

HAZARD CLASSIFICATIONS FOR SHOP EQUIPMENT (TOOLS) & INJURY PREVENTION MEASURES

Shop & Tool Descriptions				
HAZARD CATEGORY LEVEL	HCL 1	HCL 2	HCL 3	HCL 4
SIGNAGE	<b>Greenlight!</b>	<b>Caution</b>	<b>Warning</b>	<b>Danger</b>
<b>SPACES</b> NOTE: Spaces may have a range of HCL 1 - HCL 4 tools & equipment available	Design & light level fabrication oriented	Light to medium level fabrication oriented	Wood working & Machine shops with medium level of fabrication & production	Wood working, Machine & Auto shops with medium level of fabrication & production with industrial equipment
<b>CLASS OF POWER TOOLS</b>	<b>Light duty</b> battery powered & corded tools: very low torque/RPM, lighter weight to handle securely	<b>Medium duty</b> battery powered & corded tools: low torque/RPM, reasonable weight to handle securely	<b>Medium/Heavy duty</b> battery powered & corded tools: high torque/RPM, increasing weight more difficult to handle securely	<b>Heavy duty</b> battery powered & corded tools: higher torque/RPM, hefty weight & more difficult to handle securely
<b>GENERAL TYPES OF TOOLS &amp; EQUIPMENT</b> (may include, but not limited to items listed)	<ul style="list-style-type: none"> <li>• Marking, Hand &amp; Dremel Tools, Exacto® knives, Hand &amp; Orbital sander - <i>see ventilation controls</i></li> <li>• Sewing machine</li> <li>• Glue guns</li> <li>• Soldering irons - <i>see ventilation controls</i></li> <li>• Enclosed desktop 3D Printers (i.e. FDM, Polyjet &amp; PLA).  <i>NOTE:</i> Consult with EHS on appropriate engineering controls for new 3D technology &amp; materials.</li> </ul>	<ul style="list-style-type: none"> <li>• Chisels &amp; other very sharp hand tools</li> <li>• Medium duty power tools (i.e. Drills, Jig saw, Belt &amp; disc sander) - <i>see engineering controls</i></li> <li>• Small bench top equipment (preferably enclosed)</li> <li>• VacuFormer</li> <li>• Foam Cutter</li> <li>• Laser Cutter - <i>see engineering controls</i></li> </ul>	<ul style="list-style-type: none"> <li>• Industrial &amp; construction level power, hydraulic &amp; pneumatic tools</li> <li>• Larger bench type &amp; stationary equipment (i.e. Bench &amp; Angle grinders, Drill press, Hydraulic press, Metal brake, Kuka Robot (small-mid size, not enclosed), CNC Routers (enclosure as safe engineering control preferred))</li> <li>• Cutting saws (i.e. Scroll Miter &amp; Vertical saw, Bandsaw, Planer)</li> <li>• Welding: MIG, TIG, SMAW, &amp; Hand Plasma Cutters</li> </ul>	<ul style="list-style-type: none"> <li>• Heavy duty industrial &amp; construction level power, pneumatic, &amp; hydraulic tools</li> <li>• Large industrial equipment: manual &amp; CNC controlled (mills &amp; lathes), non-enclosed CNC Routers, CNC Routers enclosed in room (Procedures may lower classification level to 3)</li> <li>• Special processes or equipment (i.e. foundry, chain saw carving, kiln)</li> <li>• Cutting saws (i.e. Joiner, Radial-arm &amp; Circular saw, Table saws, SawStops®)</li> <li>• Welding &amp; cutting oxy acetylene</li> </ul>
<b>VENTILATION CONTROLS</b> Filtration: (HEPA) filtering system Exhaust: Air contaminants exhausted through ductwork by use of a blower	Filtration ventilation as a minimum for soldering stations; Exhaust ventilation preferable for sanding operations	Exhaust ventilation preferable over filtration ventilation for laser generated air contaminants, benchtop sanders, routers & saws	Exhaust ventilation required for: Woodworking equipment, welding processes & other processes generating air contaminants	Exhaust ventilation required for: Woodworking equipment, welding processes & other processes generating air contaminants

