Procedure for Repairing Snowmobile Cowls using LORD Fusor® Plastic Repair Systems

Repairing Rigid Cowls

Materials Needed:

- LORD Fusor 703 Plastic & Rubber Cleaner
- LORD Fusor 702 Fiberglass Cloth
- LORD Fusor 100EZ/101EZ Plastic Panel Repair Adhesive (Heat Set)
- LORD Fusor 704 Saturation Roller
- LORD Fusor 300 or 301 Manual Dispensing Gun, or LORD Fusor 304 Pneumatic Dispensing Gun

- **Polaris up to 1998** – ISO symbol "DCPD" (Telene®); Rigid and black in color
- **Artic Cat** – ISO symbol "DCPD" (Metton®); Rigid and brown/black in color
- **Yamaha up to 1996** – ISO symbol "SMC"; Rigid, glass fiber reinforcement

Note: A two-sided repair is required when damage goes all the way through or there is damage to the fiber reinforcment.

Surface Preparation (SMC or DCPD)

1. Panels to be repaired should be brought into the body shop in advance so that they are dry and at room temperature, 65-75°F (18-24°C), before anything is done to them.
2. Both sides of the panel must be thoroughly cleaned before sanding or grinding the repair area.
3. Cover the damaged area in the SMC or DCPD panel (front and back) with masking tape. This protects the damaged area from absorbing the plastic & rubber cleaner and eliminates wicking of the cleaner through the fibers into the panel. Wicking can cause poor adhesion.
4. Use plastic & rubber cleaner to remove all waxes, silicones, dirt and road oils from the area surrounding both sides of the damaged area.

Repairing the Back Side of the Damaged Area

1. Remove the tape and sand the back of the repair area with an angle grinder or a DA sander, or by hand using 80-grit sandpaper. Blow away all dust with an air hose. Be sure that the air does not have any oil or water in it.
2. The reinforcing patch on the back side of the repair can be made with either a matching piece of SMC or DCPD material or formed from LORD Fusor® fiberglass cloth (Stock #702). The SMC or DCPD material can be used when you have a piece that conforms well to the back of the damaged area. The LORD Fusor fiberglass cloth can be used on any SMC or DCPD repair.
3. Reinforcing Patch formed with LORD Fusor Fiberglass Cloth (Stock # 702)
   a. Separate the cloth from its plastic film backing and cut a section large enough to cover the repair plus 1 inch (25.4 mm) around the repair.
   b. Cut a section of the plastic film backing about 1 inch (25.4 mm) larger than the cloth. Lay the plastic film backing on a smooth, clean and flat surface where it will be used in Step #3d.
   c. Insert the LORD Fusor plastic panel repair adhesive cartridge (Stock #100EZ/101EZ) into the appropriate dispensing gun. Squeeze a small amount of product from each side of the cartridge to level the plungers. Attach a mixing tip and dispense a small amount of adhesive, which is about the length and width of the mixer. Dispense until the product is evenly mixed and the color is consistent.

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d. Apply enough adhesive to the plastic film backing so that after smoothing with a plastic spreader, it is about 1/16 inch (1.59 mm) thick. Spread the adhesive evenly from the center toward the sides of the film backing. The area covered with the adhesive should be about the same size as the fiberglass cloth.
e. Place the pre-cut fiberglass cloth on the adhesive-coated film backing. Cover the cloth with a coat of adhesive, spreading evenly and completely with a plastic spreader to a thickness of approximately 1/16 inch (1.59 mm).
f. Do not separate the prepared patch from the film backing. Apply the prepared patch to the backside of the repair and compress it using the LORD Fusor saturation roller (Stock #704).
g. Heat set the reinforcement patch using a heat gun or heat lamp. For SMC, heat at 180°F (82°C) for about 5-10 minutes. For DCPD, heat at 140-150°F (60-65°C) for 10-15 minutes or until the adhesive sets. Remove the plastic film backing after the repair cools.

