesion and reduce edge lifting, use a heat gun along the rivets, film edges, substrate seams and overlaps when re-squeegeeing.

Removing Air Bubbles

1. Inspect the film for bubbles.
2. Puncture the bubble at one end with a pin or the 3M™ Air Release Tool 391X. Do not use a razor blade or knife.
3. Press out the entrapped air by moving your thumb toward the puncture. See Figure 3.

Post Heating

1. After the film is conformed around the rivets as tight as possible, heat the film up to 200 - 225°F to reduce the "memory" of the film and provide a robust, long-lasting graphic.

Note: If a torch is used, cracking of the material around the rivets can occur.

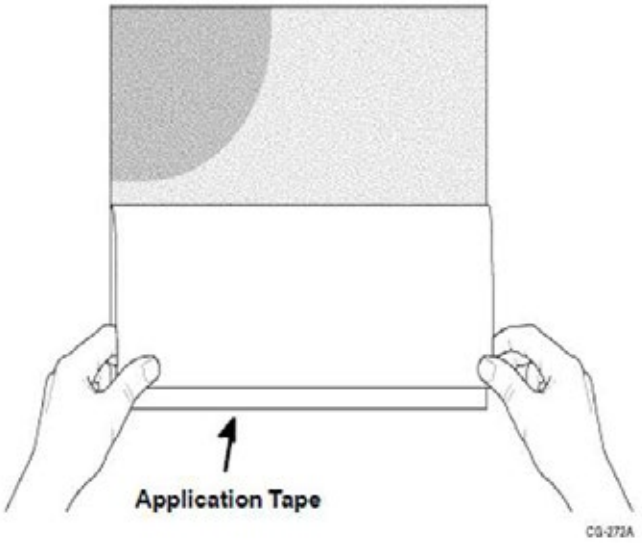


Figure 1. Removing application tape

Figure 2. Low friction hand applicator PA-1

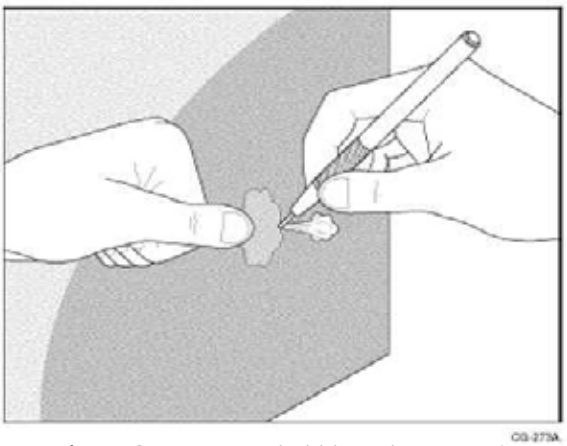


Figure 3. Puncture a bubble and remove air from under the film

Method 1: Rivet Brush

How to use a Rivet Brush

1. With application tape still on the graphic, use the Air Release tool to puncture 4 - 8 holes around the rivet.
2. If scratching of the graphic occurs around rivets from a rivet brush during application, then using a silicone spray may reduce the scratching. Apply several short bursts of silicone spray lubricant directly onto the bristles of the rivet brush (see Figure 4).

   - Roll the rivet brush during application to ensure an even coating on the bristles. Re-apply as needed.

   - 3M™ Rivet Brush RBA-1 is recommended for use with silicone spray lubricant.
3. Start a circular brushing motion around the outer edges of the air release holes. See Figure 5.
4. Continue brushing as you narrow to the area immediately over the rivet. This conforms the film to the rivet. See Figure 6.
5. Remove the application tape as outlined in General Methods section.
6. Without heat, conform the film around the rivet as tightly as possible.
7. Apply heat and rivet brush to conform the rivets tightly around the rivets.
8. Post heat the film around the rivets. See “Post Heating” on page 3.

Figure 4. Applying silicone spray lubricant to the rivet brush

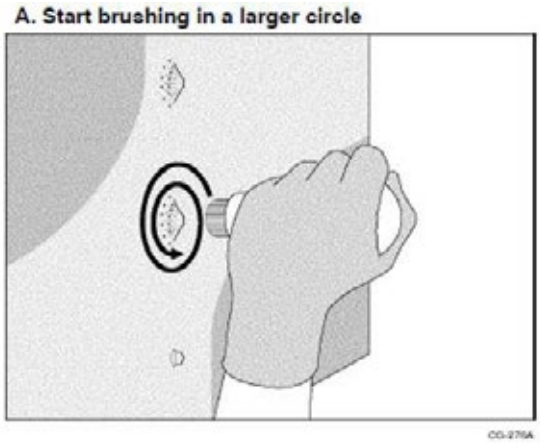


Figure 5. Conforming film around rivets with a brush (A)

