



Plastic Pointers

The Newsletter on Repairing & Refinishing Automotive Plastics

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Repairing Snowmobile Cowls

Many of our friends in the Northern US and Canada make the best of the winter season by having some fun on their snowmobiles. As with any other sport in which fragile machines are ridden at high speed through treacherous terrain, crashes happen. And when crashes happen, parts break.

One of the most oft-damaged parts on a snowmobile is its cowl.

These large plastic parts cover the engine. When the snowmobile flips or rolls, the cowl can suffer a lot of damage.

The replacement cowls for these snowmobiles can cost upwards of \$500, so the incentive to repair these parts is obvious. In this article we'll discuss the materials the "Big Four" are making their hoods from and the best ways to repair them.

The four major manufacturers, Arctic Cat, Polaris, Ski-Doo, and Yamaha, all use different materials. We'll discuss each maker in turn.

Arctic Cat - Arctic Cat cowls are made from a rigid thermoset plastic material that is popularly known as either Metton or Telene. (Metton is made by Metton America, Telene by B.F. Goodrich.) These are reaction injection molding (RIM) materials that are similar to polyurethanes in their manufacture except that they are based on Dicyclopentadiene (DCPD) chemistry.

Being a thermoset material, DCPD will not melt with the

application of heat. It therefore must be repaired using an adhesive.

The manufacturers of both Metton and Telene recommend the use of two-part adhesives for repair. We recommend the use of our **2020**



Any snowmobile cowl can be repaired using Urethane Supply Company products.

SMC Hardset Epoxy Adhesive-Filler. This product will provide outstanding adhesion to the substrate and has the strength and rigidity to substantially reinforce the dam-

aged area.

For more information on how to repair parts using two-part epoxies, please see our Book of Automotive Plastic Repair or our website.

Polaris - Up until 1998, Polaris has also used DCPD thermoset material in its cowls. Polaris is now making the transition to TPO for its cowls. Polaris is switching to TPO for the same reason the auto manufacturers are: it's cheaper.

The TPO cowls can be identified because they are more flexible than the old DCPD units. TPO will melt immediately upon being touched with the hot welder tip. It will also melt and smear when ground with sandpaper at high speed.

The new TPO cowls can be repaired using the same technique

we recommend for repairing TPO bumpers--Uni-Weld Ribbon. Uni-Weld Ribbon is a thermoplastic adhesive that has excellent adhesion to olefinic substrates like TPO. When used in conjunction with the **2045W Stainless Steel Reinforcing Mesh**, the result is a very strong and quick repair.

Ski-Doo - In the majority of Ski-Doo's sleds, a very flexible thermoset polyurethane (PUR) is used to make the cowls. This is the most durable material used by any of the manufacturers, able to withstand severe abuse. They can break, however.

The best way to fix the PUR cowls is with our **5500HT Model 5** Airless Plastic Welder and our 5003R1 urethane welding rod. Look for the article on welding urethanes on Page 2 of this issue.

Ski-Doo also uses TPO in its '98 Rotax 700 Triple, and it is predicted that they will convert more applications to TPO in the future. Ski-Doo's



Repairs made to Ski-Doo PUR cowls with 5003R1 urethane rod are tough.

PUR cowls are yellowish-white in color while the TPO units are black, so they're easy to tell apart.

Yamaha -

Through 1996, Yamaha used SMC in its cowls almost exclusively.

This material is very rigid and can be easily identified by the glass fibers that become visible when it cracks.

Like Metton and Telene, SMC is best repaired using our 2020 SMC Hardset Epoxy Adhesive-Filler. A fiberglass tape (2044-2) is also used

to reinforce the repair on the backside.

In 1997, Yamaha switched its cowls to a polypropylene blend that is off-white in color and has the ID symbol "PP+T20" molded into the backside. It is best repaired using our **5003R8 Uni-Weld Ribbon**.

After completing the repair, these plastic cowls can be refinished using our 3000 Flexible Primer and a topcoat utilizing our 3750 Flex-All 2 flex additive. See "The Book" for more information on how to repair and refinish plastics.

In-Mold Film Technology is Alternative to Painting Parts

The following article is reprinted from the November issue of *Modern Plastics* magazine. It describes a developing technology that will replace paint on bumpers with an in-mold film. This change presents a challenge to the methods for plastic part refinishing which we are familiar

with today. After the article, we'll discuss some of our findings.

"Innovative in-mold film technology that eliminates painting in molded bumper fascias has been developed by Visteon Automotive Systems in Milan, MI and Avery Dennison, Troy, MI.

"The breakthrough technology holds promise as a cost-effective alternative for car makers who are striving to eliminate costly painting processes and associated environmental concerns.