**INJURY PREVENTION MEASURES**

HAZARD CATEGORY LEVEL	HCL 1	HCL 2	HCL 3	HCL 4
<b>SIGNAGE</b>	<b>Greenlight!</b>	<b>Caution</b>	<b>Warning</b>	<b>Danger</b>
1. USER ACCESS	Flexible User access as determined by the Shop Manager	User access determined by the Shop Manager	User Access when Manager, Supervisor or Monitor present	User Access when Manager or Supervisor present (most preferable); alternatively a well experienced Monitor (to be determined by Shop Manager)
2. USER TRAINING	<p><b>Demonstration</b> by Manager, Supervisor, Monitor, Peer OR</p> <p><b>Self-Instruction</b> at discretion of Manager</p> <ul style="list-style-type: none"> <li>Review &amp; post any pertinent safety precautions to follow &amp; Equipment User Instructions</li> </ul> <p>• <b>At discretion of Manager</b> Review &amp; document <a href="#"><u>UVA User Agreement</u></a></p>	<p><b>Hands-on Instruction</b> by Manager, Supervisor, or Monitor</p> <ul style="list-style-type: none"> <li>Review &amp; document <a href="#"><u>UVA User Agreement</u></a></li> <li>Review &amp; demonstrate equipment manufacturer’s pertinent safety precautions to follow (i.e. PPE, machine guards &amp; moving parts of equipment to avoid, E Stops if present) &amp; Equipment User Instructions.</li> <li>Equipment Operator Instructions must be readily available</li> </ul>	<p><b>Hands-on Instruction</b> by Manager, Supervisor, or Monitor</p> <ul style="list-style-type: none"> <li>Review &amp; document <a href="#"><u>UVA User Agreement</u></a></li> <li>Review &amp; demonstrate equipment manufacturer’s safety precautions to follow (i.e. PPE, machine guards &amp; moving parts of equipment to avoid, E Stops) &amp; Equipment User Instructions.</li> <li>Equipment Operator Instructions must be readily available</li> </ul> <p><b>Hands-on Learning</b> New Users successfully perform an appropriate operation on equipment/ tool(s) they plan to use in the shop.</p>	<p><b>Hands-on Instruction</b> by Manager or Supervisor</p> <ul style="list-style-type: none"> <li>Review &amp; document <a href="#"><u>UVA User Agreement</u></a></li> <li>Review &amp; demonstrate equipment manufacturer’s safety precautions to follow (i.e. PPE, machine guards &amp; moving parts of equipment to avoid, E Stops) &amp; Equipment User Instructions.</li> <li>Equipment Operator Instructions must be readily available</li> </ul> <p><b>Hands-on Learning</b> New Users successfully perform an appropriate operation on equipment/ tool(s) they plan to use in the shop.</p>



## DEFINITIONS - Levels of Supervision

**Shop Manager** – The University department’s designated Manager fulfills the responsibilities to oversee operations and safety of the shop, shop users and provide tool and equipment instruction to shop users. These individuals are professionals, trained for their specific roles (i.e. academic faculty or instructor, engineering technician, machinist, tools and equipment generalist, trades specialist, etc.).

**Supervisor** – The department and Shop Manager assigns responsibilities to a designated supervisor, (University staff). The individual has qualifications to instruct shop users on equipment and tools, and oversee the shop operations and safety.

**Monitor (Qualified)** - Shop Managers assign and qualify students (i.e.-Teaching Assistants) as Monitors to help provide User supervision and instruction, usually during the hours when first level supervision is not present, or to augment assistance during a class or event. Qualification is determined by the appropriate skill level and experience for the equipment category level(s) of the shop. Shop Managers are responsible to train Monitors, and qualify the Monitor’s experience and capability to provide equipment and tool instruction. In addition to being well trained in the shop’s equipment and tools, the Monitor must be knowledgeable in any specific shop safety rules or procedures beyond those outlined in the University User Agreement; emergency response and have the authority to intervene whenever there is any infraction that affects the safety of individuals or the facility.

**Peer Buddy** – A Peer Buddy is a *Qualified User*, given access to a shop in the absence of the Shop Manager, Supervisor or Monitor. Shop Managers must ensure that *Qualified Users* are not working alone where there may be access to Hazard Category Level (HCL) 2 or higher, tools and equipment, unless these are restricted (physically separated, locked out, password protected, etc.). All qualified shop users must have a fellow *Qualified User* (**Peer Buddy**) accompany him or her when operating HCL 2 – HCL 4 equipment and tools. Peer Buddies must be within hearing distance of each other and ideally within sight as well, for equipment considered extremely hazardous such as but not limited to industrial rotating equipment that is not enclosed.

## DEFINITIONS - Levels of Shop User

**Shop User** – Shop Users (User) access shops to execute projects for curriculum, projects or personal engagement when a Shop Manager, Supervisor or Monitor is present. New Users are provided hands-on training for the safe operation of tools and equipment they need to use and are made aware of hazards to avoid during operation, and any specific shop safety rules or procedures beyond the University User Agreement. The Manager, Supervisor or Monitor provides direct oversight during the familiarization until the User is confident and competent to work independently without direct supervision.

**Qualified User** – The Shop Manager or Supervisor can designate a *Shop User* as a **Qualified User** and has approved the *Qualified User’s* experience and proficiency for the specific tools and equipment that he or she will have access to operate. In addition to training on tools and equipment, the Qualified User must be knowledgeable in any specific shop safety rules beyond those outlined in the University User Agreement; and any special procedures and emergency response for the shop. The User’s skill and knowledge is determined as sufficient to be able to access the shop and work independently of the Shop Manager’s, Supervisor’s or Monitor’s direct supervision. When designated onsite supervision is not available, a *Peer Buddy* must be present for shop spaces designated as HCL 2 or higher. Onsite Supervisors are strongly recommended for shop spaces designated as HCL 3 or higher. Only well-experienced *Qualified Users* should be given access to HCL 4 equipment in the absence of supervision.