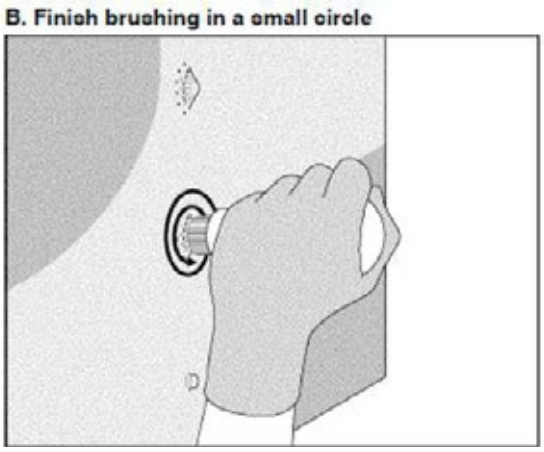


Figure 6. Conforming film around rivets with a brush (B)

Method 2: Power Grip Magic Pad Rivet Applicator CMP-1

3M™ Power Grip Multi-Pin Rivet Air Release Tool MPP-1 for Comply™ Films

Air release tool MPP - 1 makes multiple holes around a rivet with one strike.

1. Remove and retain the black cover of the tool.
2. Grip the tool as shown and strike the area around the rivet once. Do not twist the tool. See Figure 7.
3. Use fingers or rivet brush to conform the film around the rivet as best you can with the application tape still on the graphics.
4. Remove the application tape. See “Removing the Application Tape” on page 3.

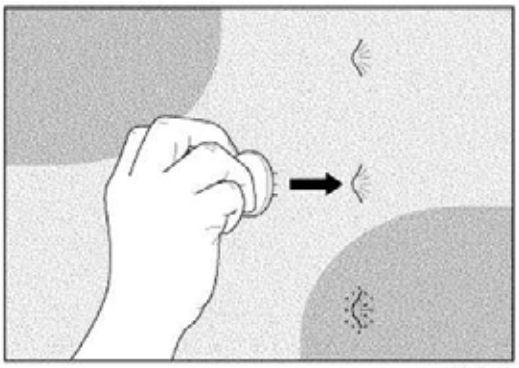


Figure 7. Using multi-pin rivet air release tool MPP-1

3M™ Power Grip Magic Pad Rivet Applicator CMP-1 for films with Comply™ Adhesive

The CMP - 1 can be used to conform hot vinyl film around small contoured shapes, such as rivets.

5. Without heat, use the CMP-1 tool to conform the film around the rivet.
6. Heat one rivet at a time with a heat gun. See Figure 8.

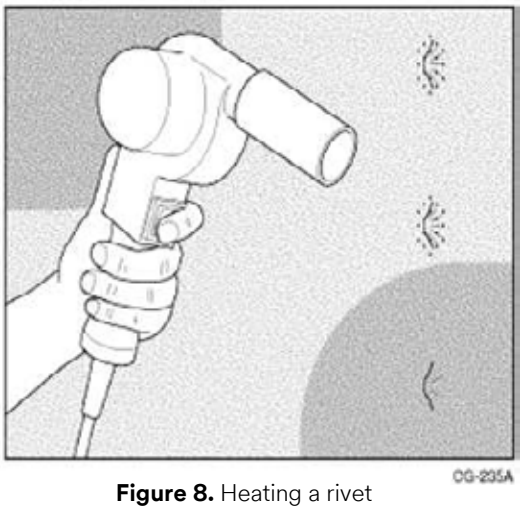


Figure 8. Heating a rivet

7. When the vinyl is hot and limp, firmly press the pad directly over the rivet and hold for one or two seconds to mold the film around the rivet. Do not twist the tool. See Figure 9.
8. If the film needs to conform around the rivets more, use a rivet brush.
9. Post heat the film around the rivets. See “Post Heating” on page 3.

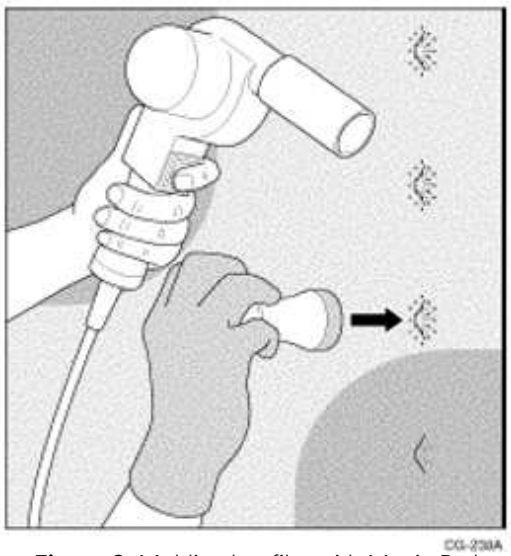


Figure 9. Molding hot film with Magic Pad Rivet Applicator CMP-1

Method 3: Rounded Rivet Finishing Tool

Figure 10. Tenting

1. Before removing the application tape, use a pin or the air release tool 391X to puncture several holes in the film, or use a multi pin rivet air release tool MPP-1, which requires only one strike to puncture several holes. Do not use a knife or a razor blade.
2. Remove the application tape. See “Removing the Application Tape” on page 3.
3. To reduce the amount of stretch at the base of the rivet, the film will be stretched from the top of the rivet to the base. See Figure 10.
4. Next, use a tool with a circular shape, the size of the rivet base to conform the film around the rivet base. In this case (Figure 11), a 10 mm socket was used. This allows the film to minimize the stretch compared to the previous method. A PA-1 Gold Squeegee or RB-1 rivet brush are then used to conform the excess film around the rivet. See Figure 12.