4. SMC or DCPD Reinforcing Patch
   a. Cut a piece of SMC or DCPD that extends past the repair area by about 1-2 inches (25.4-50.8 mm) on all sides. Make sure that it conforms well to the back side of the panel you are repairing.
   b. By grinding or sanding, shape the surface of this reinforcing patch so that it will mate with the panel being repaired. Make sure that the panel has been sanded wherever adhesive will be applied in the repair area.
   c. Insert the LORD Fusor plastic panel repair adhesive cartridge (Stock #100EZ/101EZ) into the appropriate dispensing gun. Squeeze a small amount of product from each side of the cartridge to level the plungers. Attach a mixing tip and dispense a small amount of adhesive, which is about the length and width of the mixer. Dispense until the product is evenly mixed and the color is consistent.
   d. Apply a coating of adhesive to the sanded reinforcing patch, smoothing it out with a plastic spreader. Also apply a coating of adhesive to the back of the composite panel that is being repaired, smoothing it with a plastic spreader. Make sure that you have applied enough adhesive so there will be 100% contact between the adhesive and both panels.
   e. Apply the prepared patch to the backside of the repair. Lightly clamp the two pieces together, assuring that there is complete and even contact of the adhesive to both surfaces, but not so much pressure that all of the adhesive is squeezed out.
   f. Heat set the reinforcing patch using a heat gun or heat lamp. For SMC, heat at 180°F (82°C) for about 5-10 minutes. For DCPD, heat at 140-150°F (60-65°C) for 10-15 minutes or until the adhesive sets.

Repairing the Face/Cosmetic Side of the Damaged Area – DCPD

1. Remove the masking tape from the front side of the damaged area and grind down to the backing patch. Use an angle grinder with a 36- or 40-grit wheel. Make a gradual taper in the repair area rather than a V-groove **(see Illustrations A and B)**. This will prevent “bull’s-eyes” or “readthrough” in the finished repair.
2. Sand the prepared area with a DA sander or by hand using 80-grit sandpaper.
3. Insert the LORD Fusor plastic panel repair adhesive cartridge (Stock #100EZ/101EZ) into the appropriate dispensing gun. Squeeze a small amount of product from each side of the cartridge to level the plungers. Attach a mixing tip and dispense a small amount of adhesive, which is about the length and width of the mixer. Dispense until the product is evenly mixed and the color is consistent.

Illustration A: *V-groove – DO NOT USE!*

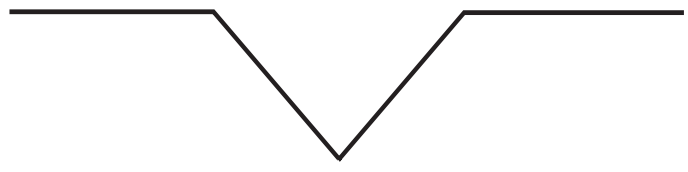


Illustration B: *Taper/cove – USE!*

4. Dispense LORD Fusor plastic panel repair adhesive into the repair area, applying enough adhesive to cover the whole repair area. Smooth with a plastic spreader, feather-edging onto the undamaged area.
5. Heat the repair with a heat gun or heat lamp for 10-15 minutes at 140-150°F (60-65°C) or until the material sets.
6. After the repair cools, rough-grind to remove all excess adhesive. Sand the repair with 80-grit sandpaper, making sure to cut slightly below the finished surface. This will allow for application of a thin, smooth coat of adhesive.
7. Apply the finish coat of LORD Fusor plastic panel repair adhesive. Rough-spread the adhesive. Then, to help force trapped air bubbles to the surface, slightly warm this final coat of adhesive with a heat gun. The heat allows for even pull with limited drag on the plastic spreader.

Note: Be careful not to overheat or heat too long as this will cure the adhesive before final smoothing.