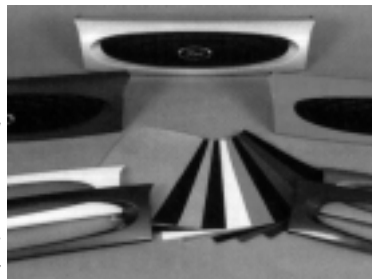
"The application is claimed to be the first use of in-mold film for a large automotive part which is line-to-line matched with the body color. TPO front bumper fascias on the 1998 Ford Taurus will use the in-mold technology, replacing painted TPO fascias beginning in the second quarter of 1998. Ford trialed the technology on about 330 production pieces for the 1997 Taurus.

"We expect cost savings as volumes increase," says Dale Moore,

manager of Visteon's advanced injection molding group. He credited improved performance in manufacturing efficiencies.

"The technology makes use of 0.023 in thick Avloy PVdF/ acrylic film from Avery Dennison. The film features a basecoat / clearcoat construction, which provides strong chemical and chip resistance. The all thermoplastic composition (both film and TPO resin) offers improved recyclability when compared to traditional painted plastic parts.

"The fascia is molded of Dexflex D161B, a standard TPO from Solvay Engineering Polymers, Auburn Hills, MI. The material was modified only for shrinkage since painting via high-heat baking ovens is eliminated. Moore says in-mold technology is superior to painted parts, providing better surface appearance, color retention, and abrasion and solvent resistance. He notes, however, that further process



Sample TPO parts coated with Avery Dennison's in-mold film.



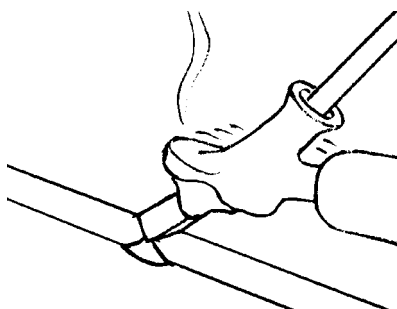
Repairing Urethane Bumpers – Don't Melt It!

When urethane bumpers came out, people were still wearing polyester bellbottoms and Jimmy Carter was the President. So you'd think that after all these years everyone would know how to repair urethane using the Mini-Weld Airless Plastic Welder.

That's just not the case! Our technical support staff gets at least a couple of calls a week from people who have trouble welding urethane bumpers. That's okay--it is different from other types of plastic, so it can get confusing. Let's do a quick review of why urethane is different and how to properly weld it.

First of all, polyurethane (PUR) is the only bumper material that is a **thermoset** plastic. That means it is "set" in the mold by a chemical reaction between two components that are injected in simultaneously. These chemicals react in the mold to form a cross-linked solid.

If you press your hot welder tip onto PUR, the plastic will boil, bubble, and smoke and a brown liquid will form. Warning: You are NOT melting the bumper, you are DESTROYING it!



When welding urethane, melt the rod into the groove, but don't try to melt the bumper.

The key to "welding" PUR is to not melt the bumper. You want to melt the welding rod (which is a meltable, thermoplastic urethane) into the v-groove, but you don't want to melt the base material together with the rod.

You're probably saying "that doesn't sound like a weld if you don't melt the base material!" You're right! Repairing PUR with the welder does not create a true weld. It's more like a braze or a hot melt adhesive. The adhesion of urethane rod onto PUR can't be beat, so the strength of the repair is outstanding.

You'll need to use a filler over the urethane weld to restore the cosmetic appearance of the outer surface. One quick way to do this is to apply a thin layer of Uni-Weld Ribbon over the area. **Hilary Wald** of Hedahls in Bismarck, ND promotes this method as the fastest and easiest way to finish out a urethane weld. The Uni-Weld Ribbon can be sanded to a fine featheredge as soon as it cools off so you can finish the job fast. If you have other low spots you need to fill, it'll be faster to use a skim coat of our **2000 Flex-Filler 2** over the entire area.

refinements are needed to improve gloss and distinctness of image."

We interviewed Mr. Moore of Visteon to determine exactly what challenges the collision repair market will face in trying to repair and refinish these film-coated parts. Because the TPO is a standard grade, there will be no problem in doing the actual repair. Our Uni-Weld Ribbon is an excellent product for making repairs to TPOs.

He says the problem will be in refinishing the parts. The film has a very slippery acrylic fluoropolymer coating that **prevents paint from sticking to it**. The only method they have found that works is using an adhesion promoter and a high-temp bake at 250F. Visteon is working with DuPont, BASF and others to develop a lower-temp refinish technique, but as of this writing, there is no result. We are also working with Visteon and Avery Dennison to develop repair procedures. Keep an eye on your *Plastic Pointers* for more info.

