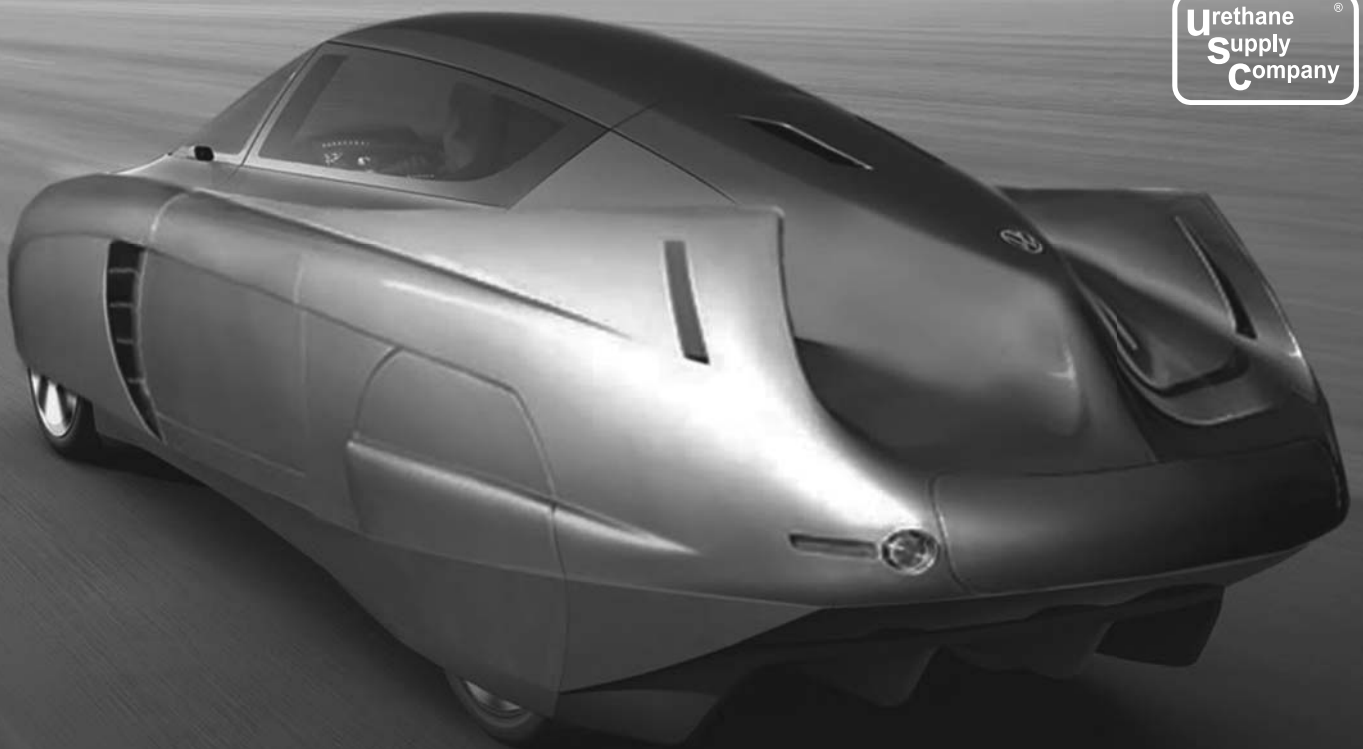


COMPLEMENTS OF



THE BOOK

OF PLASTIC REPAIR

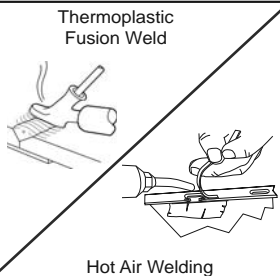
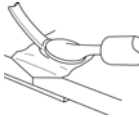

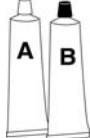


A comprehensive guide to identifying, repairing
and refinishing virtually any plastic.

Every step of the way, Urethane Supply Company has what you need!

Since 1981, Urethane Supply Company has been at the forefront of automotive plastic repair technology. We introduced the industry's first and most popular airless plastic welder back in 1983. Since then, our list of plastic repair innovations have continued to grow. In 1999, we developed Uni-Weld FiberFlex; a universal rod that eliminates the need to identify plastic while being very strong with its fiber reinforcement. In 2000, we introduced the PlastiFix Rigid Plastic Repair Kit, a revolutionary method for repairing rigid plastics like ABS and polycarbonate. In 2002 we introduced the revolutionary line of Bumper and Cladding Coat paint and in 2010 we introduced the world to welding plastic with nitrogen gas, a quantum leap in plastic repair. Through our continual quest to innovate, we have created products to make plastic repair easier, stronger and more profitable for the user, year after year!

Plastic ID Reference Chart.....	3	Hot Air Welding - bumper slot repair.....	12-13
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Preparing the Repair Area	4	Epoxy Adhesive Repair.....	15
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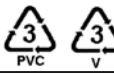

plastic repair quick reference chart

		Repair Method					
		AW-1, HA-1 Page 5 Page 11-14	AW-2 Page 6	AW-3 Page 7	EP-1 Page 15	IW-1 Page 15	PF-1 Page 16
Repair Step	1 Identify Plastic Page 3	ABS, HDPE*, LDPE*, PA-6 (nylon), PBT, PC, PP, PVC, TEO, TPE, TPO	PP, TPO, TEO, TPE, PE, or other	Thermoset Polyurethane	SMC, UP, FRP, Fiberglass	ABS, SMC, Fiberglass, PC blend	ABS, Acrylic, SMC, Fiberglass, PC blend
	2 Clean Page 4	Clean part with soap & water and Super Clean Plastic Cleaner					
	3 Repair Page 5 - 13	 <p>Thermoplastic Fusion Weld Hot Air Welding</p>	 <p>Uni-Weld FiberFlex</p>	 <p>Thermoset Urethane Weld</p>	 <p>Two-Part Epoxy Adhesive A B</p>	 <p>Insta-Weld Adhesive</p>	 <p>PlastiFix Rigid Plastic Repair Kit</p>
	4 Fill Page 12	Grind, then apply filler that matches the hardness of the substrate					
	5 Prime Page 13 -16	Prime					
	6 Paint Page 16	Apply Top Coat					

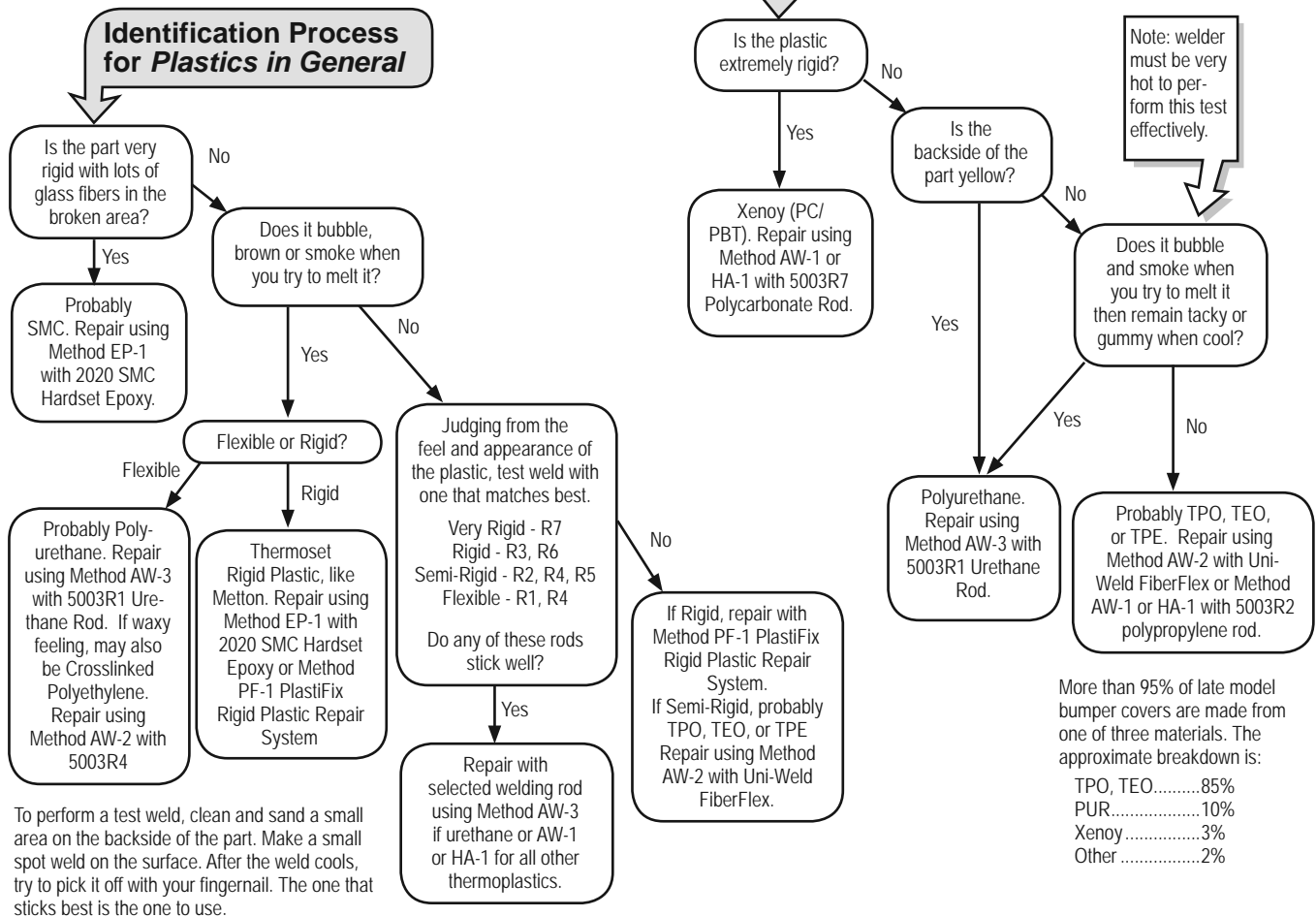
* Polyethylenes cannot be painted without special preparation. Go to www.urethanesupply.com for complete instructions.

identify plastic & determine repair method

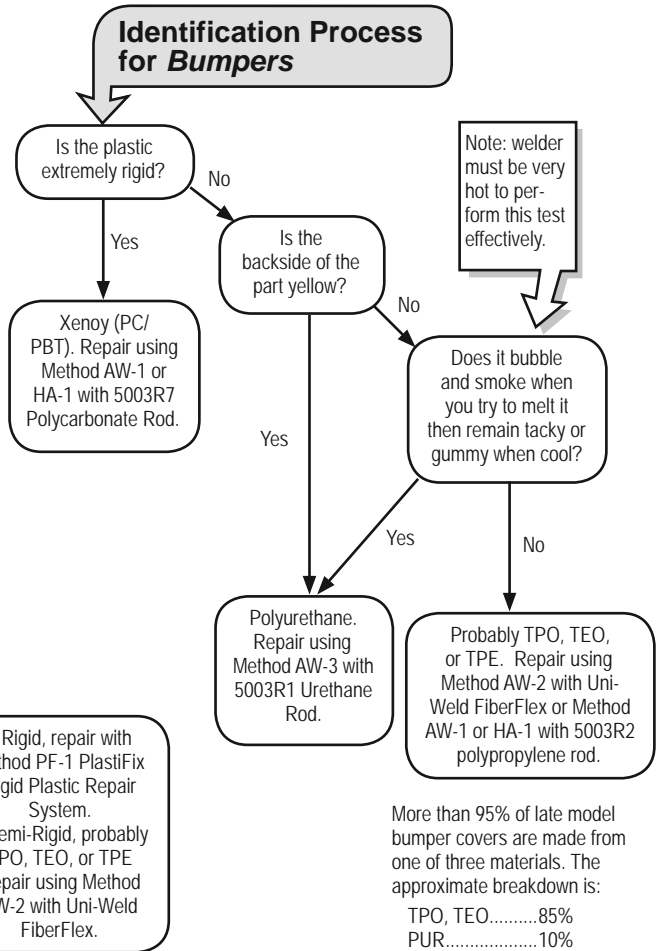
Identify the type of plastic by looking for the plastic ID symbol on the backside of the part. Match the symbol on the part with the table below. The recommended repair method is listed first. See the next page for tips when the identification symbol or abbreviation is missing.