Figure 11. Using a circular-shaped tool to conform the film around a rivet

5. After conforming the film around the rivet, heat is used to relax the stretched film and to help accelerate the adhesion process. A heat gun is preferred to control the amount of heat. If a heat gun is not available, use a torch to gently warm the rivet. Overheating will cause the ink/clear to crack. For many torches, a distance of 5 to 6 inches from the torch tip to the film surface is recommended to prevent overheating.

Figure 12. Conforming the film around a rivet

6. The end result is a rivet with minimal tenting (less than approximately 1/16 inch from rivet base to trailer substrate after 24 hours). See Figure 13.

Figure 13. Minimal tenting

Method 4: Cutting

Cutting Around Rivets

Some films and substrates require that rivets be cut around. If the graphic is not cut, some lifting occurs in the graphic **may crack** and come loose later.

1. Use a film-cutting tool around rivets under the following circumstances (See Figure 14.):
   - Stainless steel substrates
   - Film does not extend 0.5 inch (1.3 cm) or more beyond the rivet edge
   - Rivets that are excessively high
   - Reverse rivets, where the rivet head is on the inside and the film goes over the exposed shank end.
   - 3M™ Scotchlite™ Diamond grade sheeting
2. If the base film is greater than 2 mil (0.05 mm) thick and rivets are closer than
   - 1.5 inches (3.8 cm) for single row
   - 3 inches (7.7 cm) for double row then, remove the circles of film from the tops of the rivets, if desired.
3. Brush the film down in a circular motion with the rivet brush. See Figure 6 on page 4.

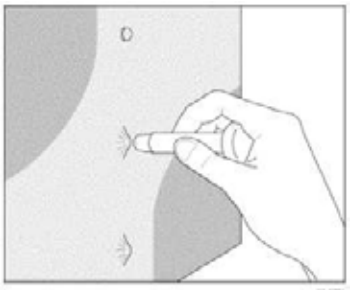


Figure 14. Cutting around rivets

Cutting Around Bolts

1. Apply the graphic over the bolt in the same manner as a rivet.
2. Cut an X through the film directly over the bolt. See Figure 15.
3. Brush the film down with the rivet brush held at a 45° angle.
4. Carefully cut the film around the bolt at a 90° angle or with a film-cutting tool.

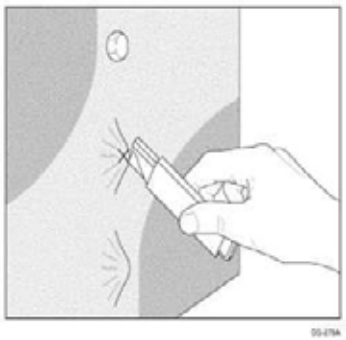


Figure 15. Cutting around bolts

Post-Application Conditions

After application of the graphic, keep the trailer temperature above 60°F (16°C) for as long as possible. At least 12 hours is ideal before exposing the trailer to either a cold or wet climate. This strengthens the graphics bond to the contoured areas.

Method 5: Plastic Rivet Finishing

Flame treating changes the molecular structure of the substrate. It oxidizes a very thin layer of the substrate allowing the adhesive to wet the surface and make a good bond.

1. Clean substrate so that is free of dirt and oil.
2. Touch the tip of the flame's outer blue envelope (not the inner, yellow or red cone) to the material for 1 second. Longer exposure can deform or soften the material. Flame treating is not heat treating.
3. Apply 3M™ Adhesion Promoter 111 or 3M™ Primer 94 to each rivet.
4. Wait 5 minutes after step 3 to apply graphics. This will allow solvent to flash off prior to graphic application.
5. Apply the film to the substrate within 1 hour after flame treating and Primer/Adhesion Promoter Application. The surface oxidation of the flame-treated rivet and the cure time of the Primer/Adhesion Promoter will disappear within 1 hour. We recommend that you only flame treat & prime areas that can be installed within the stated timeframe. If working outside of this timeframe, we would recommend removing Primer/Adhesion Promoter and repeat the steps listed above.
6. Refer to Method 1 for Rivet Finishing.
7. Cutting Around Rivets: Some films and substrates require that rivets be cut around. If the graphic is not cut, some lifting may occur especially with the larger diameter and higher profile rivets. The lifted areas may dry out and crack, eventually leading to premature failure.

8. Use a film cutting tool or desired tool of choice to cut around rivets.

9. Post Heating. Please refer to General Methods on Page 3.

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