8. To ensure a high-quality repair, heat cure the entire repair for one hour at 140-150°F (82°C) using a heat lamp.

Note: This final heat cure will bring the plastic and adhesive up to the maximum temperature generally experienced in a bake oven or under unusual weather conditions. This step ensures total shrinkage with no "bull's-eyes."

9. Cool the repair to room temperature. Feather- and contour-sand the repair with 80-grit sandpaper. Finish-sand using 180- and 220-grit sandpaper. In the event that pin holes exist, apply more adhesive. Work it into the pin holes with a plastic spreader and heat until cured. Finish-sand again. Prime and paint per manufacturer's recommendations.

Repairing the Face/Cosmetic Side of the Damaged Area – SMC

1. Remove the masking tape from the front side of the damaged area and grind down to the backing patch. Use an angle grinder with a 36- or 40-grit wheel. Make a gradual taper in the repair area rather than a V-groove **(see Illustrations A and B)**. This will prevent "bull's-eyes" or "readthrough" in the finished repair.
2. Sand the prepared area with a DA sander or by hand using 80-grit sandpaper.
3. Build a "pyramid patch" using LORD Fusor fiberglass cloth (Stock #702) and LORD Fusor plastic panel repair Adhesive (Stock #100EZ/101EZ) **(see Illustration C)**. This will be prepared on a portion of the plastic film backing.

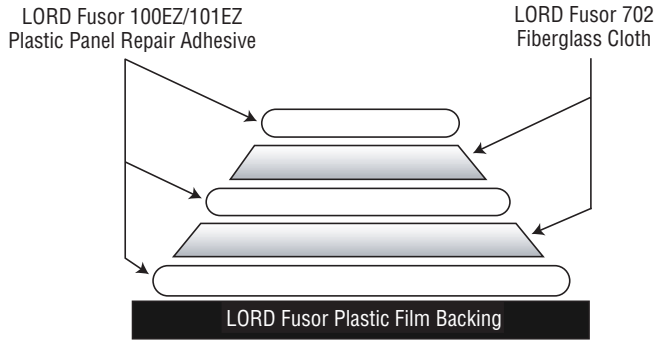
Note: The use of the fiberglass cloth is critical to control the expansion and contraction in hot and cold weather. This will control visible "bull's-eyes" and "readthrough" in the finished repair and provide a high-quality repair with maximum strength characteristics.

4. Start by removing the LORD Fusor fiberglass cloth from the plastic film backing. Cut a piece of plastic film backing larger than the repair area. Cut a first layer of LORD Fusor fiberglass cloth slightly smaller than the perimeter of the tapered area. Cut three or more additional layers of fiberglass cloth, each being slightly smaller than the previous one.

Note: It is important to work as much fiberglass cloth into the repair as possible while attaining a thickness similar to the original panel.

5. Insert the LORD Fusor plastic panel repair adhesive cartridge (Stock #100EZ/101EZ) into the appropriate dispensing gun. Squeeze a small amount of product from each side of the cartridge to level the plungers. Attach a mixing tip and dispense a small amount of adhesive, which is about the length and width of the mixer. Dispense until the product is evenly mixed and the color is consistent.

Illustration C: *Pyramid Patch*



NOTE: Not drawn to scale.