	Recycling Symbol	Symbol & Type	Description/ How to Identify	Typical Applications	Suggested Repair Method	Repair Tips
Thermoset		PUR, RIM, RRIM Thermoset Polyurethane	Usually flexible, may be yellow or gray, bubbles & smokes when melted.	Flexible bumper covers (esp. on domestics, filler panels, rocker panel covers, snowmobile cowls.	Method AW-3 w/ urethane rod (5003R1) or Method AW-3 with Uni-Weld FiberFlex	Don't melt base material! Melt rod into v-groove like a hot melt glue.
		SMC, UP, FRP Fiberglass	Rigid, polyester matrix reinforced with glass fibers, sands finely.	Rigid body panels, fenders, hoods, deck lids, header panels, spoilers.	Method EP-1 Two-part epoxy repair with fiberglass reinforcement	Use backing plate over holes, layer in fiberglass cloth for extra strength.
		XPE, XLPE, PE-Xb, PEX, Crosslinked Polyethylene	Semi-flexible, usually semi-translucent, waxy or greasy feel, softens when heated but does not melt.	Gas tanks, kayaks, canoes, trash cans, use is declining	Method AW-2 with polyethylene rod (5003R4), or (5004 series)	Applying filler or painting is difficult or impossible. Browns when heated
		ABS Acrylonitrile Butadiene Styrene	Rigid, often white but may be molded in any color, sands finely.	Instrument panels, grilles, trim moldings, consoles, armrest supports, street bike fairings, canoes, aircraft wing tips and interiors.	Method AW-1 or HW-1 w/ ABS rod (5003R3), or Methods PF-1, IW-1, or EP-1	PlastiFix is an optimal repair method. Weld repairs may be backed with epoxy for extra strength.
		PS Polystyrene (Styrofoam)	Semi-flexible, usually expanded into foam	Packaging material, insulation, food containers, light switch plates	Method EP-1 - Two-part epoxy repair.	Very sensitive to solvents and high heat.
		PBT Polybutylene terephthalate (polyester)	Semi-rigid or rigid, sands finely.	Automotive panels, electrical connectors, under-hood parts	Method AW-1 or HW-1 with slivers cut from scrap	Crystalline type plastic. Has low coefficient of friction. Use heavy pressure and reinforce with 2045 mesh.
Thermoplastic		PA, PA-6 Polyamide (Nylon)	Semi-rigid or rigid, sands finely.	Radiator tanks, head lamp bezels, exterior trim parts, mirrors, plastic engine parts.	Method AW-1 or HW-1 w/ nylon rod (5003R6)	Preheat plastic with heat gun before welding, mix completely with base mat'l.
		PC + ABS Pulse (Polycarbonate & ABS)	Rigid, sands finely, usually dark in color.	Door skins (Saturn), instrument panels, street bike fairings.	Method AW-1 or HW-1 w/ PC rod (5003R7) or Methods PF-1, IW-1, or EP-1	Preheat plastic with heat gun before welding.
		PC + PBT Xenoy (Polycarbonate blend)	Very rigid, sands finely, usually dark in color.	Bumper covers (84-95 Ford Taurus, Aerostar, some M-B and Hyundai).	Method AW-1 or HW-1 w/ PC rod (5003R7) or Methods PF-1, IW-1, or EP-1	Preheat plastic with heat gun before welding.
		HDPE Polyethylene	Semi-flexible, melts & smears when grinding, usually semi-translucent, waxy or greasy feel.	Overflow tanks, inner fender panels, ATV fenders, RV water storage tanks, gas tanks, kayaks canoes, picnic tables, lumber	Method AW-1 or HW-1 with high density polyethylene rod (5003R12)	Applying filler or painting is impossible.
		PE/LDPE Polyethylene	Semi-flexible, melts & smears when grinding, usually semi-translucent, waxy or greasy feel.	Overflow tanks, inner fender panels, ATV fenders, RV water storage tanks, gas tanks, kayaks, canoes, trash cans	Method AW-1 or HW-1 with polyethylene rod (5003R4)	Applying filler or painting is impossible.
		PP Polypropylene	Semi-flexible, melts & smears when grinding, waxy or greasy feel, usually a bit stiffer than PEs.	Bumper covers (usually blended w/ EPDM), inner fenders, radiator shrouds, gas tanks, battery cases, pallets	Method AW-1 or HW-1 w/ PP rod or method AW-2 with Uni-Weld FiberFlex (5003R10)	Use 1060FP Filler Prep before applying two-part epoxy filler.
		PPE, PPE+PS Polyphenylene	Semi-rigid, sands finely, usually off-white or black in color.	Fenders, exterior trim, rear hatch panels.	Method AW-1 or HW-1 with slivers cut from scrap or PF-1, IW-1, or EP-1	Preheat plastic with heat gun before welding.
		PPO+PA, PPE+PA Noryl GTX (Nylon blend)	Semi-rigid, sands finely, usually off-white in color.	Fenders (Saturn & GM), exterior trim.	Method AW-1 or HW-1 with nylon rod (5003R6) or PF-1, IW-1, or EP-1	Preheat plastic with heat gun before welding.
		PVC Polyvinyl chloride	Rigid, sands finely. Usually white or gray but can be made any color	Pipe, siding, window frames, decking, gutters, speed bumps	Method AW-1 or HW-1 with (5003R9) PVC welding rod or PF-1, IW-1, or EP-1	
		TPE Thermoplastic Elastomer	Semi-flexible, usually black or gray, melts & smears when grinding.	Bumper covers, filler panels, underhood parts.	Method AW-2 with Uni-Weld FiberFlex (5003R10)	Use 1060FP Filler Prep before applying two-part epoxy filler.
		TPO, TEO, PP/EPDM, TSOP Thermoplastic Olefin	Semi-flexible, usually black or gray, melts & smears when grinding.	Bumper covers, air dams, grilles, interior parts, instrument panels, snowmobile cowls.	Method AW-1 or HW-1 w/ PP rod or method AW-2 with Uni-Weld FiberFlex (5003R10)	Use 1060FP Filler Prep before applying two-part epoxy filler.
		TPU, TPUR Thermoplastic Polyurethane	Flexible, sands finely.	Bumper covers, soft filler panels, gravel deflectors, rocker panel covers.	Method AW-1 or HW-1 w/ (5003R1) or method AW-2 with FiberFlex (5003R10)	
		PETE, PET Polyethylene Terephthalate	Flexible, strong	Soda bottles, various yarn fibers, headliners, fuse boxes, door panels	Method AW-1 or HW-1 w/ slivers cut from scrap.	Can't make as strong as original part; manufactured in crisscrossed layers and can't be duplicated

If you can't find the Plastic ID Symbol...



To perform a test weld, clean and sand a small area on the backside of the part. Make a small spot weld on the surface. After the weld cools, try to pick it off with your fingernail. The one that sticks best is the one to use.



More than 95% of late model bumper covers are made from one of three materials. The approximate breakdown is:

TPO, TEO	85%
PUR	10%
Xenoy	3%
Other	2%

preparing plastic for all repairs

Clean Surface

In order to maximize strength any repair, thoroughly clean contaminants from the surface in the damaged area.

Step 1. Clean both sides with 1020 Scuff Magic soap and water. Dry with a clean cloth or compressed air.

Step 2. Spray 1000 Super Clean Plastic Cleaner onto the surface and wipe off while wet with a clean, lint-free cloth. Wipe in one direction to avoid spreading contaminants back over the clean area.

Align Damage

If the plastic is distorted, heat with a heat gun and reshape the distorted area. When heating plastic, it is important that the plastic be heated all the way through. Hold the heat gun on the area until the opposite side of the plastic is uncomfortable to the touch. Once heated, force the plastic back into position with a block of wood or other tool, then cool the area with a damp cloth.

Thermoset polyurethanes (PUR, RIM) have a "memory" that will often cause them to go back to their original position if held under a heat lamp or in a heated spray booth.

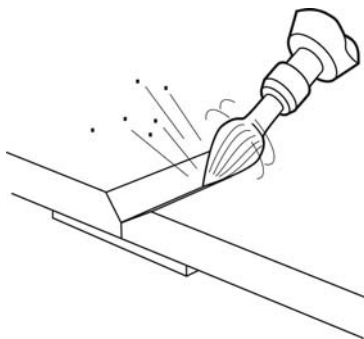
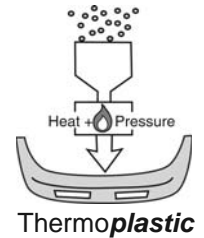
If the part is cut or torn to the edge, align the cosmetic surface with 6481 aluminum body tape and begin the repair process on the back. By aligning the outer surface, you minimize the amount of filler required to restore the proper profile to the part.

Repairing Thermoplastics with Fusion Welding

Excluding urethane bumpers, all bumpers, and nearly all other plastics on automobiles and nearly everything else made of plastic, are made of thermoplastic materials. This means they can be melted with the application of heat. Thermoplastic parts are made by melting pellets of plastic and injecting the melted material into a mold, where it cools and solidifies. This means that thermoplastic parts can be melted.

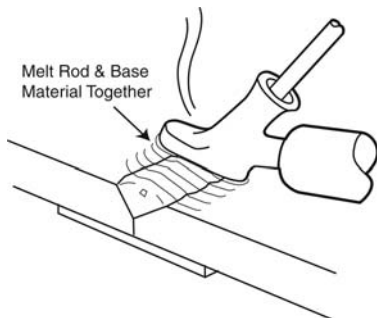
The most common thermoplastic automobile bumper material is TPO. TPO is fast becoming the most popular material for all sorts of interior and underhood plastics as well. TPOs can be welded using the fusion technique described on this page, but our FiberFlex rod often makes an easier and stronger repair on TPO (see Repair Method AW-2, Page 6).

