

Machinery & Machine Guarding

29 CFR 1910.211-212

Guarding

- Proper guarding methods must exist for machines:
 - machines must be properly placed and anchored;
 - pulleys, belts, gears, and chains must be properly guarded;
 - non mechanical hazards, such as high pressure systems, power sources and lighting must be guarded;
 - appropriate personal protective equipment must be used during operations;
 - good housekeeping must be maintained around machines; appropriate signs must be posted; and
 - energy sources controlling machinery must be properly provided, labeled and legible.

Guarding

- In addition, there must be appropriate maintenance procedures in place and used.
- The specific requirements that must be provided are summarized below:
 - Machines must be provided with one or more methods of guarding to protect the operator or other employees in the area from inherent machine hazards (1910.212(a)(1)).

Guarding

- In addition to guards, special hand tools may be needed to permit handling of material without the operator having to place their hands in the danger zone (1910.212(a)(3)(iii))
- Revolving drums, barrels, and containers must be guarded by interlocked enclosures (1910.212(a)(4))
- Blades of fans must be guarded (openings 0.5 in. or less) when the fans are within 7 feet of the floor or work area (1910.212(a)(5))
- Machines designed for fixed locations must be securely anchored to prevent movement (1910.212(b)).

Woodworking Machinery

- General guidance for woodworking machines and specific requirements for saws, jointers, tenoning, boring, mortising machines, shapers, planing, molding, sticking, matching machines, lathes, sanders and miscellaneous types of machines are as follow:
 - Freedom from sensible vibration, when using largest tool at full speed,
 - Arbors and mandrels must have firm and secure bearing and be free of play

Woodworking Machinery

- Guards must be in place on belts, pulley, gears, etc.,
- Power control must be provided for each machine, and within easy reach of operator, and non-restarting after power failure, when injury might result,
- Frames of portable wood working tools must be grounded by ground wire and polarized plug,
- Locking-type shifters must be on machines driven by belts and shafting, or similar device, and
- Operating treadles must be protected from tripping.

Saws

- Cutoff saws cannot run continuously without operator being able to control each stroke.
- Saw frames must limit the size of the saw blade that can be mounted.
- Rear areas of the blade must be guarded where there is possibility of contact.
- Saw blades, cutters, etc. must be correctly sized and shaped for the arbor.

Radial Saws

- Radial saws must have a label not less than 1.5"X.75" on the rear of the guard reading "Danger: Do not rip or plough from this end".
- Radial saws must return to the rear position when released.
- Radial saws must have non-kickback fingers located on both sides of the saw.
- Radial saws must have an adjustable stop to prevent excessive forward travel of the blade.

Bandsaws / Sanding Machines

- Bandsaws shall have all portion of the blade guarded, expect for working portion.
- Bandsaws must have tension control device.
- Sanding machines (belt type) shall be provided with guards at each nip point.
- Sanding machines (belt type) unused portion of belt must be guarded.

Saws

- Wood working machinery must be inspected and maintained to prevent hazards such as dull or cracked blades and improper tensioning (no time frame).
- Push sticks shall be provided.
- Emphasis on maintaining cleanliness.

Abrasive Wheel Machinery

- Machines must be provided with safety guards,
- Rigid work rests must be used and be within 1/8" of the wheel,
- Guards on bench and floor stands must not expose more than 25% of the periphery and not more than 65 degrees above the horizontal plane of the spindle,

Abrasive Wheel Machinery

- Wheel tongue, guard shall be adjustable and kept within $\frac{1}{4}$ " of the wheel, and
- Before mounting, wheels shall be closely inspected and sounded, and will be checked for correct maximum operating speed (rpm).

Mechanical Power Transmission Apparatus

- Mechanical systems that transmit power from prime movers (power sources) to machines.
- This includes flywheels, pulley, chains, belts, connecting rods, cams, gears, etc.
- This primary thrust is to ensure effective guarding is provided for nip points, sprockets, rotating members, etc.

Mechanical Power Transmission Apparatus

- This section does not apply for belts operating below 250 feet/minute and 1" or less in width (flat), 2" or less (if flat and free of metal lacing or fasteners), 1/2" or less (round) and 13/32" or less (single strand V belt).

Mechanical Power Transmission Apparatus

- The requirements include:
 - Guards must be made of suitable materials,
 - Guards are required when components are within 7 feet of the floor or work surface,
 - Provisions are given to allow non-guarding of components located in rooms used exclusively for power transmission,
 - Keys, set screws, bolts, nuts and other projections which could cause injury must be guarded,

Mechanical Power Transmission Apparatus

- Provisions for maintenance activities such as oiling openings are required,
- Suspended counterweights must be guarded by location or encased,
- Power transmission must be inspected at least every 60 days and kept in good working condition at all times, and
- Regular oilers shall wear tight fitting clothing and whenever possible oil only motionless equipment.

Other

- The following sections of subpart O are for specialized equipment.
 - 1910.216 covers machinery for rubber and plastic industries,
 - 1910.217 covers mechanical power presses,
 - 1910.218 covers forging machines.

Inspections

- Inspections must be made to ensure that guards are in place, secure and properly designed and adjusted prior to machine operation.
 - Inspections should be documented.

Training

- Machine operators must be trained in the proper use of machines including proper identification of guarding, and maintenance of guarding, clothing and hair issues, and procedures for removing and installing guarding.

Improper Guard Examples



Questions?