6. Lay the plastic film backing on a smooth, clean and flat surface. Apply the adhesive to the plastic film backing and smooth using a plastic spreader. Spread the adhesive evenly from the center toward the sides of the plastic film backing. The adhesive should have a thickness of approximately 1/16 inch (1.59 mm). Place the largest piece of fiberglass cloth onto the adhesive-coated film backing. Apply a coat of the LORD Fusor plastic panel repair adhesive to this layer of fiberglass cloth. Smooth with a plastic spreader. Continue to apply at least three subsequent layers of cloth and adhesive (1/16 inch [1.59 mm] thick). Center each on the piece below, with each layer being slightly smaller than the previous one.
7. This multi-layer patch should now form a pyramid shape **(see Illustration C)**. Place the pyramid patch into the prepared repair area. Work the adhesive into the repair by rolling with the LORD Fusor saturation roller (Stock #704). Initially, roll from the center toward the sides to eliminate air pockets and pin holes, and improve overall adhesion.
8. Heat the pyramid patch repair with a heat gun or heat lamp for 5-10 minutes at 180°F (82°C) or until the material sets.
9. After the repair cools, remove the plastic film backing and rough-grind to remove all excess adhesive. Sand the repair with 80-grit sandpaper, making sure to cut slightly below the composite plastic finished surface. This will allow for application of a thin, smooth coat of adhesive.
10. Apply the finish coat of LORD Fusor plastic panel repair adhesive. Rough-spread the adhesive. Then, to help force trapped air bubbles to the surface, slightly warm this final coat of adhesive with a heat gun. The heat allows for even pull with limited drag on the plastic spreader.

Note: Be careful not to overheat or heat too long as this will cure the adhesive before final smoothing.

11. To ensure a high-quality repair, heat cure the entire repair for one hour at 180°F (82°C) using a heat lamp.

Note: This final heat cure will bring the plastic and adhesive up to the maximum temperature generally experienced in a bake oven or under unusual weather conditions. This step ensures total shrinkage with no "bull's-eyes."

12. Cool the repair to room temperature. Feather- and contour-sand the repair with 80-grit sandpaper. Finish-sand using 180- and 220-grit sandpaper. In the event that pin holes exist, apply more adhesive. Work it into the pin holes with a plastic spreader and heat until cured. Finish-sand again. Prime and paint per manufacturer's recommendations.

Repairing Flexible Cowls

Materials Needed:

- LORD Fusor 703 Plastic & Rubber Cleaner
- LORD Fusor 200 Quik Stick Cyanoacrylate Kit
- LORD Fusor 702 Fiberglass Cloth
- LORD Fusor T11 Plastic Repair Adhesive
- LORD Fusor 704 Saturation Roller
- LORD Fusor 141/140 Plastic Bonding Adhesive (Super Fast)
- LORD Fusor 602EZ Plastic Surface Modifier
- LORD Fusor 300 or 301 Manual Dispensing Gun, or LORD Fusor 304 Pneumatic Dispensing Gun

- **Polaris up to 1998** – ISO symbol "TPO"; Flexible and black in color
- **Ski-Doo** – ISO symbol "PUR"; Flexible and yellow in color
- **Ski-Doo 1998 Rotex 700 Triple** – ISO symbol "TPO"; Flexible and black in color
- **Yamaha 1997+** – ISO symbol "PP+T20"; Flexible and off-white in color

Note: A two-sided repair is required when there is a crack or a hole in the cowl.

Surface Preparation

Surface Preparation

1. Cover the damaged area of the cowl with masking tape.
2. Clean the repair area using plastic & rubber cleaner. For hardened tar and sap deposits, consider using a wax and grease remover.

Note: Repeat Steps #1 and #2 on the back side of the cowl if a backing patch is needed.

3. If necessary, align the damaged area with tape, clamp or use LORD Fusor quik stick (Stock #200).
4. Use a DA sander with 80-grit sandpaper at low rpms to remove paint surrounding the damaged area. Cove out the damaged area, leaving rounded edges rather than a V-groove **(see Illustrations A and B)**.

Note: Adhesive will not bond to melted plastics. To prevent bond failure, operate DA sander at low rpms during surface preparation.

5. If a backing patch is being applied, sand the back side of the cowl using a DA sander with 80-grit sandpaper at low rpms to remove paint and roughen the surface surrounding the damaged area.
6. Follow the DA-sanding with 80-grit hand-sanding to remove any melted plastic on the surface. Blow off the repair area with an air gun. Be sure that the air does not have any oil or water in it.

Note: Do not use any cleaners after the damaged area has been sanded.

Application Procedure

Backing Patch

A backing patch is required if the damage penetrates through the cowl.