The third most common bumper material, Xenoy, is best repaired using the following thermoplastic Fusion technique.



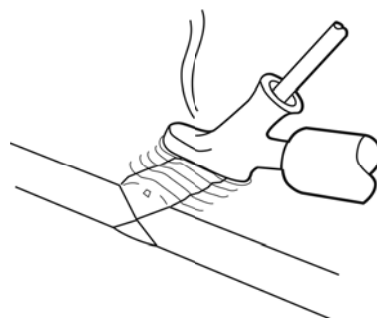
V-Groove Damaged Area

- Line up the outer surface of the tear with 6481 Aluminum Body Tape or with clamps. You can also tack the tear together with 2200 Insta-Weld 1 thin adhesive.
- V-groove halfway through the part with either the 6121-T Teardrop Cutter Bit and a rotary tool or the sharp edge of the plastic welding tip.
- Remove the paint in the area surrounding the v-groove and radius into the v-groove with coarse sandpaper.



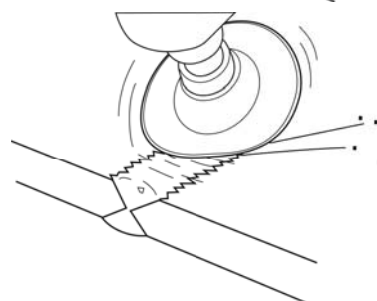
Melt the Rod Together with the Base Material

- Set the temperature setting of your airless plastic welder to the setting that's appropriate for the welding rod you selected in the identification process. In most cases, the welding rod should melt cleanly and not be discolored (the only exception would be nylon, where the rod should turn a light brown).
- Lay the welder tip on the surface of the plastic and slowly melt the rod into the v-groove. Pull the welder toward you so you can see the welding rod fill the v-groove as you make your pass.
- Lay down no more than 2 inches of welding rod into the v-groove at a time. Remove the rod from the welder tip, and before the melted rod has time to cool down, go back over it with the hot welder tip and thoroughly melt the rod together with the base material. It helps to press into the plastic with the edge of the welder tip to mix the materials, then go back and smooth it out. Keep the heat on it until you have a good mix between the rod and base.



V-Groove and Weld Opposite Side

- After the weld on the backside cools, repeat the v-grooving and welding process on the opposite side.



Grind Weld to a Smooth Contour

- If you need to refinish the plastic, grind weld to a smooth contour with coarse sandpaper. Grind the weld slightly flush so that filler can cover the welded area completely. Follow instructions for filler application. (Page 17)

Repairing with Uni-Weld FiberFlex Universal Rod

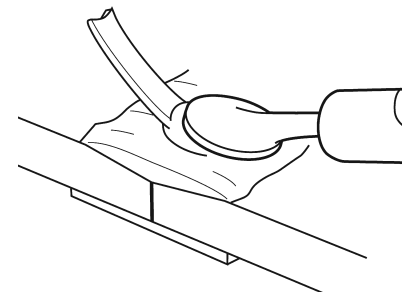
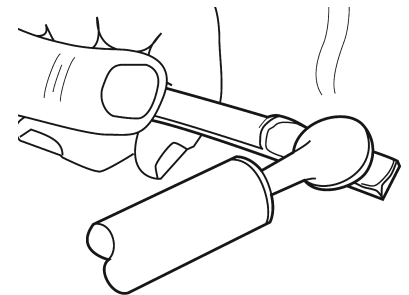
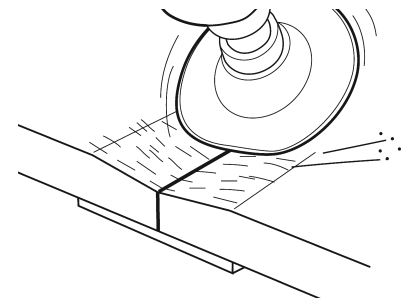
Uni-Weld FiberFlex is a unique repair material in that it sticks to any plastic substrate. It is not a true welding rod, but rather a thermoplastic or hot-melt adhesive. When you do a repair with the FiberFlex, you will actually be using the heat of the welder to apply an adhesive. FiberFlex has a very strong bond and is reinforced with carbon and glass fibers for outstanding strength.

FiberFlex is the best way to repair TPOs (aka TEO, PP/EPDM, TSOP), the most common automotive bumper material. The reason is that there are no two TPOs that are exactly alike. As a result, our 5003R5 TPO welding rod will not match any TPO exactly. The FiberFlex, with its fiber reinforcement, actually makes a stronger repair than the true welding rod. Therefore, you'll find the FiberFlex to be the easiest and best way to repair TPOs.

The FiberFlex can also be used to repair virtually any plastic. It will stick to urethanes and Xenoy also. When you are not sure what type of plastic you are repairing, try the FiberFlex.

V-Groove Damaged Area

- Line up the outer surface of the tear with 6481 Aluminum Body Tape or with clamps. You may also tack the tear together with 2200 Insta-Weld 1 thin adhesive, however, instant adhesives don't stick well to TPO.
- Grind away plastic into the shape of a broad V-groove halfway through the backside of the part using a die grinder with either the 6122 or 6122NF Heavy Duty Round Burr or the 6134-R Round Cutter Bit. You'll want the v-groove to be about 1-1/2 inches wide when you get done.
- It is very important to put some "tooth" in the plastic by grinding the v-groove with 50 grit or coarser sandpaper. Use a low speed grinder. Grinding at high speed will tend to melt many thermoplastics.
- Using 80 grit in a DA sander, remove the paint in the area around the v-groove and radius smoothly into the v-groove. This will give you a better featheredge when you get ready to sand the FiberFlex.



Melt on the FiberFlex

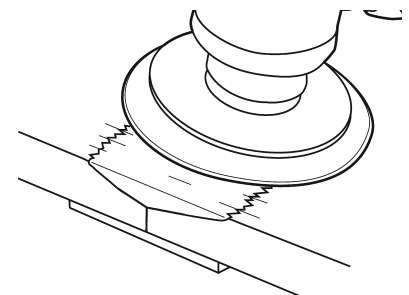
- With the airless welder set to the highest temperature setting, use the 6028RT Round Tip to melt the 5003R10 FiberFlex welding rod onto the surface. Best adhesion is achieved by premelting one side of the end of the rod, then flipping the rod over so that the melted portion sticks to the plastic. Cut the melted part of the ribbon off using the edge of the welder tip and spread the FiberFlex into the v-groove. Do not attempt to melt the base material together with the FiberFlex. Repairing with Fiber-Flex is similar to a brazing process.
- You may also apply the 5003R11 FiberFlex Round Rod with the 6030 Speed Welding Tip for faster application.

V-Groove and Weld Opposite Side

- After the FiberFlex on the backside cools (you may force cool with water), repeat the v-grooving and welding process on the opposite side. Build the FiberFlex slightly higher than the surface. FiberFlex is also a sandable filler.

Finish Sand

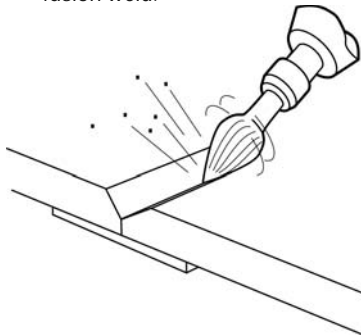
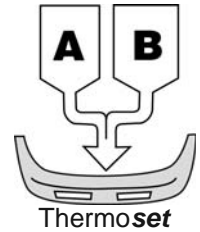
- After allowing the FiberFlex to cool completely, sand with 80 grit paper in a DA sander at low speed. Progress to finer grits, ending with 320 grit.
- Fill any low spots with more FiberFlex or with a skim coat of 2000 Flex Filler 2 or 2020 SMC Hardset epoxy filler.



Repairing Thermoset Urethanes

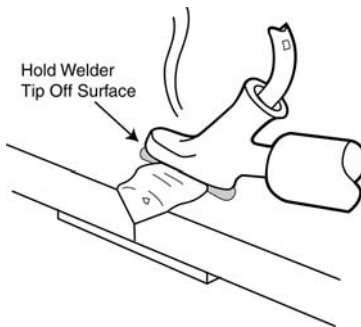
Automotive urethane, or PUR, is a “thermoset” material. Similar to what happens when mixing body filler and cream hardener, thermoset plastic is formed when two liquid chemicals come together in the mold to form a solid. The importance of this is that if polyurethane is “melted” the plastic decomposes and prevents adhesion of repair materials. **AVOID MELTING URETHANE BUMPERS WITH THE WELDER!**

A positive way to identify urethane bumpers is to press a HOT welding tip into the backside of the bumper. If it's a urethane, the plastic will liquefy, bubble and smoke. (note: welder must be extremely hot for this to happen). After the heated area cools off, it will remain gummy or tacky. This is an indication that the heat broke down the chemicals in the plastic. Thermoset urethanes can be easily repaired with the airless plastic welder, but the repair will be more like brazing rather than a true fusion weld.



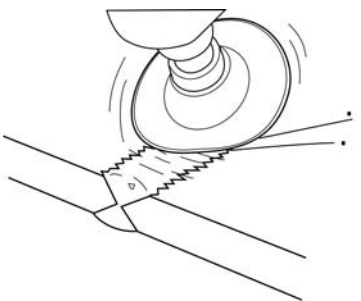
V-Groove Damaged Area

- Line up the outer surface of the tear with 6481 Aluminum Body Tape or with clamps. You can also tack the tear together with 2200 Insta-Weld 1 thin adhesive.
- V-groove halfway through the back side of the part with the 6121-T Teardrop Cutter Bit. You cannot use a hot tool to melt the v-groove into urethane because it will decompose.
- Sand the v-groove with coarse sandpaper (80 grit or coarser) to put “tooth” into the plastic. Also, remove the paint in the area surrounding the v-groove and radius the edges of the v-groove for extra strength.



Melt the Rod into the V-Groove

- Turn the temperature setting of your airless plastic welder to the “clear” or “R1” rod position. Using the 5003R1 Polyurethane welding rod, the rod should come out of the bottom of the welder's shoe completely melted and clear, not discolored or bubbling.
- Holding the welder's tip slightly off the surface of the plastic, melt the rod into the v-groove. Don't overheat the base material, simply melt the rod onto the surface. Again, you are NOT trying to melt the rod and the bumper together; the bumper material is NOT meltable!
- Lay down no more than 2 inches of welding rod into the v-groove at a time. Remove the rod from the welder tip, and before the melted rod has time to cool down, go back over it with the hot welder tip and smooth out the weld, being careful not to overheat the base material.

