

Plastic And Composite Repair

Objectives Worksheet



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PLA03-STHO01-E

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***Module 1 - Plastic
Identification And
Repair
Considerations***

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Identifying Plastics

Common Plastics

Bumper covers are commonly made from _____ (PP) and thermoplastic polyolefin (TPO).

Reinforced Reaction Injection Molding (RRIM)

A RRIM part can be repaired using plastic repair adhesives or by _____ repairs, even though it is a thermoset part.

ISO Codes

An ISO code is a standard set of letter codes that identify the type and _____ of plastic.

ISO Code Locations

An ISO code is molded into the _____ of the part in an unseen area.

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Module 2 - Adhesive Bumper Repair

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Adhesive Repair Definitions

Backing (Reinforcement) Material

Backing (reinforcement) material should be used on any _____ - _____ repair, especially when it is in an area that can flex.

Fillers

Fillers used for plastic repairs have good sanding characteristics. While some of the product makers have a separate two-part filler for the front side, others use the same plastic repair adhesive on the backside. Flexible plastic polyester fillers are used only to fill minor scratches or gouges on plastics. Do not use _____ body fillers or metal polyester glazes on plastics, as they were not designed for use on plastic parts. They also lack the correct flexibility needed on plastics.

Dual Cartridge Precautions

When using a dual cartridge product, always level plungers before each use. Next, install the static mixer and dispense a bead of product through the static mixer _____ application of the product.

Adhesion Promoters

Adhesion promoters or surface modifiers, if recommended, are applied _____ the surface has been sanded, but before any plastic repair adhesives or fillers are applied. Some materials have adhesion promoters built into the product, so no additional adhesion promoter is necessary. It is important to read the instructions for the product that is being used.

Never use a _____ maker's adhesion promoter instead of a product maker's adhesion promoter as they are made to create adhesion for different materials.

Two-Sided Repair

Two-Sided Repair Precautions

It is important to make sure there is no _____ in the repair area, including any paint overspray on the backside of the repair. The plastic repair adhesives are designed to stick to plastic, not paint. Also, paint overspray forms a weak bond to the part making it a major problem for good adhesion.

Starting A Two-Sided Repair

It is necessary to temporarily align the front side of the repair and hold it together with _____ tape, body tape, or cyanoacrylate.

Backside Repair Taper

Any melted or _____ plastic from the grinding procedure must be sanded until there is no shiny plastic left. This is done because the plastic repair material will not stick to shiny melted plastic.

Pinning Process

When using the pinning method it is important to keep all of the holes within the repair taper. The holes should all be evenly spaced about _____ When using the pinning method it is important to keep all of the holes _____ the repair taper. The holes should all be evenly spaced about $\frac{1}{4}$ - $\frac{1}{2}$ " apart.

Applying Adhesion Promoter / Surface Modifier

If a heavy coat of adhesion promoter / surface modifier is applied, it may _____ adhesion problems. The adhesion promoter should make the plastic look dull and not glossy. Also do not intermix an adhesion promoter from another plastic repair system, as some are made for urethane materials while others are made for epoxy materials.

***Module 3 - Fiber
Reinforced Plastic
(FRP) Repair***

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FRP Definitions

Sheet-Molded Compound (SMC)

One type of FRP is called sheetmolded compound (SMC), which cannot be repaired using fiberglass repair materials or plastic welding. The reason fiberglass repair materials cannot be used is that fillers and mold release agents in SMC cause adhesion problems with _____ repair materials. SMC cannot be welded because it is a thermoset. Also, adhesion promoters and pinning are not used for any FRP repairs.

FRP Repair

FRP Backing

A backing is _____ on any two-sided FRP repair. The backing may be made of a scrap piece of the same material, a fiberglass cloth, or a backing tape.

Prepping FRP For A Two-Sided Repair

When prepping FRP for a two-sided repair it requires _____ off any exposed fibers before using wax and grease remover. If the fibers are not taped off, the fibers can wick the solvents and trap them under repair materials, which can lead to delamination.

Sanding Front Side Of Repair

Once the repair area has been block sanded, clean the area with a dry cloth or a _____. Check the area for pinholes and apply a glaze coat of the appropriate product if needed.

Carbon Fiber

Carbon Fiber Challenges

Some challenges with a carbon fiber repair include that the material may not be able to be repaired if the damage extends to an edge. This recommendation comes from GM on the ZR1 / Z06 Corvette fender repair procedures. Exposed weave carbon fiber cannot be buffed if damage goes through the _____ on tooled-faced surfaces.

Carbon Fiber Downfalls

Carbon fiber dust created when sanding can _____ circuit electric tools because it is a conductive material. The dust is also very hazardous to breathe, so the

appropriate particulate respirator should be used. The raw or exposed carbon fiber can cause _____ corrosion when it comes into contact with metal. But once it has been imbedded in the resin, it eliminates the galvanic corrosion problem.

Carbon Fiber Cosmetic Repair Possibilities

When repairing carbon fiber, it is important to inspect the rest of the part for secondary damage. Just like when repairing fiberglass or SMC, carbon fiber repair possibilities include repairing using SMC repair material and methods. It may be recommended to use a _____ patch.

Module 4 - Plastic Welding Repairs

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Plastic ID For Welding

Rod Adhesion Test

A rod adhesion test is available if an ISO code cannot be found or is not available. To perform a rod adhesion test, clean and scuff a hidden area of the part to be repaired. Next, melt a rod on the part, allow it to cool, and try to pull it off. Try the other rods at different locations. Determine which rod sticks _____. If none of the rods stick well, there is also a universal ribbon that may be an option.

Sanding Test

When performing a sanding test on a polyolefin, it may _____, melt, or appear greasy or waxy. When performing a sanding test on a nonpolyolefin part, it usually creates a _____ dust when sanded.

Weld Equipment And Types Of Welds

Nitrogen / Hot Air Welding Equipment

One type of hot air welder uses nitrogen to make a plastic weld. The difference between a nitrogen hot air welder and a regular hot air welder is that the former uses nitrogen as a shielding gas and compressed air. The latter uses regular compressed air. Both types of welders can only be used on _____.

Welding Techniques

To perform the melt flow technique, preheat the taper with a heat gun or hot air welder and melt the filler _____ onto the melted plastic in the repair taper.

Airless Welding Repair Procedure

Cleaning The Welding Shoe

Cleaning the welding shoe avoids _____ the weld with other plastics that may be on the shoe. It also helps ensure enough heat is generated to effectively perform the weld. If the welding shoe has a melt tube, it is also important to remove melted plastic from the melt tube. When cleaning the tip, use _____ grit sandpaper while the tip is hot, or a stainless steel wire brush. It is also important to keep the tip tightened to ensure proper heat transfer.

Weld Repairs

Backing Material

When performing an airless weld, backing is needed to increase the strength of the repair especially in a flexible area. This backing can be made of regular _____ window screen. Aluminum tape is then applied on the front side while making a weld on backside to hold the pieces in alignment.