

MANUAL B6 PLASTIC WELDING SYSTEM

Using the B6 PLASTIC WELDING SYSTEM

WARNING: Portable electric heating devices of the plastic welding type present certain inherent hazards.



The temperatures necessary for their normal use are high enough to cause fire if they are left in contact with or near combustible materials.

During normal operation the heating element, welding tip and plastic materials are hot enough to cause severe burns even at the lowest possible temperature setting.

Never use near flammable liquids or vapors.



Electric shock hazard: Do not use in or near water. Do not immerse in water. Do not use if wet.



Do not use if cord, switch, or heating element are damaged. Never attempt servicing the welder while plugged in.

During operation, use in a well ventilated area. Use a properly fitted organic vapors respirator to prevent inhalation of vapors. WARNING: This tool must be placed on its stand when not in use.

Introduction:

Before you begin:

Place "L" shaped metal welder stand on work bench with the "V" notch up. Lay heating element in the stand so the element does not touch any surrounding surface. Plug power cord into the control unit. Make sure switch is in the off position, turning the knob counter-clockwise until it stops. Plug unit into a power supply that matches the voltage ratings of your welder. Turn the welder to the maximum temperature setting. The heating element may smoke at this initial start-up as it burns off the preservative oils on the elements components. It may take several minutes for all the oils to burn off. This is normal. Turn the temperature setting to the desired range for the material you are welding. You are now ready to weld!

Changing the Welding Tip:

While cold, unscrew the existing tip out of the heating element. Screw desired tip into the threaded end of the unit until snug. Do not over tighten! Over tightening will make tip removal difficult or impossible. Do not retighten tip while hot, unless it is excessively loose. Tightening while hot will make removing the tip difficult or impossible.

If tip becomes fused into the element and the element is equipped with a removable adapter, the adapter can be removed by loosening the set-screw on the side of the element barrel. Additional adapters are available if desired. Note: if your element does not have a set screw, it has a non-removable threaded insert.

Cleaning the Welding Tip:

Immediately after welding, use the wire brush to remove as much plastic from the tip as possible. Keeping the tip clean will ensure cleaner welds and help reduce the amount of smoke produced after the welding process is complete.

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Plastic Identification Reference Chart

The easiest way to identify the type of plastic you're working with is to look for the plastic ID symbol on the backside of the part. Simply match the symbol on the part with the table below and look at the suggested repair method, listed in order of preference. See "The Book of Plastic Repair" for tips when you can't identify the plastic based on this chart or find the plastic ID symbol.

	Recycling Symbol	Symbol & Type	How to Identify	Typical Applications	Repair Method
Thermoset		PUR, RIM, RRIM Thermoset Polyurethane	Usually flexible, may be yellow or gray, bubbles & smokes when melted.	Flexible bumper covers, filler panels, rocker panel covers, snowmobile cowls.	A or C
		SMC, UP, FRP Fiberglass	Rigid, polyester matrix reinforced with glass fibers, sands finely.	Rigid body panels, fenders, hoods, deck lids, header panels, spoilers.	NA Adhesives Only
		XPE, XLPE, PE-Xb, PEX, Crosslinked Polyethylene	Usually semi-translucent, waxy or greasy feel, softens when heated but does not melt.	Gas tanks, kayaks, canoes, trash cans, use is declining	с
	ABS	ABS Acrylonitrile Butadi- ene Styrene	Rigid, often white but may be molded in any color, sands finely.	Auto interior panels, grilles, street bike fair- ings, canoes, aircraft interiors and wing tips.	В
	< € ₽	PS Polystyrene (Styrofoam)	Semi-flexible, usually expanded into foam	Packaging material, insulation, food containers, light switch plates	NA Adhesives Only
		PA Polyamide (Nylon)	Semi-rigid or rigid, sands finely.	Radiator tanks, head lamp bezels, exterior trim parts, mirrors, plastic engine parts.	В
		PC + ABS Pulse, PC + PBT Xenoy, (Polycar- bonate blend)	Rigid, sands finely, usually dark in color.	Door skins, instrument panels, street bike fairings, bumper covers	В
	ADPE HDPE	HDPE Polyethylene	Semi-flexible, melts & smears when grinding, usually semi-translucent, waxy or greasy feel.	All types of tanks, inner fenders, ATV fenders, kayaks canoes, picnic tables, lumber	В
		PE/LDPE Polyethylene	Semi-flexible, melts & smears when grinding, usually semi-translucent, waxy or greasy feel.	All types of tanks, inner fender panels, ATV fenders, kayaks, canoes, trash cans	в
	<5 ₽P	PP Polypropylene	Semi-flexible, melts & smears when grinding, waxy or greasy feel, usu- ally a bit stiffer than PEs.	Bumper covers, inner fenders, radiator shrouds, gas tanks, battery cases, pallets	B or C
		PPO + PA Noryl GTX (Nylon blend)	Semi-rigid, sands finely, usually off-white in color.	Fenders, exterior trim.	В
olastic		PVC Polyvinyl chloride	Rigid, sands finely. Usually white or gray but can be made any color	Pipe, siding, window frames, decking, gutters, speed bumps	В
Thermop		TPE Thermoplastic Elastomer	Semi-flexible, usually black or gray, melts & smears when grinding.	Bumper covers, filler panels, underhood parts.	С
		TPO, TEO, PP/EPDM, TSOP Thermoplastic Olefin	Semi-flexible, usually black or gray, melts & smears when grinding.	Bumper covers, air dams, grilles, interior parts, snowmobile cowls.	C or B
		TPU, TPUR Thermoplastic Polyurethane	Flexible, sands finely.	Bumper covers, soft filler panels, gravel deflectors, rocker panel covers.	B or C
		PETE, PET Polyethylene Terephthalate	Flexible, strong does not weld well	Soda bottles, various yarn fibers, headlin- ers, fuse boxes, door panels	В