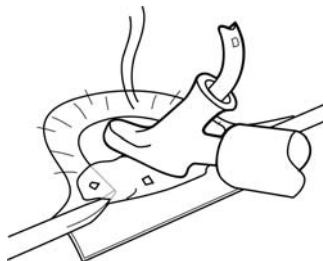


V-Groove and Weld Opposite Side

- After the weld on the back side cools, repeat the V-groove and welding process on the cosmetic side. V-groove deep enough to penetrate the welding rod on the back side.

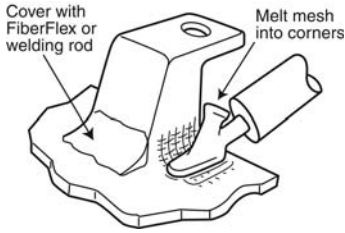
Grind Weld to a Smooth Contour

- Using coarse sandpaper, grind the weld to a smooth contour. The urethane welding rod will not feather very well, so it will need to be covered with 2000 Flex-Filler 2 epoxy filler to refinish completely. Grind the weld slightly below flush so that filler can cover the welded area completely. Follow instructions for filler application. (Page 17)



Repairing Torn Bolt Holes on Urethanes

- Taper the plastic all around the hole down to a point on both sides using a Roloc disc.
- Use 6481 Aluminum Body Tape to create a bridge across the torn mounting hole. Melt 5003R1 urethane welding rod into the area. Drill out hole when finished.

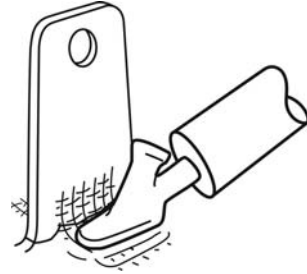


• Repairing Flexible Tabs on TEO Plastics

Many TEO bumpers have mounting tabs that have to flex during installation. These can be repaired very durably with the mesh and FiberFlex. First, rough grind the area with a coarse Roloc disc.

Cut 2045W Stainless Steel Wire Mesh to size to fit in the corner areas on both sides of the tab. Using the hot welder tip, bury the mesh directly into the plastic. After you've melted the mesh into the plastic, scuff the melted plastic with coarse sandpaper to remove the gloss.

Melt on a thin layer of FiberFlex over the mesh just to cover. In this repair, the mesh provides the strength and flexibility while the FiberFlex just gives a cosmetic covering.



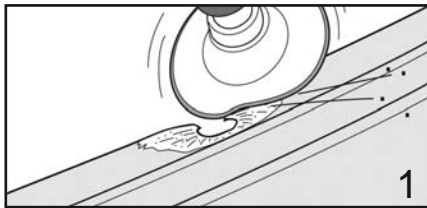
• Repairing Torn Tabs

Rough grind the area surrounding the crack with a coarse Roloc disc.

Cut 2045W Stainless Steel Wire Mesh to size to fit in the corner areas. Using the hot welder tip, bury the mesh directly into the plastic. (This won't work on urethane parts since they don't melt. See Page 7). After you've melted the mesh into the plastic, scuff the melted plastic with coarse sandpaper to remove the gloss.

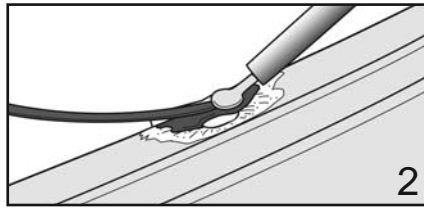
Melt either the FiberFlex or the matching standard plastic rod over the mesh. If using the standard rod, keep the heat on the plastic to make sure the rod melts thoroughly with the base material. Keep adding more rod to make a bigger fillet and increase strength.

• Repairing Torn Bolt Holes in TPO with FiberFlex



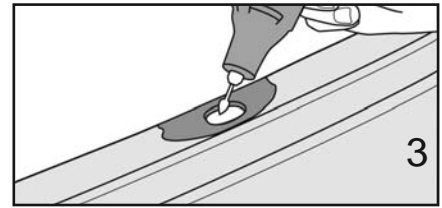
Taper both side of plastic to a point with a coarse Roloc disc. Grind and taper around the edges of the entire bolt hole. Taper back about 1 inch on all sides. Remove paint and radius into taper with 80 grit in a DA.

Apply 6481 Aluminum Tape across the gap to support the melted rod while it's hot.



Melt 2045W Stainless Steel Reinforcing Mesh into the plastic across the gap if desired for extra strength. This step is often not necessary because FiberFlex is blended with glass fibers for strength.

Apply FiberFlex to area using the instructions on Page 6. After cooling, remove aluminum tape and repeat on opposite side.



Allow FiberFlex to cool completely. Open the hole with a die grinder or drill bit, then sand with 80 grit in a DA at low speed to finish the repair.

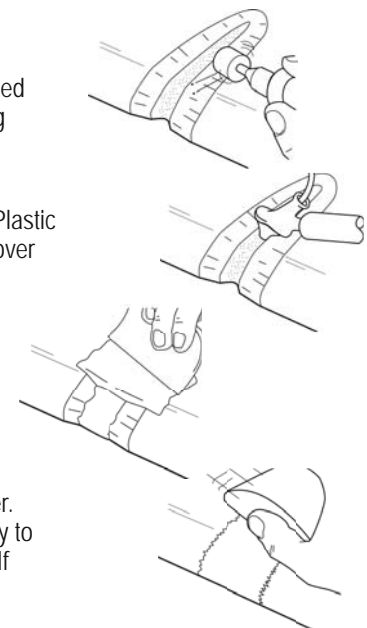
• Padded Dash Repair

Clean the damaged area with 1000 Super Clean Plastic Cleaner. Bevel the edges of the area to be welded with a drum sander on an electric die grinder and open up a cavity at least 1/4" deep in the foam backing and vinyl cover. Sand and bevel the vinyl cover around the cavity to allow for featheredging of filler.

Using the 5003R1 Urethane Welding Rod, start your weld at the bottom of the cavity using your Airless Plastic Welder. Fill the cavity up with melted plastic and spread it out so that it overlaps the edges of the vinyl cover about 1/4".

After allowing the weld area to cool, grind the weld area smooth with a drum sander. Rough up the surrounding area to improve adhesion of the filler. Mix 2050-9 Padded Dash Filler and apply with plastic squeegee. Cover an area larger than the weld in order to feather out the repair to a smooth contour.

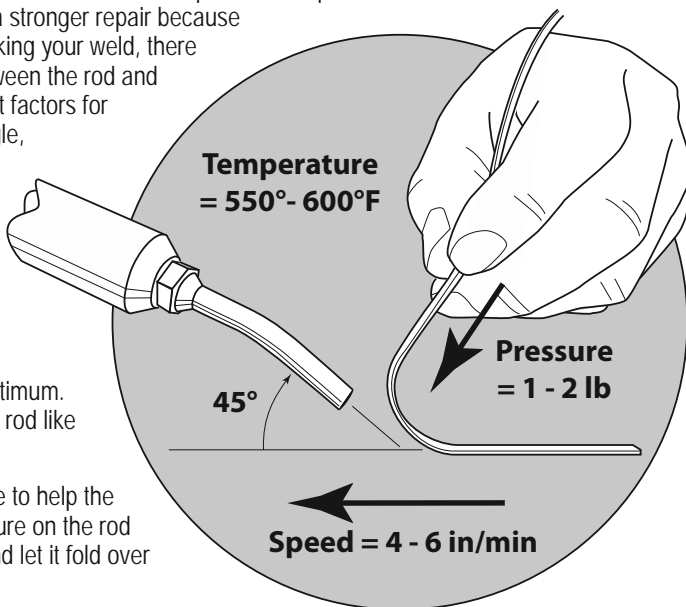
Allow the filler to cure at least 15 minutes, then sand to a smooth contour. Finish sand with 220 grit paper. Retexture the panel with 3803 Flextex VT texture material according to directions on Page 17. Do not try to spot retexture. Retexture and blend the leading edge or most visible area of the pad all the way across. If there is a noticeable difference in texture, retexture the entire pad.



Basic hot air welding process

Welding with hot air involves the coordination of both hands, one controlling the torch and the other feeding the rod. When you weld, you just want to melt the bottom surface of the rod and the top of the bumper. You don't "puddle" the rod like you do in metal welding. This makes for a stronger repair because it leaves the basic structure of the rod intact. When you're making your weld, there will be a small bead of melted plastic at the junction point between the rod and bumper as you make your pass. Remember the four important factors for plastic welding: "T.A.P.S.", an acronym for Temperature, Angle, Pressure, and Speed.

- For **temperature**, set the temperature on the hot air welder's dial to the proper setting. For example, the PP/TPO setting will generate an air flow of about 550°-600°F. This can be adjusted up or down for various thicknesses of plastic, but this is a good starting point.
- An **angle** of 45° between the torch and the bumper is optimum. Aim the stream of hot air a little in front of the rod; for thick rod like the R16, focus the heat back toward the rod.
- Put as much downward **pressure** on the rod as possible to help the rod fuse with the bumper. Keep a steady downward pressure on the rod and keep the rod moving slowly. Don't overheat the rod and let it fold over backwards.
- The **speed** of your weld should be about 4 to 6 inches per minute. With thin rod like the R13, it's difficult to go this slow. With thick rod like the R16, it may go even slower. The important thing is to move steadily while keeping proper downward pressure on the rod and a small bead of melted plastic in front of the rod.



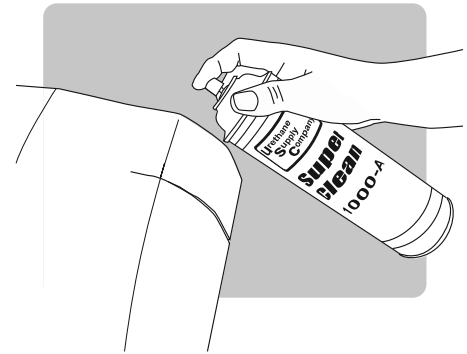
Common Automotive Thermoplastics & Typical Applications

Plastic Symbol & Type	Typical Applications	Welding Rod
ABS	instrument panels, grilles, trim moldings, street bike fairings	ABS (R3)
PA - Polyamide, Nylon	radiator tanks, mirrors, door handles, plastic engine parts	PA (R6)
PC - Polycarbonate	headlight lenses and housings	PC (R7)
PC + ABS blend	door skins, street bike fairings, instrument panels	PC (R7) or ABS (R3)
PC + PBT blend (Xenoy)	bumper covers (older Ford, M-B, BMW)	PC (R7)
PBT	Polybutylene terephthalate	PBT
PE - Polyethylene	over-flow tanks, windshield washer bottles, ATV & dirt bike fenders, water storage tanks, kayaks & canoes	PE (R4, R18, R19, R20, R21)
PP, PP/EPDM, TPO, TEO, TSOP - Polypropylene Blends	bumper covers, side cladding & trim, filler panels, under-hood parts, interior parts, snowmobile cowls	PP (R2, R5, R13, R14, R15, R16, R17)
PPO + PA blend (Noryl GTX)	fenders (GM), exterior trim	PA (R6)
PVC - Polyvinyl Chloride	pipe, siding, window frames, gutters, trim	PVC (R9)

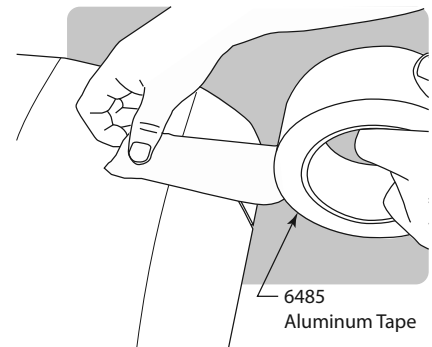
Repairing a cracked bumper

Let's assume you have a cracked PP/TPO bumper. This section will take you through the whole process—cleaning, prepping, and welding. This describes the basic repair technique that can be adapted to other speciality repairs on tabs and mounting holes.

