



Machine Shop Equipment Safety Selection Guide
The following is a practical guide for evaluating safeguarding measures on manual metalworking equipment commonly found in machine shops, toolrooms, maintenance departments, and tool & die facilities.

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Engineering Your Safety

Master Audit Sheet

Machine ID	Location	Machine Type	Present / Installed					
			POO Guarding	E-Safety Evaluation	PTC Guard	Emergency Stop	Anti-Restart Protection	Stop Time Evaluation

Notes / Comments:

Machine Selection Matrix

Machine Type	ANSI Reference	POO Guarding	E-Safety Evaluation	PTC Guard	Emergency Stop	Anti-Restart Protection	Stop Time Evaluation
Drill Press / Radial Arm Drill	B11.8	Typically Required	Typically Required	Required	RA Required	Required	RA Required
Manual Lathe	B11.6	Typically Required	Typically Required	Required	RA Required	Required	RA Required
Bench / Pedestal Grinder	B11.9	Typically Required	No	Required	RA Required	Required	RA Required
Disc / Belt Sander	B11.9	Typically Required	No	Required	RA Required	Required	RA Required
Milling / Boring Machine	B11.8	Typically Required	Typically Required	Required	RA Required	Required	RA Required
Bandsaw (H/V)	B11.10	Typically Required	Typically Required	Required	RA Required	Required	RA Required
Surface Grinder	B11.9	Typically Required	Typically Required	Required	RA Required	Required	RA Required
Roll Bender / Former	B11.12	Typically Required	No	Required	RA Required	Required	RA Required

- E-Safety Evaluation: E-Safety Evaluation (Electronic Safeguarding): Evaluation of the need for electronic safeguarding devices used to reduce machine risk, including safety interlocks, light curtains, laser scanners, safety mats, safety-rated radar systems, two-hand controls, enabling devices, safety PLC functions, monitored safety relays, and other safety-related control functions, as determined through the applicable ANSI B11 standard and documented risk assessment.
- POO Guarding: point of operation
- PTC Guard: power transmission
- RA Required: risk assessment required

Hazard Selection Guide

Hazard	Typical Protection
Rotating spindle / chuck	Point of operation guarding
Hazardous access	Interlocked guard evaluation
Flying chips	Chip shield
Flying coolant	Splash shields
Belt drives and pulleys	Fixed guard
Unexpected restart	Anti-restart / drop out protection
Long stopping time	Brake evaluation
Stored energy	Lockout/tagout verification

ANSI B11 Machine Standards Reference

This audit sheet is intended as a general guideline for **screening and prioritizing machine safeguarding improvements** and is not intended to serve as a formal, certified, or compliant machine risk assessment. Use of this document does not ensure compliance with ANSI B11 standards, OSHA regulations, NFPA 79, or any other applicable safety requirements. PowerSafe Automation assumes no responsibility or liability for the use or misuse of this tool. A documented machine risk assessment performed by a qualified individual is required to properly identify hazards, evaluate risks, and determine appropriate risk reduction measures.

The ANSI B11 standards require that identified hazards be reduced to an acceptable level through appropriate risk reduction measures. Depending on the machine, application, and identified hazards, these measures may include physical guards, point-of-operation guards, chip or splash shields, fixed guards over power transmission components, safety-related control functions, and other safeguarding methods.

The **typical safeguards** identified in the Selection Matrix are intended as practical guidance based on common manual metalworking machine applications and are **not universal requirements**. Final safeguarding requirements should be determined by the machine's intended use, operating modes, reasonably foreseeable misuse, applicable ANSI B11 machine-specific standard, and the results of a documented risk assessment.

Hinged chip or splash shields should normally be positioned between the operator and the machining operation during use. If a movable guard is intended to prevent access to hazardous motion, rather than solely provide protection from chips or coolant, the need for a safety interlock or other safety-related control function should be evaluated as part of the machine risk assessment.

Other applicable standards to reference:

- ANSI B11.0 — Safety of Machinery
- ANSI B11.19 — Performance Requirements for Risk Reduction Measures
- ANSI B11.26 — Functional Safety for Machinery
- ANSI B11.29 — Machine Control Systems
- NFPA 79 — Electrical Standard for Industrial Machinery
- OSHA 29 CFR 1910 Subpart O — Machinery and Machine Guarding
- OSHA 29 CFR 1910.147 — The Control of Hazardous Energy (Lockout/Tagout)

PowerSafe Best Practices

This section provides practical engineering recommendations developed from industry experience. These best practices supplement applicable ANSI B11, OSHA, and NFPA requirements but are not intended to replace a documented machine risk assessment or mandatory standard requirements.

General Safeguarding

- Guards should protect the identified hazard while allowing normal machine operation whenever practical.
 - Guard designs should encourage use rather than create incentives for operators to bypass or remove them.
 - Fixed guards should require tools for removal whenever routine operator access is unnecessary.
 - Hinged chip or splash shields should be positioned between the operator and the machining operation during normal use.
 - Hinged shields should naturally return to the protective position whenever practical.
 - Polycarbonate viewing panels should be kept clean and replaced when visibility is significantly reduced.
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Machine Controls

- Manual machine tools should require intentional operator action before restarting following a power interruption.
 - Emergency stop devices should be easily identifiable and readily accessible.
 - Start and Stop controls should remain visible and unobstructed.
 - Motor braking should be evaluated whenever hazardous motion continues after the Stop command.
 - Machine control circuits should operate at 120 VAC or less. High-voltage control devices (e.g., drum switches and line-voltage operator controls) should be replaced with low-voltage control circuits where practical.
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Operator Protection

- Workpieces should be secured using appropriate vises, clamps, or fixtures whenever practical.
 - Operators should avoid wearing loose clothing, jewelry, or gloves around exposed rotating machinery unless specifically required and evaluated for the task.
 - Flying chip hazards should be minimized through shielding, guarding, and appropriate PPE.
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Maintenance

- Damaged guards should be repaired or replaced before returning equipment to service.
- Lockout/Tagout procedures should be available for servicing and maintenance.
- Safety devices should be inspected periodically to verify proper operation.
- Guards should be routinely inspected to verify they remain securely mounted, functional, and free from damage or unauthorized modification.

