

Clarksville-Montgomery County School System  
**MACHINE GUARDING PROGRAM**  
OSHA Standard - [29 CFR 1910.211](#) ; [.212](#) ; [.213](#) ; [.215](#) ; [.217](#)

**1.0 Summary**

The purpose of the Machine Guarding Program is to establish and maintain practices that will protect Clarksville-Montgomery County School System (CMCSS) employees from injuries as a result of rotating, moving or other actions of machinery.

This procedure establishes mandatory requirements for the assessment, design, implementation, operation, and maintenance of machine guarding and for training of personnel to properly use machine guarding.

As used in this procedure, machine guarding shall mean any device which effectively prevents personnel, contractors, subcontractors, contracted services or visitor from physical harm due to contact with any hazard present at any machine. Hazards shall include any machine, any part of a machine or any projectile from a machine, capable of crushing, puncturing, severing, breaking or otherwise injuring any body part.

**2.0 Purpose**

The purpose of this procedure is to establish and maintain practices that will protect Clarksville-Montgomery County School System (CMCSS) employees from injuries as a result of rotating, moving or other actions of machinery.

**3.0 Scope**

This procedure establishes mandatory requirements for the assessment, design, implementation, operation, and maintenance of machine guarding and for training of personnel to properly use machine guarding.

As used in this procedure, machine guarding shall mean any device which effectively prevents personnel, contractors, subcontractors, contracted services or visitor from physical harm due to contact with any hazard present at any machine. Hazards shall include any machine, any part of a machine or any projectile from a machine, capable of crushing, puncturing, severing, breaking or otherwise injuring any body part.

**4.0 Definitions**

- Safeguarding – Any means of effectively preventing personnel from coming in contact with parts of machinery or equipment which would cause physical harm. Examples of such safeguarding methods are: barrier guards, two-handed tripping devices, electronic safety devices, etc.
- Hazardous Parts of Machinery – Any area of a machine or piece of equipment that creates a potential hazard to personnel such as those created by point of operation, in-going nip-points, rotating parts, flying chips and sparks.
- Interlocks – Protection devices designed and incorporated into the control system so that when "opened", moving parts will stop, or will not start.
- Enclosures – Guarding by fixed physical barriers that are mounted on, or around, a machine to prevent access to moving parts. They are most effective when designed as

part of the machine, but can be bolted or welded to the frame if access is required.

- Fencing – Guarding by means of a fence or rail enclosure which restricts access to the machine except by authorized personnel. Guarding by fencing and location guards should be designed to prevent contact with the hazardous equipment when reaching around, under, through, or over the barrier.
- Location – Guarding that is the result of physical inaccessibility of a particular hazard under normal operating conditions. (such as distance or height)
- Point of Operation – That area on a machine where material is positioned for processing or changes by the machine and where work is actually being performed on the material.
- Power Transmission – All mechanical components including gears, cams, shafts, pulleys, belts, clutches, brakes, and rods that transmit energy and motion from the power source to the point of operation.
- In-Going Nip-Points – A hazard area created by two or more mechanical components rotating in opposite directions in the same plane and in close conjunction, proximity, or interaction.
- Shear Points – A hazard area created by a reciprocal (sliding) movement of a mechanical component past a stationary point on a machine.
- Zero Access – is when a machine is guarded so hands, arms, fingers or other body parts cannot contact a hazard.

## **5.0 Responsibilities**

Department supervisor and/or their designee are responsible for the implementation of a review process for this program. This entire program must be reviewed, to ensure continuous and effective compliance with all applicable codes and regulations.

To increase the effectiveness of the program, the department supervisor may designate specific individuals in their department to Machine Guarding issues.

Safety and Health Department will:

- Verify compliance with the procedures in this program
- Recommend changes to improve execution of the program
- Assist with review of audits
- Periodically review program to identify its effectiveness and determine if revisions or improvements are needed

## **6.0 Procedures**

**General rules for machine guards:**

- MACHINE GUARDS (INCLUDING PRESENCE SENSING DEVICES SUCH AS LIGHT CURTAINS OR PRESSURE MATS) SHALL NOT BE REMOVED, ALTERED, DEFEATED OR BYPASSED TO INCREASE OR AID IN PRODUCTION.
- Some maintenance activities may require the removal of guards. For repair activities, the removal of guards shall take place only after the appropriate energy isolation has occurred by following lock-out/tagout procedures.(ref. RSK-PRO14 Lockout/Tagout)

- Equipment cannot be used if guards are missing, damaged, or inoperable until the guards are fixed or replaced as needed unless interim and alternative levels of protection are provided.
- Machine guards such as light curtains or interlocked gates shall not be used to isolate energy for lockout/tagout activities.
- Special tools such as "push sticks" cannot be used in place of machine guards, but may be used to supplement such guards.