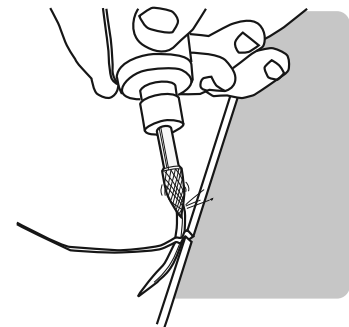
- a. **Clean the bumper before you grind it.** Before you touch the bumper with sandpaper or a die grinder, make sure it's clean first. It's difficult enough to get adhesion to TPO—don't make things more difficult by not cleaning it first. First, clean the entire bumper by washing with 1047 Scuff Magic soap using a red scuff pad to spread the soap and scuff the plastic. This will put small sanding scratches into the bumper to help further improve adhesion. Rinse the soap off and allow the bumper to dry. Once dry, clean the bumper with Urethane Supply 1000 Super Clean plastic cleaner or 1030 Eco-Solv. This will remove all solvent-soluble contaminants like silicone, wax, mold release agents, etc. Spray on in a heavy, wet coat, let it sit on the surface for a few seconds, then wipe dry with a clean paper towel before it evaporates. Don't just soak a rag and wipe it around—that only moves the contamination around on the surface and does not remove it.
- b. **Align the Outer (Cosmetic) surface.** Often the plastic has been stretched or distorted in the damaged area. Before you weld, get the crack aligned as closely as possible. If the plastic is dented or stretched, heat with a heat gun and push the plastic back into position. Once the plastic pieces are lined up, use Urethane Supply's 6481-1 or 6485 aluminium tape on the outer (cosmetic) surface. It's best to line up the outer surface to minimize the need for filler and weld the backside of the crack first.
- c. **Prep the backside of the crack.** If there's any paint over-spray on the backside, remove it first by sanding with 80 or 180 grit sandpaper. Also lightly sand the area the welding rod will be applied to with 80-180 grit paper. Welding flat on the back with a deeper v-groove on the front will help create a stronger repair.
- d. **V-groove perpendicular to the crack.** Once the front is aligned and secured with tape, cut a curved v-groove on across the crack about 1/4" from the edge of the bumper and about 1-1/2" long. This is to allow you to weld a reinforcing stitch across the crack to help stabilize the crack and help prevent it from tearing in the future.
- e. **Weld across the crack.** Using 5003R2 polypropylene rod, weld a stitch across the crack to make the repair more tear resistant and to help keep the rest of the repair aligned for the next step.



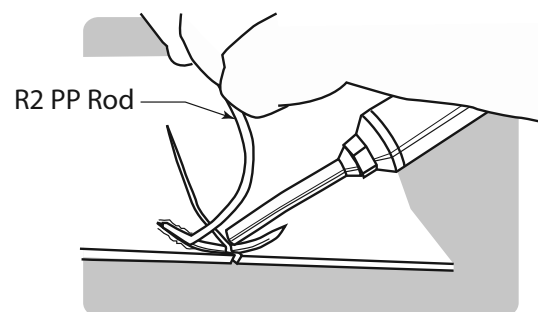
Step a - Cleaning the plastic with 1000-A Super Clean plastic cleaner



Step b - Aligning the cosmetic outer surface with aluminum tape



Step d - V-grooving across the crack.



Step e - Weld across the crack

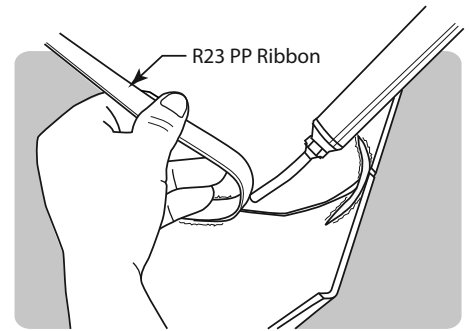
- f. **Weld the backside of the crack.** For maximum strength, it is best to use a polypropylene ribbon style rod (like R23) on the backside. Ribbon style rods offer more surface area and/or thicker stock for greater strength. To do the weld, start by focusing the heat of the welder about 1/2" past the crack on a solid part of the bumper. The plastic will start to turn glossy. At this point, push the end of the ribbon rod down into the plastic and bending it toward the welder as you work your way down the crack.

- g. **Weld a "Tee".** Upon completing the weld down the crack, it is advisable to make another cross stitch weld at the end of the crack. This will further reinforce the repair, making it even stronger.

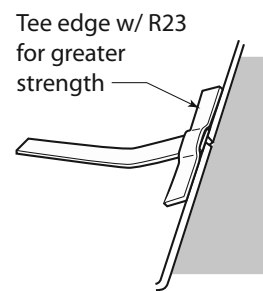
- h. **Prep the front side for welding.** After the backside is cool, peel the aluminum tape off the front side. Using a 6121-T cutter bit in a rotary tool, grind out a v-groove down the crack in the plastic about 1/16" to 3/32" deep. Sand off the paint immediately adjacent to the v-groove.

- i. **Weld the front side of the crack.** On the front, it's usually best to use the 5003R2 rod in order to minimize the cosmetic repair. This will tuck down into the v-groove and retain most of its strength even after it's been sanded flush. Use the same process as on the backside to weld it. However, the R2 will melt and bend much more easily since it's smaller. It's best to focus the heat from the welder a little farther in front of the point where the rod meets the bumper to keep the rod from becoming too soft. You need to apply about a pound of downward pressure on the rod as you do your weld to make sure the rod fuses properly with the bumper.

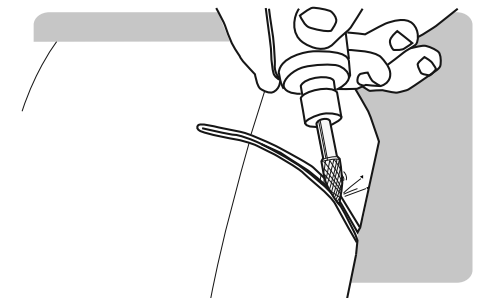
- j. **Finishing the weld.** Once the weld is completely cool, sand with 50-80 grit paper in a grinder or DA. Be careful not to sand too fast; this will just melt and smear the plastic. It's best to use a sharp, new piece of paper and slow the sander down a bit to keep the plastic from melting. Sometimes the repair may be finished out and feathered with the welding rod, but most often you're going to need some filler to fill in the low spots. Please read the section in this book for more information on how to apply filler on plastic parts. (page 18)



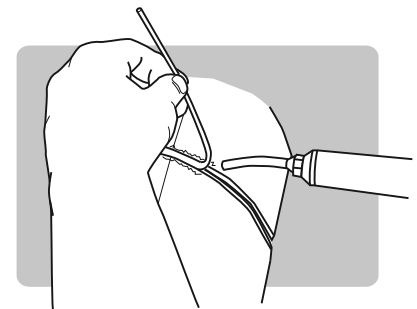
Step f - Welding the backside of the crack with Polypropylene ribbon



Step g - Weld a "tee" across the crack.



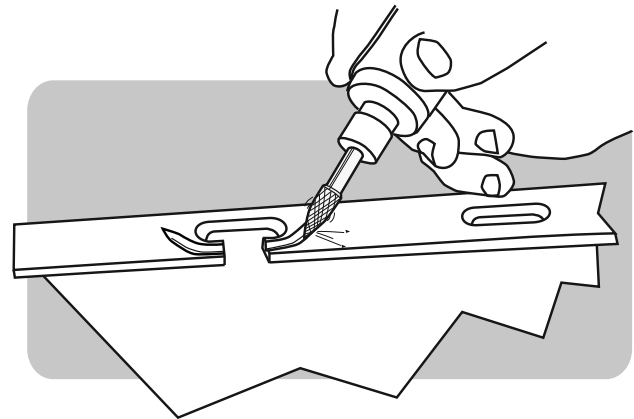
Step h - Preparing the front side for welding by grinding a v-groove



Step i - Welding the front side of the crack with 5003R2 polypropylene rod.

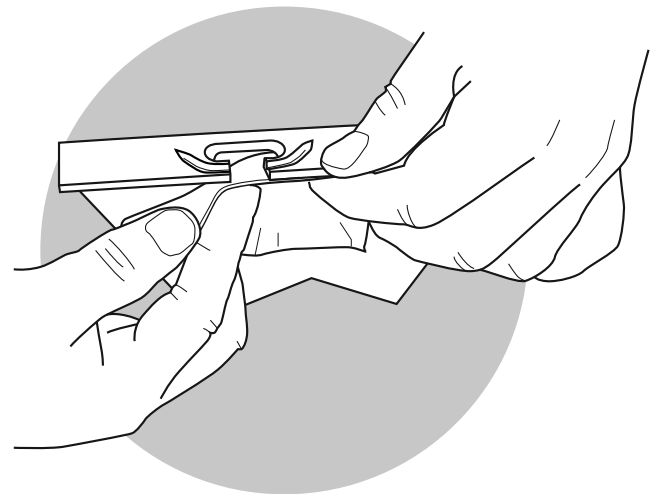
Welding a broken bumper slot

Because of the strength provided by the nitrogen welding system, you can make strong repairs even when you don't have a lot of surface area to weld to. A perfect example is the slots on the edge of the bumper where the bumper snaps into the quarter panel, like on a Honda bumper. These often seem to break out when the bumper is removed. There's not enough surface area to make a good repair with either a two-part system or with the FiberFlex. Here's how you fix a torn-out bumper slot.

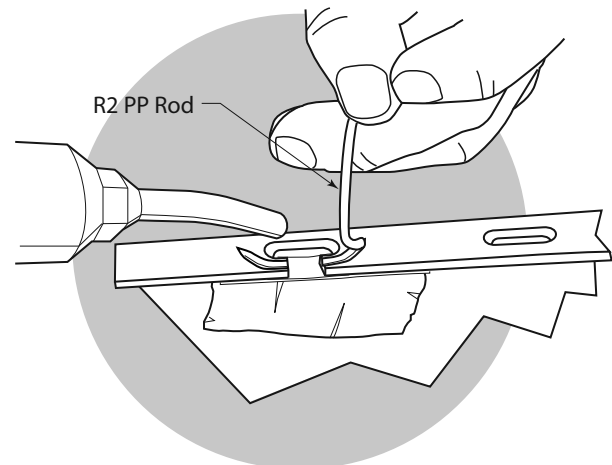


Step b - V-groove the part.