TPOs – Fastest Growing Polymer in the Auto Industry

Thermoplastic olefin elastomers (TPOs) have emerged as one of the fastest growing polymers for the automotive industry. Through 2002, annual growth will average 11%.

TPO bumper fascia accounts for about two-thirds of the North American automotive TPO market. On some vehicles, the **TPO fascia covers a fourth of the vehicle exterior**. There is also growth in bumper trim in light trucks and sports utility vehicles.

At the forefront of TPO technology is new thinwall capabilities that offer a drastic weight and cost savings, faster cycle times, and improved abrasion resistance. High-flow, high flexural modulus materials permit wall thicknesses to be reduced by 33%. The 1998 Ford Windstar's bumper fascia wall thickness has been reduced to 2.4 mm, resulting in a weight savings of over 5 lb.

- excerpted from *Modern Plastics*
December 1997

Chrysler wants its cores back

According to the Auto Body Parts Association's *Body Language* magazine, Chrysler dealers have begun to levy a \$40.00 core charge on customers if they fail to return a core when they order a bumper.

The move is an apparent attempt to eliminate the supply of repairable cores to the bumper recycling industry. One recycler said, "if they can deny the aftermarket access to its core supply, they probably figure they can put a real crimp into the way we do business."

Please call us if you've had any experiences with this. We'd like to keep everyone up to speed with developments in this area.

Low Temperatures Cause Epoxy to Cure More Slowly

Winter's a good time to let you know that the cure rate of two-part adhesives varies with temperature. The colder it gets, the longer it takes for your epoxy to cure out.

To quantify this, we tested the cure times of a single batch of 2000 Flex Filler 2 at various ambient temperatures. As the table shows, the sanding time varies from 9:50 at 94F to 24 minutes at 40F.

When it's cold outside, you can speed things up by warming the tubes of epoxy with a heat gun prior to squeezing the epoxy out. This also makes the epoxy easier to mix. By heating the tubes on a 58F day, we

speeded up the sand time by almost three minutes.

Two-part adhesives form a solid through a chemical reaction which takes some time to complete. Although we advertise a sanding time of 12 to 15 minutes at 75F, it doesn't mean that the epoxy is fully cured by that point...not by a long shot. It takes about 24 hours to achieve a 100% cure at 75F.

The cure time can be accelerated by heating the epoxy with an IR lamp after it gels. It will achieve a full cure in about 2 hours at 160F. Make sure you allow the epoxy to cool down before you start sanding it.

As an aside, the chemical reaction that takes place when you mix epoxy generates heat. The greater the mass of epoxy, the more heat is generated. The more heat is generated, the faster the epoxy will cure out.

Therefore, very thin skim coats of epoxy will take longer to cure fully because they don't get the benefit of the extra heat generated from the chemical reaction taking place around it. That's all the more reason to use a heat lamp to cure or to wait 24 hours before sanding.

It's especially important to allow the epoxy to fully cure before sanding it on TPO. TPO is difficult to adhere to, so to get the best featheredge on TPO, give yourself the edge by letting the epoxy cure out 100% before sanding.

Epoxy Cure Time as a function of Ambient Temperature

Epoxy Type: 2000 Flex Filler 2

Temperature	40 F	58 F	58 F (tubes heated)	70 F	94 F
Gel Time (min.)	16:30	10:26	9:00	8:50	7:25
Sanding Time (min.)	24:00	16:30	13:45	13:00	9:50



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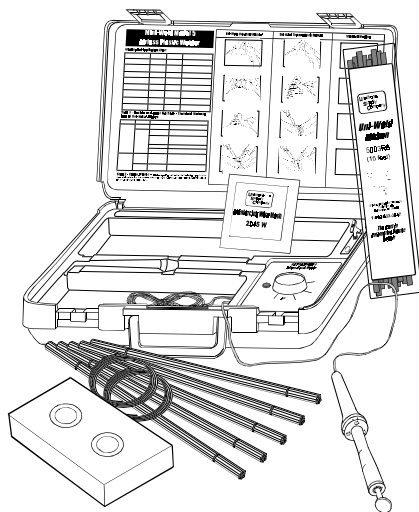
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Problem - "I keep tossing out these bumper covers with just the tiniest amount of damage. I'm sure if I could fix some of these things I could make more money."

Solution - With the new **5500HT Mini-Weld Model 5** airless plastic welder from Urethane Supply Company, you can fix virtually any type of plastic on any automobile!

- Repair TPO and polypropylene bumpers with ease with the Uni-Weld Ribbon.
- Repair underhood, interior, or industrial plastics with the complete selection of standard plastic welding rods.
- Train everybody in the shop how to repair plastics with the included instructional videotape.
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- Only \$199.95 (suggested user price)

*"I've probably made \$3,000 in the past couple of months repairing bumpers."
Jessie Reeves
Reeves Collision
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