Corrective Action Priority Guide

Critical Priority (Immediate): Immediate action required before continued operation.

Examples

- Missing point-of-operation guard exposing hazardous motion.
- Exposed rotating chuck or spindle creating entanglement hazards.
- Missing power transmission guard.
- Machine automatically restarts following power restoration.
- Defeated or bypassed safety device.
- Missing abrasive wheel guard.

Recommended Action: Remove from service or implement interim risk reduction until corrected. Where immediate correction is not feasible, interim risk reduction measures should be implemented until permanent corrective actions are completed.

High Priority: Correct as soon as practical.

Examples

- Missing chip shield where flying chips present significant risk.
- Damaged or improperly adjusted work rest or tongue guard on a grinder.
- Missing emergency stop where the risk assessment identifies it as necessary.
- Excessive machine stopping time requiring further evaluation.

Recommended Action: Schedule corrective action promptly and document completion.

Medium Priority: Improvement recommended.

Examples

- Damaged warning labels.
- Cracked or scratched polycarbonate reducing visibility.
- Minor guard adjustment needed.
- Guard fasteners missing but guard remains secure.

Recommended Action: Correct during the next scheduled maintenance opportunity.

Low Priority: Housekeeping or administrative improvement.

Examples

- Guard identification labels faded.
- Safety signage missing.
- Documentation updates.

Recommended Action: Correct as resources permit.

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Glossary

Anti-Restart (No-Voltage Release): A control function that prevents automatic restarting of a machine following restoration of electrical power until the operator intentionally initiates a restart.

Chip Shield: A transparent barrier intended primarily to protect operators from flying chips, coolant, and similar hazards. A chip shield is not necessarily intended to prevent access to hazardous motion.

Emergency Stop: A manually actuated control intended to stop hazardous machine motion as quickly as practical during an emergency. An emergency stop is not a substitute for safeguarding.

Fixed Guard: A guard secured in place that requires tools for removal.

Hinged Guard: A movable guard attached by hinges that allows access for setup, maintenance, or adjustment.

Interlocked Guard: A movable guard equipped with a safety interlock that performs a safety function by preventing hazardous motion or initiating a stop when opened.

Point of Operation (POO): The location where the machine performs work on the material and where exposure to the hazard may occur.

Power Transmission Components (PTC): Mechanical components that transmit power, including belts, pulleys, gears, sprockets, chains, couplings, shafts, and similar mechanisms.

Residual Motion: Machine movement that continues after a Stop command has been issued.

Residual Risk: The risk remaining after safeguards have been implemented.

Risk Assessment: A systematic process used to identify hazards, estimate risk, and determine appropriate risk reduction measures.

Risk Reduction Measure: A safeguard or protective measure implemented to reduce the probability or severity of injury.

Rotating Component: Any rotating machine element capable of creating entanglement, drawing-in, crushing, or impact hazards.

Through Protection: A term often used in industry to describe a transparent barrier that provides a line-of-fire barrier against chips, coolant, or debris while allowing visibility. Depending on its intended function, it may serve as a chip/splash shield rather than a primary safeguarding device.

Unexpected Restart: The unintentional restarting of a machine following restoration of electrical power or other energy source without deliberate operator action.

Typical Safeguarding Solutions



Head mount mill guard with a non-contact safety switch



Drill press guard with a non-contact safety switch



Radial arm drill with a non-contact safety switch



Belt / Disc sander shields



Bench grinder / buffer shields



Steel mesh press ejection curtains



Horizontal bandsaw (sm) guard with (2) non-contact safety switches



Horizontal bandsaw (lg) guard with safety mat and remote controls



Vertical bandsaw (sm) guard
without a safety switch



Vertical bandsaw guard
with a non-contact safety switch



Vertical bandsaw (lg) guard with safety
light curtains



Chuck guard (primary) and lathe guard (secondary)
with (2) non-contact safety switches and bypass key



Hardinge lathe guard and collet closer with
a non-contact safety switch



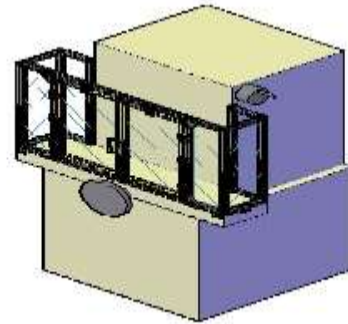
Large Lathe Guard with (2) non-contact safety switches



Large Lathe Guard with (x) non-contact safety switches



Floor Mounted Surface Grinder Guard
without a safety switch



Machine Mounted Surface Grinder Guard
without a safety switch



Piranha (only) ironworker guards



Scotchman ironworker guards

Inspection performed by (Print)

____ / ____ / 20____
Date of inspection

Inspection performed by (Signature)

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