- a. **Clean the plastic first.** Do this every time BEFORE you touch it with sandpaper. Clean the plastic with soap and water first, then with 1000 Super Clean plastic cleaner.
- b. **V-groove the slot.** Cut an arced v-groove into the bumper using a 6121-T tear drop cutter bit and a rotary tool. Cut the v-groove so it extends at least 1/2" on both sides of the gap. Using 50 to 80 grit sandpaper, remove paint from the area to be welded.
- c. **Apply tape to support rod during weld.** Use the 6481-1 or 6485 aluminum body tape underneath the hole to support the melted plastic welding rod. You can also clamp a strip of sheet metal or wood along the edge if that works better. Make sure the edge of the support is at the edge of the plastic so it doesn't interfere with the clamp and leave room between the clamps to use the hand seamer as described in Step F.
- d. **Weld across the gap.** Use 5003R2 or 5003R2W polypropylene welding rod. Starting on one side, preheat the bumper about 1/2 inch past the slot using the nitrogen until it starts to turn glossy. Stab the end of the rod down into the plastic and start laying it down as shown. Span across the gap and pick up the process on the other side. Cut off the rod on the other side with the hot welding tip.

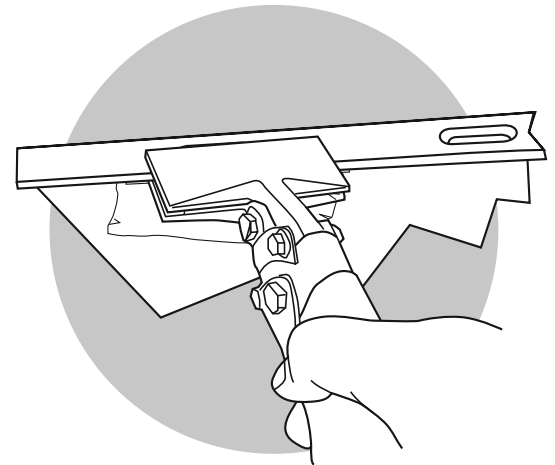


Step c - Applying aluminum tape to support the melted welding rod. You can also clamp a wooden stick underneath to provide extra support.

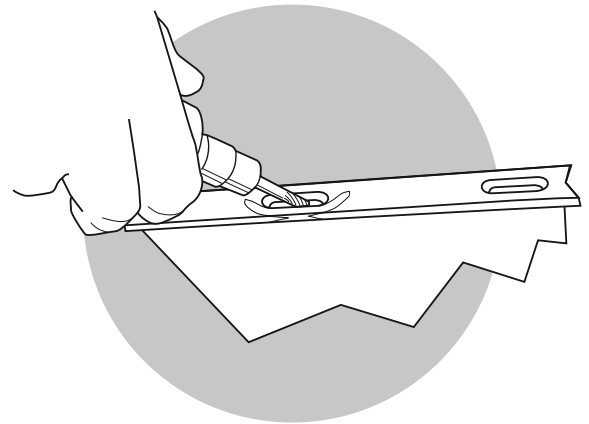


Step d - Bridge the gap with welding rod.

- f. **Heat until rod turns clear then compress with a hand seamer.** If you're using our white polypropylene rod, you can see that it turns clear when it gets to the proper melting temperature. Heat up the ribbon you just laid down with the nitrogen welder until it all turns clear. (If you're using the black rod, heat it until it all turns glossy black). Immediately use the 6145 hand seamer to firmly press the melted ribbon down into the plastic. This also aligns the repaired section with the rest of the bumper. If necessary, weld another pass to build up the plastic's thickness.
- g. **Restore slot dimensions.** Let the weld cool and remove the tape or metal support. Restore the original slot dimensions using either a rotary tool with a 6120 or 6123 straight burr, an airless plastic welder, or a utility knife. This is easier to do when using the white rod as you can see the underlying plastic's original profile.
- h. **Weld opposite side.** Repeat the welding process on the opposite side. Usually the tape or metal support is not needed, but it can make the process easier. After welding, press the repaired area flat and straight again using the hand seamer.
- i. **Restore slot dimensions and finish repair.** After letting the weld cool, restore the final dimensions of the slot and bumper edge using a rotary tool, airless welder, or knife. Finish sand the outer surface with 180 then 320 grit paper to prepare it for paint.



Step f - Pressing the hot plastic flat with the 6145 hand seamer.

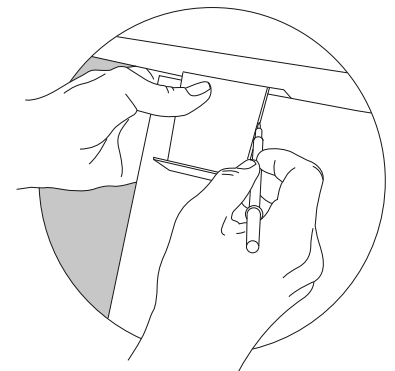


Step i - Restoring slot dimensions with a rotary tool and finishing the repair

Recreating a tab with a "living hinge"

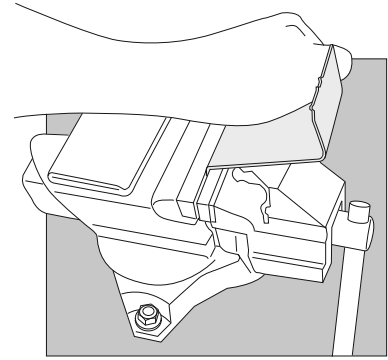
Many times you'll see bumpers that have a flexible tab, usually at the bottom of the bumper. These tabs have a "living hinge", which is a thin line in the plastic where it naturally wants to flex. These living hinges are very weak and are easy to tear. You can't repair it at the hinge line because it won't be flexible there anymore. To do this, you need to recreate the tab using our polypropylene sheet using the following method.

- a. **Trace out the tab in the polypropylene sheet.** If you have the old tab, lay it down on the 5010 polypropylene sheet and trace the edges and any holes with a Sharpie. Put a dotted line where the hinge line is supposed to be. Then create a notch back into the bumper about 1/2" deep and extend the tab about 1/2" on each side of the tab. Cut the tab out of the PP sheet with a jigsaw, and drill out the mounting hole.

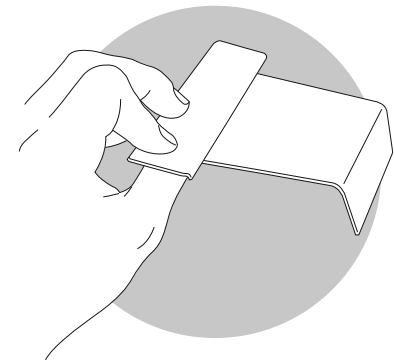


Step a - Tracing out the shape of the tab on the 5010 PP sheet

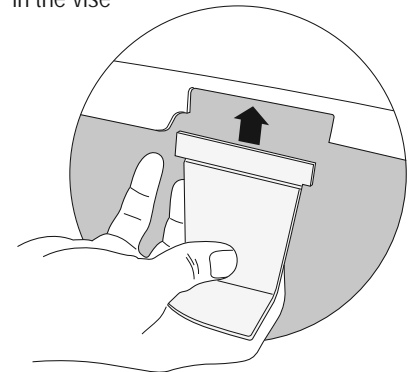
- b. **Create hinge line.** To create the hinge line, put the tab in a vise and fold it back and forth several times along the dotted line you drew on the tab. Take it out of the vise, then fold it over double a few times to make it more limber. This is flexible and much stronger than the original bumper's hinge. If there's a hook or fold in the tab, you can create it by folding it in the vise one time.
- c. **Notch back the bumper.** Place the new tab in position on the bumper and mark the cut line on the bumper with a Sharpie. Cut out the notch with a jigsaw.
- d. **Prep the bumper** by removing paint and applying sanding scratches the bumper on the backside.
- e. **Tape the tab in position** using 6481-1 or 6485 aluminum tape on the outer surface.
- f. **Weld the backside of the tab** using R23 rod. Start by focusing the stream of hot nitrogen about 1/2" beyond the tab until the bumper turns glossy. Stab the rod down and start making your pass using the same technique as described earlier.
- g. **Prep the outer surface** by grinding a shallow v-groove about 3/8" wide along the seam. Feather back paint and put down some sand scratches with 80 grit in a DA. Blow dust free.
- h. **Weld the front side of the bumper** with R23 rod. Lay one strip down along the long seam, then weld each end and wrap the welding rod around the edge. If you have an airless welder, you can melt and burnish everything down and make it easier to sand flush.
- i. **Let cool and finish the repair** by sanding smooth with 80 grit in a DA. Use filler if necessary to fill out any low spots, then sand with 180 and 320 grit to prepare for primer.



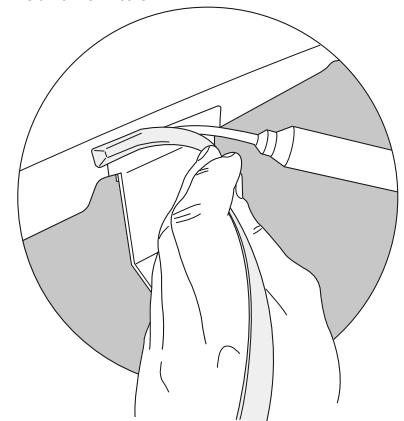
Step b - Create hinge line by bending back-and-forth in a vise



Step b - Create angles by bending once in the vise



Step c - Notch back into the bumper to mount new tab



Step f, h - Weld the tab into place using R13 or R14 rod

Repairing Plastics with Epoxy Based Adhesives

- a. Sand the backside of the area to be repaired with 50 grit sand paper or coarser and v-groove away from tear. The deeper and wider the v-groove is, the stronger the repair will be.* Remove paint in the surrounding area and radius into the v-groove with 80 grit in a DA. Heavy grooving of the plastic is desirable to maximize the mechanical strength of the bond. Afterward, sand lightly with 80 grit for finer grooving which will further improve adhesion.

