

Requirements Documents

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Machine Guarding

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Change Summary

Description of Change

Minor change to document throughout.

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1.0 PURPOSE

This Requirements Document (RD) identifies requirements and provides the guidance necessary to ensure hazards associated with unguarded machinery are properly identified, evaluated, controlled, and communicated in accordance with Occupational Safety and Health Administration (OSHA) regulations and manufacturer's recommendations.

2.0 SCOPE

These Level 2 requirements are applicable to Hanford Mission Integration Solutions (HMIS) employees and subcontractors involved in HMIS scope of work.

Guarding of portable powered tools is not included in the RD. Refer to 29 CFR 1910.243 and HMIS-RD-SP-49920, *Hand and Portable Power Tools*, implementing requirements related to guarding of portable powered tools.

This document partially implements the ISMS Core Functions #1, Define Scope of Work, #2, Identify and Analyze the Hazards, #3, Develop and Implement Hazard and Environmental Controls; and Guiding Principles #5, Identification of Safety and Environmental Standards and Requirements, #6, Hazard Controls Tailored to Work Being Performed.

3.0 REQUIREMENTS

Personal Protective Equipment shall be worn during the operation of any machine following the manufacturer's recommendations and the controls listed in the applicable Craft Specific Hazard Analysis.

NOTE: According to OSHA, Guards (also referred to as shields): barriers which prevent access to danger areas. There are four general types of guards: fixed, interlocked, adjustable, and self-adjusting.

3.1 General Requirements for All Machinery Example

NOTE: For the tables in this section under the requirement "type" column and "V" means verbatim, "I" means interpreted.

#	Requirement	Type V or I	Source
1.	Machine guarding shall be provided to protect employees in the machine area from hazards such as those created by point of operation, in-going nip points, rotating and reciprocating parts.	I	29 CFR 1910.212(a)(1)
2.	Guards (shields) must be provided on machines that expose employees to chips, sparks, flying particles, or other debris.	I	29 CFR 1910.212(a)(1)

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3.	Guard belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains, or other reciprocating, rotating, or moving parts exposed to employee contact or that may otherwise create a hazard.	I	29 CFR 1910.212(a)(1)
4.	Equipment must not be operated unless guards are in place and functioning properly.	I	29 CFR 1910.212(a)(1)

3.2 Types and Methods of Machine Safeguarding

1.	Machinery and equipment shall be appropriately guarded in accordance with one or more of the methods established in Types and Methods of Machine Guarding, (Attachment 1), which outlines the different types of guards and the safeguarding actions for each of the various methods.	I	29 CFR 1910.212(a)
2.	Guarding devices shall be in conformity with appropriate standards. In the absence of applicable specific standards, guards shall be so designed and constructed as to prevent the operator from having any part of his body in the danger zone during the operating cycle.	I	29 CFR 1910.212(a)(3)(iii)
3.	Install the guard(s) so a hazard is not created.	I	29 CFR 1910.212(a)
4.	Use the manufacturer's recommendations and requirements or contact HMIS S&H for specific guarding requirements for each machine.	I	10 CFR 851.20(a)(2)
5.	Guards shall be affixed to the machine where possible and secured elsewhere if for any reason attachment to the machine is not possible.	V	29 CFR 1910.212(a)(2)
6.	Bench and pedestal grinders shall be constructed and guarded in accordance with Attachment 2.	I	29 CFR 1910.215

3.3 Machine Safety Guarding by Location/Distance

1.	A thorough evaluation of each machine and particular situation is absolutely essential before attempting to safeguard machinery by location/distance.	I	10 CFR 851.21 10 CFR 851.22
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	NOTE: Attachment 3 provides additional considerations for guarding by location/distance.		
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3.4 Machine Guarding Safe Work Practices

1.	A guard or shield shall be provided to protect the operator and other employees in the machine area from hazards such as those created by point of operation, ingoing nip points, rotating parts, flying chips and sparks. Use personal protective equipment as noted for the work area and per manufacturers recommendations.	I/V	10 CFR 851.22(b)(4) 10 CFR 1910.212 (a)(1)
2.	Where necessary, provide special hand tools so that operator's hands remain out of danger zones. These special tools do not take the place of the guards required by this practice.	I	29 CFR 1910.212(a)(3)(iii)

3.5 Machinery Operations and Repairs

1.	Machinery that is guarded shall be shut down and secured as required by DOE-0336, <i>Hanford Site Lockout/Tagout</i> before any maintenance or repair work is performed, unless specifically necessary to test, repair, or verify operation. Such operation must be addressed in the JHA for the task.	I	29 CFR 1910.147
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3.6 Anchoring Installed Machines

1.	Machines designed for fixed installations (i.e., drill presses, bench grinders, hydraulic presses) shall be securely anchored to prevent tipping and/or movement.	I	29 CFR 1910.212(b)
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3.7 Exposure to Blades

1.	Fans within 7 feet of the floor or working level must be guarded. The guard must not have openings greater than one-half inch in width.	I	29 CFR 1910.212(a)(5)
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3.8 Training

1.	Employees who have exposure to hazardous machinery/equipment, shall be briefed to the requirements in this procedure, and the controls found in the CSHA.	I	10 CFR 851.25
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SOURCES**4.1 Source Requirements**

10 CFR 851, U.S. Department of Energy, *Worker Safety and Health Program*
29 CFR 1910, *OSHA Standards for General Industry*
DOE-0336, *Hanford Site Lockout/Tagout*

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Appendix A. Types and Methods for Machine Guarding

Guards

METHOD	SAFEGUARDING ACTION
Fixed	Provides a barrier, that during the operating cycle, the user cannot reach over, under, through or around.
Interlocked	Shuts off or disengages power and prevents starting of machine when guard is open; shall require the machine to be stopped before the worker can reach into the danger area.
Adjustable	Provides a barrier, which may be adjusted to facilitate a variety of production operations. And, where, during the operating cycle, the user cannot reach over, under, through or around.
Self-adjusting	Provides a barrier, which moves according to the size of the stock entering the danger area. And, where, during the operating cycle, the user cannot reach over, under, through or around.