Repair Method A: Thermoset Urethanes

Automotive urethane, or PUR, is a "thermoset" material. Like epoxy type plastics, thermoset urethane is formed when two liquid chemicals come together to form a solid. Therefore, you cannot melt urethane ______ bumpers with the welder.



The easiest way to identify thermoset urethane is to press the heated tip of the welder into the plastic. If it is thermoset urethane, it will liquefy, bubble and smoke (note: welder must be extremely hot for this to happen). Upon cooling, the "melted area" will remain tacky.

V-Groove Damaged Area

- Line up the outer surface of the tear with 40900 Aluminum Backing Tape.
- Using a die grinder, V-groove halfway through the backside of the part with a 40800 Garbide grinding tip or equivalent.
- Sand the v-groove with coarse sandpaper (80 grit or coarser) to put some extra "tooth" in the plastic. Also remove the paint in the area surrounding the v-groove and radius into the v-groove for extra strength.



Melt the Rod into the V-Groove

- Set the temperature setting of your airless plastic welder to the "clear" or "R1" rod setting. Using the 40208 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 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. Don't overheat the base material.

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

 Using coarse sandpaper, grind weld to a smooth contour. The urethane welding rod will not feather very well, so it will need to be covered with epoxy filler to refinish completely.

Grind the weld slightly flush so that filler can cover the welded area completely.

Repair Method B: Fusion Welding

Outside of urethane, all other bumpers, and most other plastics on automobiles, are made from thermop<u>lastic</u> materials. This means they can be melted with the application of heat. Thermoplastic parts are made by melting pellets of plastic and squirting the melted material into a mold, where it cools and resolidifies. This means that thermoplastic parts can be melted.



V-Groove Damaged Area

- Line up the outer surface of the tear with 40900 Aluminum Backing Tape.
- Using a die grinder, V-groove halfway through the backside of the part with a 40800 Garbide grinding tip or equivalent.
- 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 vgroove. 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 (5 cm) of welding rod into the vgroove 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.

Repair Method C: FiberFlex Rod

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 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 the most common automotive bumper material, TPO (aka TEO, PP/EPDM, TSOP).

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

V-Groove Damaged Area

- Line up the outer surface of the tear with 40900 Aluminum Backing Tape
- Using a die grinder, remove plastic in the shape of a broad V-groove halfway through the backside of the part with a round cutter bit or equivalent.



The v-groove should be about 3 to 4 cm wide when finished.

- 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.
- With 80 grit paper in a DA sander, feather the paint into the area around the v-groove and radius the edges of the v-groove smoothly.

Melt on the FiberFlex

With the airless welder set to the highest temperature setting, use the 40210 Round Tip to melt the 40209 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 EiberFlex. Repairing with Fiber-Flex is similar to a brazing process.



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.



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