* If repairing SMC by laminating another SMC panel to back of the panel, no V-groove is required, but thorough sanding is.
- b. If the material is TEO, TPO or PP, you must apply 1060FP Filler Prep Adhesion Promoter. Brush onto the sanded area and allow to flash off.
- d. Choose a two-part epoxy adhesive system to match the hardness of the substrate. Use 2020 Hardset Filler for rigid plastics, like SMC, fiberglass, ABS and others. For flexible plastics like urethane, use 2000 Flex Filler.
- e. Apply glass cloth over the damaged area, overlapping both sides of the damaged area by at least 2". If part is SMC, cut a backing panel from a scrap piece of SMC to laminate to the back of the panel being repaired. Make sure the backing panel extends at least 2" beyond damage in all directions.
- f. Mix epoxy adhesive in equal parts, then saturate the fiberglass on the backside of the repair. Build up the epoxy slightly higher than the surface to allow for sanding. Allow 20 minutes to cure before handling. On SMC, apply a bead of 2020 SMC Hardset Filler to the backing panel and press into place. Allow epoxy at least 20 minutes to cure before handling. If no backing panel is used, layer pieces of 2043-U Uni-Cloth fiberglass cloth into the v-groove between coats of epoxy. Use a saturation roller if necessary to fully saturate the cloth with epoxy.
- g. Contour and smooth the surface with 80 and 180 grit paper if needed.

repair method IW-1: Insta-Weld repair

Repairing Plastics with Insta-Weld Adhesives

Our line of Insta-Weld adhesives are specially formulated to provide maximum adhesion on a wide variety of common automotive plastics. Because Insta-Weld forms rigid bonds, it works best with rigid plastics like ABS, polycarbonate, and SMC. It may also be used to tack parts together while performing a welding or PlastiFix adhesive repair.

Fixing Cracks Quickly

- a. Prior to assembling parts, lightly spray area to be bonded with 2303 Insta-Weld Activator.
- b. Assemble and align parts. Use clamps or 6481 Aluminum Body Tape to hold parts together while bonding.
- c. Apply a small amount of 2200 Insta-Weld 1 thin adhesive to the joint or crack. Optimum results are obtained with the minimum quantity of adhesive needed to fill the joint. The adhesive is thin enough to allow it to be wicked down into the crack. Use 2250 Insta-Weld 2 thick gap-filling adhesive for parts that do not fit together perfectly.
- d. Spray on additional 2303 Activator to complete the cure. Additional Activator and Insta-Weld 2 may be applied to fill any small remaining gaps.

Filling Gaps, Holes, and Gouges

- a. Use 6481 Aluminum Body Tape as a back-up under the gap or hole.
- b. Rough sand and v-groove area around the gap or hole and blow dust free.
- c. Spray a light coat of 2303 Activator in and around hole and allow to flash off.
- d. Fill hole with 2300 Weld Compound and saturate with a few drops of 2200-1 Thin Insta-Weld 1. Smooth and saturate the Weld Compound with Insta-Weld using a disposable tool if desired. Wait 5 or 10 seconds and apply another light coat of 2303 Activator. The repair may be sanded, drilled or put into use immediately.

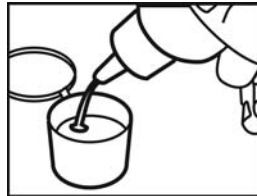
Repairing Plastics with PlastiFix® Rigid Plastic Repair Kit

The PlastiFix® Rigid Plastic Repair Kit is a revolutionary plastic repair system that allows you to repair cracks, fill gaps, rebuild tabs, and fix stripped threads. The most unique feature of the PlastiFix® Rigid Plastic Repair Kit is the FlexMold flexible molding bar. The FlexMold bar allows you to replace a broken tab by forming a mold from an undamaged piece, then casting your new part using the PlastiFix acrylic adhesive system. This system is *ideal* for ABS, acrylic, polycarbonate and other hard plastics, however it does not work on olefinic plastics like PE, PP, or TEO.

Kit Components:



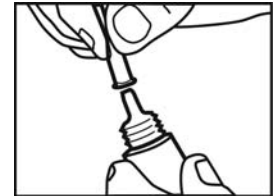
Getting Ready



Dispense powder into cup.

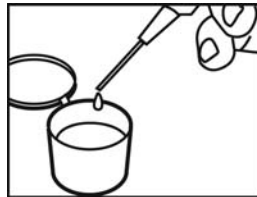


Use pipet to dispense liquid into the dropper bottle.

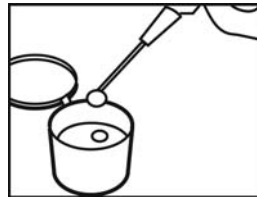


Insert dropper tip into bottle and place applicator needle onto dropper tip.

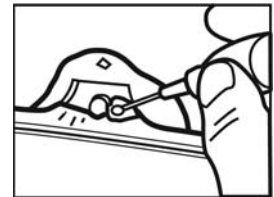
Application



Squeeze one drop of liquid into powder.



Pick up liquid/powder mix with tip of needle.

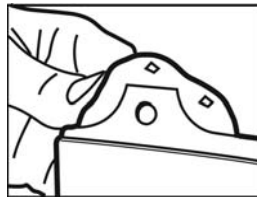


Squeeze bottle to apply liquid/powder mix to repair area.

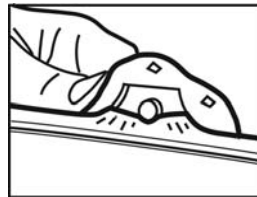
FlexMold Molding Bar Use



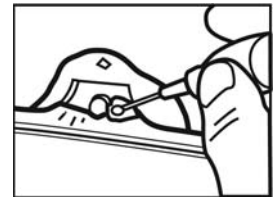
Place FlexMold bar in very hot water until it softens.



Shape FlexMold bar over pattern. Caution! Very hot!

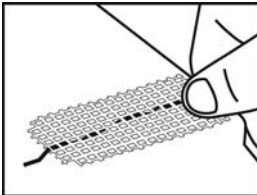


When FlexMold bar cools, position in repair area.

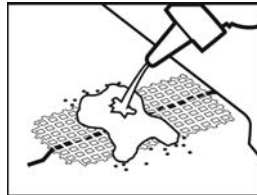


Fill mold with PlastiFix powder/liquid mix, allow to cure 30 min., remove mold.

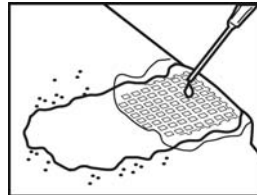
Reinforcing



Cut fiberglass cloth to cover damage on backside.



Cover fiberglass cloth with thin layer of PlastiFix powder.

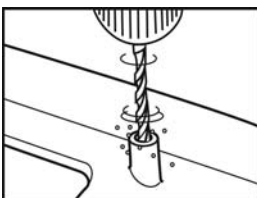


Saturate powder with PlastiFix liquid.

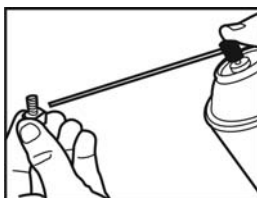


Cover with plastic sheet, press to shape, allow to cure.

Repairing Threads



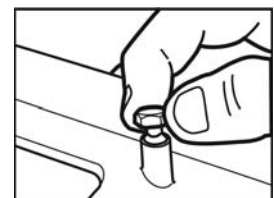
Drill or file threads from hole.



Apply lubricant to screw threads.



Apply PlastiFix powder/liquid mixture to screw threads.



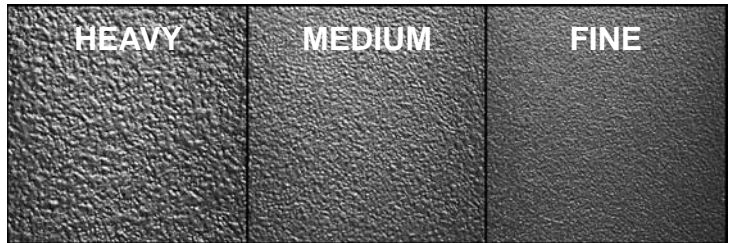
While adhesive is wet, insert into hole.



Using 3803 Flextex VT

Flextex VT is a tough, durable variable texture material formulated to simulate textured automotive plastics and metal. It can be used over or under most finishes and may be top-coated with Bumper and Cladding Coat paint, base/clear or single stage systems. Flextex VT has excellent durability and may be used as the finish coat where black texture is needed.

Textures Shown Actual Size



Texturing Reference: Use a test panel for determining the textured desired. Paint with no reducer and low air pressure at the gun will produce the coarsest texture. For finer textures, reduce the paint with lacquer thinner up to 100%.

Heavy Texture: Spray Flextex VT straight from the can using a 1.8 mm Spray gun and low air pressure.

Medium Texture: Reduce Flextex VT by adding thinner 25% by volume and spray using moderate air pressure.

Fine Texture: Reduce Flextex VT by adding thinner 50% by volume and spray using a higher air pressure.

Smooth Texture: Reduce Flextex VT by adding thinner 100% by volume and spray at the optimal air pressure for the gun used to produce a smooth finish.

- a. Clean surface to be textured with 1020 Scuff Magic Prep Soap and water. Rinse thoroughly and wipe dry with a clean cloth or towel.
- b. Spray on a heavy wet coat of 1000 Super Clean Plastic Cleaner or 1030 Eco-Solv over a 1 - 2 square foot area. Wipe dry with a clean cloth.
- c. Sand surface with 180-240 grit sand paper to remove gloss. Blow dust free with clean, dry air.
- d. For raw unpainted TPO, PP, or TEO, spray one light coat of 1050 Plastic Magic adhesion promoter. Allow to dry. For other raw plastics, adhesion promoter is optional. (Will not work on polyethylene.)
- e. To build texture, apply 3 to 5 light coats allowing flash time between coats. Reduce fluid flow at gun for light coats. Let dry 30 minutes if light coats are applied and 2 to 3 hours for heavier applications before topcoating. Flextex VT can be topcoated at any time after the minimum dry time.
- f. After Flextex VT has completely dried, (if desired) topcoat with a light coat of Bumper and Cladding Coat followed by one or two more wet coats. If another type of topcoat is needed, use a lacquer compatible top coat system.
- g. Clean spray gun immediately after use with lacquer thinner.

applying epoxy filler

- a. Grind area to be filled with coarse sandpaper. Slightly v-groove away from the damaged area. All gloss on the surface should be removed to maximize filler adhesion.
- b. If the material is a polyolefin (PP, TEO, or TPO), apply 1060FP Filler Prep Adhesion Promoter.
- c. Choose a two-part epoxy filler system to match the hardness of the substrate. Use 2020 Hardset Filler for rigid plastics, like SMC, fiberglass, ABS and others. For flexible plastics like urethane, PP, TEO, and TPO use 2000 Flex Filler.
- d. Mix epoxy adhesive in equal parts and apply with a body spreader. Build up slightly higher than the surface to allow for sanding. Allow at least 20 minutes to cure before sanding. Contour and smooth the surface with 80 and 180 grit paper. Finish sand and apply a high build primer surfacer.