Devices

METHOD	SAFEGUARDING ACTION
Photoelectric (optical)	Machine will not start cycling when the light field is interrupted. When the light field is broken by any part of operator's body during the cycling process, immediate machine braking is activated.
Radiofrequency (capacitance)	Machine cycling will not start when the capacitance field is interrupted. When the capacitance field is disturbed by any part of the operator's body during the cycling process, immediate machine braking is activated.
Electromechanical	Contact bar or probe travels a predetermined distance between the operator and the danger area. Interruption of this movement prevents the starting of machine cycle.
Pullback	As the machine begins to cycle, the operator's hands are pulled out of the danger area.
Restraint (holdback)	Prevents the operators from reaching into the danger area.
Safety Trip Controls	Stops machine when tripped.
Two-hand Control	Constant, concurrent use of both hands is required, preventing the operator from entering the danger area.
Two-hand Trip	Concurrent use of two hands on separate controls prevents hands from being in danger area when machine cycle starts.
Gate	Provides a barrier between danger area and operator or other personnel.

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Feeding and Ejection Methods

METHOD	SAFEGUARDING ACTION
Automatic Feed	Stock is fed from rolls, indexed by machine mechanism, etc.
Semiautomatic Feed	Chutes feed stock, movable dies, dial feed, plungers, or sliding bolster.
Automatic Ejection	Air or mechanical means ejects work pieces.
Semiautomatic Ejection	Work pieces are ejected by mechanical means, which are initiated by the operator.
Robots	Perform work, which is usually performed by an operator.

Appendix B. Abrasive Wheel Grinders

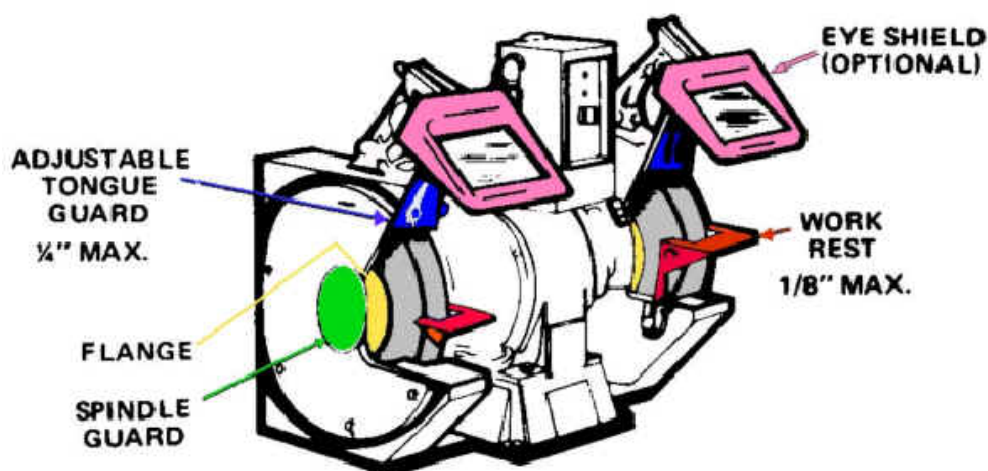
Side guards cover the spindle, nut and flange, and 75% of the wheel diameter.

Work rests are adjusted to within 1/8-inch of the wheel.

Adjustable tongue guards on the top side of the grinder are within 1/4-inch of the wheel.

Maximum RPM rating of abrasive wheel(s) are compatible with the RPM rating of the grinder motor.

New abrasive wheels are visually inspected and ring tested before they are mounted.



Appendix C. Machine Safeguarding by Location /Distance

To consider a part of a machine to be safeguarded by location, the dangerous moving part of a machine must be so positioned that those areas are not accessible or do not present a hazard to a worker during the normal operation of the machine. This may be accomplished by locating a machine so that the hazardous parts of the machine are located away from operator workstations or other areas where employees walk or work. This can be accomplished by positioning a machine with its power transmission apparatus against a wall and leaving all routine operations conducted on the other side of the machine. Additionally, enclosure walls or fences can restrict access to machines. Another possible solution is to have dangerous parts located high enough to be out of the normal reach of any worker.

The feeding process can be safeguarded by location if a safe distance can be maintained to protect the worker's hands. The dimensions of the stock being worked on may provide adequate safety. For instance, if the stock is several feet long and only one end of the stock is being worked on, the operator may be able to hold the opposite end while the work is being performed. An example would be a single-end-punching machine. However, depending upon the machine, protection might still be required for other personnel.

The positioning of the operator's control station provides another potential approach to safeguarding by location. Operator controls may be located at a safe distance from the machine if there is no reason for the operator to tend it.