1. Separate the LORD Fusor fiberglass cloth (Stock #702) from its plastic film backing and cut a section large enough to cover the repair area plus 1 inch (25.4 mm) around the repair.
2. Cut a section of the plastic film backing about 1 inch (25.4 mm) larger than the patch. Lay the plastic film backing on a smooth, clean and flat surface, where it will be used in Step #4.
3. Insert LORD Fusor plastic repair adhesive cartridge (Stock #T11) into the appropriate dispensing gun. Squeeze a small amount of product from each side of the cartridge to level the plungers. Attach a mixing tip and dispense a small amount of adhesive, which is about the length and width of the mixer. Dispense until the product is evenly mixed and the color is consistent.
4. Apply the LORD Fusor plastic repair adhesive onto the film backing. Spread the adhesive evenly from the center toward the sides of the film backing. The area covered with adhesive should be about the same size as the fiberglass patch.
5. Place the pre-cut fiberglass patch on the adhesive-coated film backing. Cover patch with more adhesive and spread it evenly and completely over the fiberglass patch.

Note: Use two layers of fiberglass cloth to reinforce the cowl even more.

6. Place the prepared patch onto the repair area with the plastic film backing facing out. With a LORD Fusor saturation roller (Stock #704), smooth out the material and let it cure with the plastic film backing left on. Once cured, remove the plastic film backing.

Cosmetic Side

1. Apply LORD Fusor plastic repair adhesive in two layers. Work the first layer into the plastic with an acid brush or spreader. Immediately apply a second, thicker coat and spread it over the entire area. Feather-edge onto the undamaged area.

Note: The repair adhesive should be slightly higher than the cowl surface to allow for sanding. As an alternative, the adhesive can be applied in one step.

2. Place the plastic film backing over the repair. Allow at least 20 minutes cure time before removing the plastic film backing and rough-sanding. One to two hours is preferred on the TPO and TPE cowls before final sanding.
3. Slowly rough-sand the repair material with a DA sander using 80-grit sandpaper. Start in the middle of your repair material and work toward the outer edges. Then, sand with 180-grit sandpaper to provide better feather-edging. For optimal results, contour with a block sander using 220- or 320-grit sandpaper.
4. Paint per manufacturer's recommendations using a high-build primer.

Flexible Cowl Mounting Tab

Torn tabs on the cowls can be repaired in a manner similar to that described in this repair procedure.

1. Hand-sand the area around the torn tab. Blow away any debris.
2. Apply LORD Fusor surface modifier (Stock #602EZ) and let it dry for 10-15 minutes.
3. Cut a patch of LORD Fusor fiberglass cloth (Stock #702) to use as reinforcement.
4. Apply LORD Fusor plastic bonding adhesive (Stock #141/140) to the fiberglass reinforcement. Spread the adhesive with the end of the adhesive mixer and wrap the adhesive-coated fiberglass on both sides of the tab area. Make sure that good contact with the cowl is made.
5. Hold the patch in place for about 3 minutes, or until it will stay in place by itself. After the adhesive cures, drill a mounting hole to simulate the original tab.

Technical Tips

- If the flexible cowl was hit and appears to be dented, apply light heat to the damaged area and massage the back side of cowl to allow the plastic to come back to its natural state. If this step is omitted, the dent may result in a "bull's-eye" in the repair area after placing it in the bake oven.
- When working in difficult areas such as corners, apply the adhesive to the repair area and lightly spread it. Then, lay a piece of plastic film backing over the repair. This will help contour the repair material to the original shape.
- For additional method on repairing flexible snowmobile cowls, refer to Fusor Repair Procedure – *Procedure for Repairing TEO, TPO and Other Type Bumpers with LORD Fusor Plastic Repair Systems*.

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LORD Corporation
World Headquarters
111 Lord Drive
Cary, NC 27511-7923
USA

Customer Support Center
+1 877 ASK LORD (275 5673)

www.lord.com

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