



## Machine Guarding/Tools

### Machine Guards

The following types of dangerous moving parts require guarding:

**The Point of Operation:** The point where work is performed on the material, such as cutting, shaping, boring or forming of stock

**Power Transmission Apparatus:** The components of the mechanical system that transmit energy to the part of the machine performing the work. These components include flywheels, pulleys, belts, connections, couplings, cams, spindles, chains, cranks and gears

**Other Moving Parts:** Parts of the machine which move while the machine is working, can include reciprocating, rotating and transverse moving parts, as well as feed mechanisms and auxiliary parts of the machine. Guards must meet these minimum general requirements:

- **Prevent Contact:** The guard must prevent hands, arms or any part of your body or clothing from making contact with dangerous moving parts.
- **Secure:** Guards should not be easy to remove or alter; a guard that can easily be made ineffective is no guard at all. Guards and safety devices should be made of durable material that will withstand the conditions of normal use. They must be firmly secured to the machine.
- **Protect from Falling Objects:** The guard should ensure that no objects could fall into moving parts. A small tool that is dropped into a cycling machine could easily become a projectile that could injure someone.
- **Create No New Hazards:** A guard defeats its own purpose if it creates a hazard of its own such as a shear point, a jagged edge, or an unfinished surface which can cause a laceration. The edges of guards should be rolled or bolted in such a way that they eliminate sharp edges.
- **Create No Interference:** Guards should be designed so equipment can be maintained and lubricated without having to remove them.



## Machine/Tool Safety Requirements

General safety rules apply to both stationary and portable equipment. The following rules apply to every machine or power tool used:

- Keep your work area well-lit and dry
- Keep tools sharp, oiled and stored in a safe, dry place. Regularly inspect all tools, cords and accessories. Repair or replace problem equipment immediately.
- Keep your work area clean. Sawdust, paper and oily rags are a fire hazard and can damage tools
- Use safety features like three-prong plugs, double insulated tools and safety switches. Be sure all machine guards are in place before using any equipment
- Use personal protective equipment when necessary. This might include safety eyewear, gloves, hearing protection, or respiratory protection
- Dress accordingly for the job. Never wear clothing or jewelry that could become entangled in power tools. Ties are a real no-no around rotating spindles!!
- Only qualified personnel may install or repair equipment
- Use the right tool for the job. Do not force a small tool to do heavy work
- Keep electric cables and cords clean and free from kinks. Never carry a tool by its cord, or pull a plug from the wall by the cord
- All visitors to machine shops are required to have safety eyewear if equipment is in operation
- Never leave loose tools on other equipment, telescopes, antennas, or vehicles
- All stationary equipment in labs, shops or other work areas should be secured to the floor or bench surface



## Grinding Wheels

It is important for all employees who use a grinder to be familiar with the mounting operation, speed, and use of the grinder and different wheels. The following guidelines represent minimum acceptable safety practices for grinder use:

- Inspect the grinding wheel before installation
- Never alter the mount hole or force a wheel on the spindle
- Make sure the safety flanges are used to mount the wheel
- Adjust the tool rests to within 1/8" of the wheel. Be sure the guards are properly positioned to be effective and put on your PPE before grinding.
- Make grinding contact without bumping the wheel
- Grind only using the face of the straight wheel
- Use a disk wheel for side grinding
- Never grind aluminum on a standard wheel

For more information on UA policies, please see <https://risk.arizona.edu/occupational-safety/shop-safety>.