#### **New/ Revised equipment review:**

- New or significantly revised equipment must be reviewed for machine guarding hazards before the equipment is released for operation.
- This review should be led by the department supervisor and should be conducted as early in the process as possible.
- Releasing equipment for operation before all required guards are in place must be OK'd by the department or his designee.

#### **General Guarding Requirements:**

- Purchased equipment should be supplied with the needed guards installed by the manufacturer.
- Guards should be designed to prevent contact with moving, rotating or otherwise hazardous parts of equipment and from sparks or other projectiles from equipment.
- Guards should be securely fastened to equipment in a manner that requires tools for removal.
- Rotating shafts & fan blades located within 7 feet from ground level or work platforms shall be guarded to prevent accidental contact with body parts & clothing, which could result in injury.
- When needed, ports for lubrication should be provided to minimize the need to remove or alter the guard for such activity.
- Guards removed or altered during maintenance activity must be fully restored prior to returning the equipment to production.
- Machinery designed for a fixed location shall be securely anchored in place to prevent "walking" or moving. (such as pedestal grinders)
- Machinery designed not for a fixed location shall have feet or a base plate to assure adequate stability during use. Addition of "shoes", "cleats", or leveling screws, will address the problem of "walking" or moving.

#### **Abrasive Wheel Grinders and Cut-off Wheels:**

- Written procedures and training are required for anyone mounting abrasive wheels onto pedestal or bench grinders that address the use of a **ring test** prior to mounting.

A **ring test** is the tapping of the wheel with a solid object to determine cracks. The wheel should have a distinct ringing sound when tapped. If a dull thud sound is indicated, the wheel must not be mounted since it is an indication of a crack. The wheel must be discarded and not used for any purpose. The ring test does not apply to composite abrasive cut-off wheels.

- Tongue guards and tool rests must be present and properly adjusted when operating pedestal or bench grinders.
- Safety glass or plastic see-through guards on grinders and cut-off wheels should be adjusted to provide the maximum area of protection for the operator. When the machine attached guarding is insufficient, additional PPE, such as face shields or see-through curtains, should be used.
- Changing grinding or cut-off wheels requires that the machine be locked out using the department's lockout/tagout procedure.

### **Abrasive Belt Grinders**

- For the purposes of machine guarding, abrasive belt grinders fall into three categories, freestanding, bench, and hand-held types. The procedure for changing abrasive belts depends on the machine type.
- For hand-held, air driven grinders, the air line must be disconnected from the air supply and the pressure in the line to the tool released. Verification that pressurized air is not present must be made before changing the belt.
- For bench mounted, electrically operated belt grinders, the electrical plug must be disconnected and the START button depressed to verify power disconnection before changing belts.
- For large freestanding grinders having power disconnects capable of being locked out, the department lockout/tagout procedure applies.

### **Band Saw Blades**

- All band saws used in the department require specific instructions in the use and operation of the saws, including a documented procedure for blade tensioning. Only trained and authorized personnel shall be permitted to operate band saws. Training and authorization performed by department supervisor.

### **Assessing/Evaluating Machine Guarding Hazards**

- While there are many different machine guarding assessment tools, the "AUTO" principle can be used to confirm the appropriate level of protection is provided.
- Guards should be able to pass the "AUTO" principle. In general, you should not be able to reach **A**round, **U**nder, **T**hrough or **O**ver guards and touch the hazard(s).
- There may be limited cases in which AUTO will not apply. In these situations, a combination of layers of protection such as procedures, training and identification should be used.
- Signs alone are not adequate machine guards.

### **Training Requirements (minimal)**

- Training will be conducted & documented by the department supervisor for employees based on their needs and potential exposures.

- Documentation should be kept in each department for retention. Training records should be kept indefinitely.
- Training should cover site-specific machine guarding information.  
Examples:
  1. Reason for machine guards.
  2. Recent machine guarding related incidents, if any.
  3. Types of guards provided.
  4. Proper operation & use of guards.
  5. What to do if guards are not available or not working

### **Inspections/Pre-Use Inspections**

- Operators should verify the availability and proper operation of guards before the first use of the equipment on each shift.
- Electrical devices (examples: light curtains, interlocks and pressure mats) should be functionally tested by the equipment operator prior to the first use of the equipment on each shift.
- If guards or electrical devices are missing, damaged or inoperable, the equipment shall not be used until repaired, replaced, or equally effective interim guarding is provided. Exceptions to this must be approved by the department supervisor or his designee.

### **Periodic Assessments**

- Departmental assessments should be conducted by the department supervisor at least annually and on new equipment by the supervisor to verify the availability, use and proper operation of guards. Assessments should be documented and retained by the department supervisor for future use and reference.

## **7.0 OUTSIDE CONTRACTORS**

Whenever outside servicing personnel are to be engaged in activities associated with guarded machinery, they must comply with requirements of this document. In many instances this will include the need to conform to the department's lockout/tagout procedures. (ref. RSK-PRO14 Lockout/Tagout)

Associated Documents: RSK-PRO14 Lockout/Tagout