Types of Bumpers

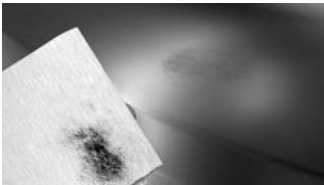
New Replacement Bumpers

Repaired Bumpers

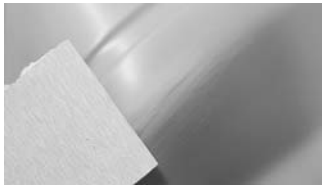
RAW TPO Bumpers



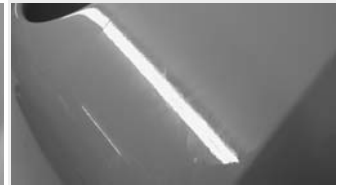
OEM Primed Bumpers



RAW PUR Bumpers



OEM Painted Bumpers



Identify Bumper

Toyota, Nissan, Kia and Subaru are usually raw, unprimed TPO. ID symbol is PP, PP/EPDM, TSOP, TPO, TEO, or TPE. Usually black with dull finish, sometimes non-uniform in appearance, may have tacky mold release agent on surface. When sanded lightly with 400 grit sandpaper, virtually no dust is produced.

Domestic bumpers (GM, Ford, Chrysler) usually have OEM primer. Color is usually black with high sheen and uniform appearance. Occasionally gray. Sanding the surface lightly with 400 grit sandpaper will produce fine dust. The color or appearance of the painted side is different or if overspray is visible on the inside of the bumper. NOTE: Sometimes the inside is primed also.

May be PUR if Toyota or Lexus with light gray color. All yellow plastic bumpers are PUR. ID symbol is PUR. When lightly sanded with 400 grit sandpaper will produce virtually no dust.

High Gloss. Color matches body color. Base material different color than top coat.

3611, 3612, 3601, or 3602
Bumper & Cladding Coat Adhesion Primer

3050, 3051, or 3052
ALL SEASONS Waterborne Sealer

3050, 3051, or 3052
ALL SEASONS Waterborne Sealer

3043 Black Jack ALL SEASONS Waterborne Primer Surfacer
3041 E-Z Sand ALL SEASONS Light Gray Waterborne Primer Surfacer
3042 E-Z Sand ALL SEASONS Black Waterborne Primer Surfacer

Product Selection



Surface Preparation

Clean entire surface to be primed with 1000 Super Clean Plastic Cleaner or 1030 Eco-Solv. Spray heavy, wet coat over a 1 to 2 square foot area, wipe dry with a clean cloth, exposing clean surface to plastic with each wipe.

Repeat until the entire surface has been cleaned.

NOTE: Scuff or sanding is not required!

Clean with 1000 Super Clean Plastic Cleaner or 1030 Eco-Solv. Scuff entire bumper with 1020 Scuff Magic Prep Soap and a red scuff pad.

Rinse with clean water.

Allow to Dry.

Clean entire surface to be primed with 1000 Super Clean Plastic Cleaner or 1030 Eco-Solv. Spray heavy, wet coat over a 1 to 2 square foot area, wipe dry with a clean cloth, exposing clean surface to plastic with each wipe.

Repeat until the entire surface has been cleaned.

Clean Bumper with 1020 Scuff Magic Prep Soap and a gray scuff pad.

Allow to Dry.

Clean Bumper with 1020 Scuff Magic Prep Soap and a gray scuff pad.

Allow to Dry.

Clean entire surface to be primed with 1000 Super Clean Plastic Cleaner or 1030 Eco-Solv. Spray heavy, wet coat over a 1 to 2 square foot area, wipe dry with a clean cloth, exposing the clean face of the cloth to the plastic with each wipe. Repeat until the entire surface has been cleaned.

Sand overall with 320 grit sandpaper. Blow dust free. Remove remaining dust with a tack cloth.

New Replacement Bumpers

Repaired Bumpers

Paint Preparation

Catalyst Mix Ratio

Paint Gun

Application

Dry Time

RAW TPO Bumpers

Shake or stir Bumper and Cladding Coat. Pour appropriate amount into gun to meet job requirements.

Base coat gun with a 0.8 mm to 1.3 mm nozzle.

Apply one light coat. Immediately apply second light coat if needed to hide thin areas. If second full coat is desired, allow Bumper and Cladding Coat to flash off before applying second full coat. Flash time varies depending on temperature and humidity. Flash time is usually between 5 and 10 minutes.

Allow at least 60 minutes dry time at room temperature or 15 minutes at 130°F. Dry time will vary depending on temperature and humidity. Bumper and Cladding Coat must be completely dry before topcoating. Any unused paint may be returned to the can for future use.

OEM Primed Bumpers

Stir ALL SEASONS Waterborne Sealer, do not shake. Mix the appropriate shade of ALL SEASONS Waterborne Sealer using the 3050, 3051, and 3052 toners. If using the optional catalyst, catalyze only the amount of sealer needed for immediate use. Once catalyzed, pot life is about 8 hours.

If desired, mix 3104 catalyst with ALL SEASONS Waterborne Sealer 4% to 6% by weight. For example, if you are using 100 grams of sealer add 4 to 6 grams of 3104 catalyst. If no scale is available, then mix 4 to 6 teaspoons of catalyst per pint of ALL SEASONS SEALER. Mix thoroughly. Do not shake. Use as soon as possible. If thinning is required, up to 5% by volume of water may be added to optimize viscosity.

Base coat gun with a 1.3 mm to 1.5 mm nozzle.

Apply one medium coat. If needed, apply second coat to hide thin areas. Allow sealer to flash off between coats. Flash time varies depending on temperature and humidity. Flash time is usually between 10 and 30 minutes.

Allow to dry completely at room temperature or allow to flash off then force dry at 180°F for 20 minutes or 30 minutes at 120°F. Dry time will vary depending on temperature and humidity. ALL SEASONS Waterborne Sealer must be completely dry before topcoating. The crosslinking process takes six hours at room temperature or one hour at 120°F. Because drying and crosslinking are independent processes, ALL SEASONS Waterborne Sealer may be topcoated before crosslinking is complete as long as it is completely dry.

RAW PUR Bumpers

Stir ALL SEASONS Waterborne Sealer, do not shake. Mix the appropriate shade of ALL SEASONS Waterborne Sealer using the 3050, 3051, and 3052 toners. If using the optional catalyst, catalyze only the amount of sealer needed for immediate use. Once catalyzed, pot life is about 8 hours.

If desired, mix 3104 catalyst with ALL SEASONS Waterborne Sealer 4% to 6% by weight. For example, if you are using 100 grams of sealer add 4 to 6 grams of 3104 catalyst. If no scale is available, then mix 4 to 6 teaspoons of catalyst per pint of ALL SEASONS. Mix thoroughly. Do not shake. Use as soon as possible. If thinning is required, up to 5% by volume of water may be added to optimize viscosity.

Base coat gun with a 1.3 mm to 1.5 mm nozzle.

Apply one medium coat. If needed, apply second coat to hide thin areas. Allow sealer to flash off between coats. Flash time varies depending on temperature and humidity. Flash time is usually between 10 and 30 minutes.

Allow to dry completely at room temperature or allow to flash off then force dry at 180°F for 20 minutes or 30 minutes at 120°F. Dry time will vary depending on temperature and humidity. ALL SEASONS Waterborne Sealer must be completely dry before topcoating. The crosslinking process takes six hours at room temperature or one hour at 120°F. Because drying and crosslinking are independent processes, ALL SEASONS Waterborne Sealer may be topcoated before crosslinking is complete as long as it is completely dry.

OEM Painted Bumpers

Stir waterborne primers, do not shake. If desired, ALL SEASONS primers may be thinned with water up to 5% by volume to optimize spray viscosity. If using the optional catalyst, catalyze only the amount of sealer needed for immediate use. Once catalyzed, pot life is about 8 hours.

If desired, mix 3104 catalyst with ALL SEASONS Waterborne primers 4% to 6% by weight. For example, if you are using 100 grams of sealer add 4 to 6 grams of 3104 catalyst. If no scale is available, then mix 4 to 6 teaspoons of catalyst per pint of ALL SEASONS. Mix thoroughly. Do not shake. Use as soon as possible. If thinning is required, up to 5% by volume of water may be added to optimize viscosity.

Base coat gun with a 1.3 mm to 1.5 mm nozzle for smoother finish or a primer gun with a 1.8 mm to 2.0 mm nozzle for high build.

Apply one medium coat. If additional coats are needed, allow primer to flash off before applying additional coats, sand between coats. Flash time varies depending on temperature and humidity. Flash time is usually between 10 and 30 minutes.

Allow at least 30 minutes dry time at room temperature or 15 minutes at 120°F before dry sanding. ALL SEASONS primers may be wet or dry sanded after 6 hours dry time at room temperature or after 60 minutes at 120°F. Dry time will vary depending on temperature and humidity. ALL SEASONS primers must be completely dry before topcoating. The crosslinking process takes six hours at room temperature or one hour at 120°F. Because drying and crosslinking are independent processes, primer may be topcoated before crosslinking is complete as long as it is completely dry.

New Replacement Bumpers

Repaired Bumpers

Top Coat

RAW TPO Bumpers

No sanding required before applying topcoat. Although sanding Bumper and Cladding Coat Adhesion Primer is not recommended, trapped debris may be removed with very light sanding using 600 grit paper. Apply any approved Base/Clear system according to the manufacturer's instructions. Topcoating window does not close. Bumper and Cladding Coat Adhesion Primer may be topcoated at any time once fully dry.

OEM Primed Bumpers

No sanding required before applying the topcoat. If required, surface may be lightly scuffed or sanded to achieve desired smoothness. If sanded, blow or wipe dust off surface before applying topcoat. Apply any Base/Clear or single stage topcoat system according to the manufacturer's instructions. Topcoating window does not close. ALL SEASONS Waterborne Sealer may be topcoated at any time once fully dry.

RAW PUR Bumpers

No sanding required before applying the topcoat. If required, surface may be lightly scuffed or sanded to achieve desired smoothness. If sanded, blow or wipe dust off surface before applying topcoat. Apply any Base/Clear or single stage topcoat system according to the manufacturer's instructions. Topcoating window does not close. ALL SEASONS Waterborne Sealer may be topcoated at any time once fully dry.

OEM Painted Bumpers

Finish sand with 400 to 600 grit sand paper. Apply any sealer, Base/Clear or single stage topcoat system according to the manufacturer's instructions.

more information about plastic repair

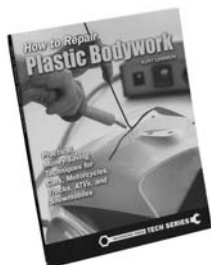


Website - If you've got an internet connection, you're a keystroke away from a wealth of information about plastic repair on our website. We have tons of instructional videos, the latest edition of The Book of Automotive Plastic Repair, MSDS's, and many other resources.

DVD - This fast-paced, professionally-produced 50 minute dvd on plastic repair is the best in the industry. Train your whole crew in less than an hour and start making profits with plastic repair!



Book - "How to Repair Plastic Bodywork" is the worlds most comprehensive publication printed related to plastic repair. Owing this book will not only teach you how to perform virtually any plastic repair, but it also explains why. You'll find this to be a truly valuable addition to your library.



Technical Support - Free technical support from our friendly staff is available at our toll free number. We'll be happy to help you identify a type of plastic, the best repair procedure, or help you to solve any problem you might be having with plastic repair. Give us a call, we will help!

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