

JOB SAFETY ANALYSIS

Safety Information for the University of California, Berkeley

DEPARTMENT OF MECHANICAL ENGINEERING OPERATING A CNC MILLING MACHINE

TASK	HAZARDS	CONTROLS
1. Assess work area; is it clear of obstructions and slip/trip/fall hazards?	<ul style="list-style-type: none">• Slip, trip, or fall	<ul style="list-style-type: none">• Clear work area of any obstructions or slip/trip/fall hazards
2. Install vise and/or work piece	<ul style="list-style-type: none">• Pinching hazard for hands/fingers• Foot injury from dropping of heavy objects	<ul style="list-style-type: none">• Avoid pinch points• Position body to maintain balance, maximize use of legs, and ask for assistance if necessary
3. Install all of the required tooling for the job into the machine	<ul style="list-style-type: none">• Pinching hazards• Lacerations to hands/fingers from bit• Cutter dislodged from the tool holder while cutting	<ul style="list-style-type: none">• Keep hands free from pinch points; particularly when loading the tool into the spindle• Handle tool bit with care; avoid sharp edges• Ensure the cutter is tightly secured in the tool holder before loading it into the spindle
4. Use edge finder or probe to locate and set your work coordinate system	<ul style="list-style-type: none">• Crashing edge finder or probe• Eye injury from flying debris	<ul style="list-style-type: none">• Work slowly and deliberately. Use appropriate jog increments and spindle speed for the edge finder; use the appropriate VPS template for the probe (<i>Eg. Bore, Boss, Web, Pocket, Internal/External Corner, Single Surface, etc.</i>)• Only operate machine with doors closed, wear safety glasses at all times when operating machine

	5. Load G-code onto machine and dry run through program	<ul style="list-style-type: none"> • Crashing the machine • Eye injury from flying debris 	<ul style="list-style-type: none"> • Add a minimum of 3 inches to your Z-axis offset so all tools run in the air and well above the part. Reduce the Rapid Overrides on the machine to 25% maximum. Reduce the feed rate to 50% maximum. Always be ready to hit the E-Stop button. • Only operate machine with doors closed, wear safety glasses at all times when operating machine
	6. Return Z-axis offset to where it was first established and run through the entire program	<ul style="list-style-type: none"> • Crashing the machine • Eye injury from flying debris • Excessive noise levels 	<ul style="list-style-type: none"> • Never leave the machine running unattended. Reduce feed and rapids if necessary to allow the operator to react more quickly. Always be ready to hit the E-Stop button. • Only operate machine with doors closed, wear safety glasses at all times when operating machine • Wear ear plugs/muffs if necessary
	7. Remove finished work piece and clean the machine	<ul style="list-style-type: none"> • Lacerations to hands/fingers from chips • Lacerations to hands/fingers from the cut part • Eye injury from flying debris • Damage to spindle from chips entering spindle cavity 	<ul style="list-style-type: none"> • Never brush chips away with bare hands or fingers. Use a chip brush or pliers to remove chips. • Always deburr your parts before handling. Be cautious of extremely sharp edges produced from the cutting process. • Do not use compressed air to clean table. Use a chip brush and coolant spigot. • Never leave the spindle empty while cleaning the machine; load an empty tool holder into the spindle before cleaning to reduce the risk of getting chips in the spindle. Don't use compressed air.
	8. Remove all tool holders from the tool carousel and ensure the spindle is empty before turning off the machine	<ul style="list-style-type: none"> • Pinching hazards • Lacerations to hands/fingers from bit 	<ul style="list-style-type: none"> • Keep hands free from pinch points; particularly when unloading the tool from the spindle • Handle tool bit with care; avoid sharp edges

Other Information: Contributors: Created: JSA Library Number:	Required Training: Student Shop Safety Training Program Must complete additional training under guidance of a qualified Student Shop Laboratory Mechanician	Required Personal Protective Equipment (PPE) Safety glasses, ear plugs/muffs
	Haas VF Series Product Manual (2002) , Haas VF Series Product Manual (2020) Scott G. McCormick; R&D Engineering Manager, Jacob Gallego; Principal Lab. Mech. July 2020 (EH&S will insert number here, if applicable)	
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