

JOB HAZARD ANALYSIS {EV Mirror}

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	Approved by:

Location of Task:	Central Washington University – Machine Lab (Hogue), Materials Lab (Hogue)
Required Equipment / Training for Task:	Drill Press, how to handle carbon fiber, abs, and adhesive, hole press, understanding of safety policy in Hogue Labs, training involved with 3D – Printing, ANSI and OSHA approved eye and hand protection
Reference Materials as appropriate:	MSDS Sheets for Resin, Hazards and Manual Involved with 3D – Printer, Material Properties for Carbon Fiber and ABS/PLA UC Berkley JSA for 3D - Printing

Personal Protective Equipment (PPE) Required						
(Check the box for required PPE and list any additional/specific PPE to be used in “Controls” section)						
						
Gloves	Dust Mask	Eye Protection	Welding Mask	Appropriate Footwear	Hearing Protection	Protective Clothing
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use of any respiratory protective device beyond a filtering facepiece respirator (dust mask) is voluntary by the user.						

PICTURES	TASK DESCRIPTION	HAZARDS	CONTROLS
	Hand Drill	Pinching Cuts and abrasions Burns	Proper Training and PPE Keep hands away from tooth bit to avoid cuts and pinching. Avoid wearing long sleeve clothing to avoid clothing being stuck in drill Keep hands away from drill bit in case of excess heat from drilling. Wear gloves when necessary.
	Adhering Carbon Fiber to ABS plastic	Accidental Spills of Adhesive product Resin getting into eyes while applying There could be noxious films while using the resin	Wear Safety Glasses and Gloves Wash hands thoroughly after using glue Do not touch Eyes when using material Use resin in a well ventilated room with safety standards in place to ensure safety of others

	Attaching Mirror to Vehicle	Pinch point Accidental dropping of mirror	Wear Gloves if glass has been broken, wear safety glasses in case of accidental glass breakage. Avoid spacing between mirror edge and mirror holder edge
	3D-Printing Operations Heat Hazards	During operation, the extruder can reach temperatures of 518°F	Do not touch the metal extruder tip of the printer when the 3D printer is turned on. Wear ANSI-approved eyewear & gloves when working with the 3D-printer.
	3D-Printing Operations Chemical Hazards	During operation the melted filament (both ABS & PLA) will produce toxic fumes (styrene & volatile organic carbon).	Operate the 3D printer in a well-ventilated room or in a hood.
	3D – Printing Operations Mechanical Hazards	During operation, the 3D-printer’s gantries and belts pose pinch hazards to the user.	Do not touch the 3D-printer while the extruder head is in motion.
	Using scissors to cut Carbon Fiber to Shape	Pinch Point Cuts and abrasions	Keep fingers in proper holes to avoid pinching of fingers Use proper handling of scissors and what they are intended for by keeping fingers only on the handle Cut away from the body to avoid accidentals cuts to person
	Assess work area; is it clear of obstructions and slip/trip hazards?	Slip, Trip or Fall	Remove any obstructions or trip hazards. Maintain a dry floor.
	Assess path to emergency eye wash station; is the path clear and free of obstructions?	Not immediately able to access emergency eyewash station if needed	Remove any obstructions and maintain clear pathway
	Select and don personal protective equipment	Exposure of corrosive solution to eyes or skin.	Use of PPE is required and mandatory
	Select items/parts needing dissolve support removed and place in appropriate soak basket	Loss of parts within solution tank	Use appropriate basket
	Slowly raise lid of solution tank and allow condensate to drain back into the solution tank	Possible corrosive solution spilled outside of solution tank.	Place lid in secondary containment container
	Slowly lower soak basket into solution tank making sure not to splash solution	Exposure of corrosive solution to eyes or skin.	Work in a slow and deliberate manner
	Make sure basket is submerged and sitting	Possible corrosive solution from being splashed on	Work in a slow and deliberate manner

	level on the bottom of tank	operator	
	Replace solution tank lid	Possible accidental exposure of corrosive solution	No not operate without lid in place
	Set timer on solution tank control	Solution tank not dissolving support material properly	Verify timer is set and operating
	Do not allow observers within splash area during time while parts are put into or being removed from dissolve tank	Possible exposure of corrosive solution to eyes or skin.	Maintain a three foot perimeter anytime the tank lid is removed
	Maintain tank water levels within the manufacturers specifications	Possible exposure of corrosive solution to eyes or skin.	Don personal protective equipment, remove solution tank lid, and replace/remove water as necessary
	Draining solution from tanks as necessary	Possible corrosive solution spilled outside of solution tank or exposure of corrosive solution to eyes or skin.	Don personal protective equipment, remove drain plug from tank, attach hose to drain, and drain liquid into designated 5 gallon containers. Constantly monitor disposal container, DO NOT overflow (more than 4 gallons)
	Mixing and adding new solution to tanks	Possible corrosive solution spilled outside of solution tank or exposure of corrosive solution to eyes or skin.	Don personal protective equipment SPECIAL NOTE: ALWAYS! ADD concentrate (P400-SC) to water, NEVER add water to concentrate!