

from the sudden release of a compressed gas against a free piston impart impact to the workpiece.

(8) *Forging rolls* mean a class of auxiliary forging equipment wherein stock is shaped between power driven rolls bearing contoured dies. Usually used for preforming, roll forging is often employed to reduce thickness and increase length of stock.

(9) *Ring rolls* mean a class for forging equipment used for shaping weldless rings from pierced discs or thick-walled, ring-shaped blanks between rolls which control wall thickness, ring diameter, height and contour.

(10) *Bolt-headers* mean the same as an upsetter or forging machine except that the diameter of stock fed into the machine is much smaller, i.e., commonly three-fourths inch or less.

(11) Rivet making machines mean the same as upsetters and boltheaders when producing rivets with stock diameter of 1-inch or more. Rivet making with less than 1-inch diameter is usually a cold forging operation, and therefore not included in this subpart.

(12) Upsetters (or forging machines, or headers) type of forging equipment, related to the mechanical press, in which the main forming energy is applied horizontally to the workpiece which is gripped and held by prior action of the dies.

(f) As used in §1910.219, unless the context clearly requires otherwise, the following mechanical power-transmission guarding terms shall have the meaning prescribed in this paragraph.

(1) *Belts* include all power transmission belts, such as flat belts, round belts, V-belts, etc., unless otherwise specified.

(2) *Belt shifter* means a device for mechanically shifting belts from tight to loose pulleys or vice versa, or for shifting belts on cones of speed pulleys.

(3) *Belt pole* (sometimes called a *belt shipper* or *shipper pole*.) means a device used in shifting belts on and off fixed pulleys on line or countershaft where there are no loose pulleys.

(4) *Exposed to contact* means that the location of an object is such that a person is likely to come into contact with it and be injured.

(5) *Flywheels* include flywheels, balance wheels, and flywheel pulleys

mounted and revolving on crankshaft of engine or other shafting.

(6) *Maintenance runway* means any permanent runway or platform used for oiling, maintenance, running adjustment, or repair work, but not for passageway.

(7) *Nip-point belt and pulley guard* means a device which encloses the pulley and is provided with rounded or rolled edge slots through which the belt passes.

(8) *Point of operation* means that point at which cutting, shaping, or forming is accomplished upon the stock and shall include such other points as may offer a hazard to the operator in inserting or manipulating the stock in the operation of the machine.

(9) *Prime movers* include steam, gas, oil, and air engines, motors, steam and hydraulic turbines, and other equipment used as a source of power.

(10) *Sheaves* mean grooved pulleys, and shall be so classified unless used as flywheels.

[39 FR 23502, June 27, 1974, as amended at 39 FR 41846, Dec. 3, 1974; 53 FR 8353, Mar. 14, 1988]

**§ 1910.212 General requirements for all machines.**

(a) *Machine guarding*—(1) *Types of guarding*. One or more methods of machine guarding 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. Examples of guarding methods are—barrier guards, two-hand tripping devices, electronic safety devices, etc.

(2) *General requirements for machine guards*. Guards shall be affixed to the machine where possible and secured elsewhere if for any reason attachment to the machine is not possible. The guard shall be such that it does not offer an accident hazard in itself.

(3) *Point of operation guarding*. (i) Point of operation is the area on a machine where work is actually performed upon the material being processed.

(ii) The point of operation of machines whose operation exposes an employee to injury, shall be guarded. The guarding device shall be in conformity

with any appropriate standards therefor, or, in the absence of applicable specific standards, 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.

(iii) Special handtools for placing and removing material shall be such as to permit easy handling of material without the operator placing a hand in the danger zone. Such tools shall not be in lieu of other guarding required by this section, but can only be used to supplement protection provided.

(iv) The following are some of the machines which usually require point of operation guarding:

- (a) Guillotine cutters.
- (b) Shears.
- (c) Alligator shears.
- (d) Power presses.
- (e) Milling machines.
- (f) Power saws.
- (g) Jointers.
- (h) Portable power tools.
- (i) Forming rolls and calenders.

(4) *Barrels, containers, and drums.* Revolving drums, barrels, and containers shall be guarded by an enclosure which is interlocked with the drive mechanism, so that the barrel, drum, or container cannot revolve unless the guard enclosure is in place.

(5) *Exposure of blades.* When the periphery of the blades of a fan is less than seven (7) feet above the floor or working level, the blades shall be guarded. The guard shall have openings no larger than one-half (1/2) inch.

(b) *Anchoring fixed machinery.* Machines designed for a fixed location shall be securely anchored to prevent walking or moving.

**§ 1910.213 Woodworking machinery requirements.**

(a) *Machine construction general.* (1) Each machine shall be so constructed as to be free from sensible vibration when the largest size tool is mounted and run idle at full speed.

(2) Arbors and mandrels shall be constructed so as to have firm and secure bearing and be free from play.

(3) [Reserved]

(4) Any automatic cutoff saw that strokes continuously without the oper-

ator being able to control each stroke shall not be used.

(5) Saw frames or tables shall be constructed with lugs cast on the frame or with an equivalent means to limit the size of the saw blade that can be mounted, so as to avoid overspeed caused by mounting a saw larger than intended.

(6) Circular saw fences shall be so constructed that they can be firmly secured to the table or table assembly without changing their alignment with the saw. For saws with tilting tables or tilting arbors the fence shall be so constructed that it will remain in a line parallel with the saw, regardless of the angle of the saw with the table.

(7) Circular saw gages shall be so constructed as to slide in grooves or tracks that are accurately machined, to insure exact alignment with the saw for all positions of the guide.

(8) Hinged saw tables shall be so constructed that the table can be firmly secured in any position and in true alignment with the saw.

(9) All belts, pulleys, gears, shafts, and moving parts shall be guarded in accordance with the specific requirements of § 1910.219.

(10) It is recommended that each power-driven woodworking machine be provided with a disconnect switch that can be locked in the off position.

(11) The frames and all exposed, non-current-carrying metal parts of portable electric woodworking machinery operated at more than 90 volts to ground shall be grounded and other portable motors driving electric tools which are held in the hand while being operated shall be grounded if they operate at more than 90 volts to ground. The ground shall be provided through use of a separate ground wire and polarized plug and receptacle.

(12) For all circular saws where conditions are such that there is a possibility of contact with the portion of the saw either beneath or behind the table, that portion of the saw shall be covered with an exhaust hood, or, if no exhaust system is required, with a guard that shall be so arranged as to prevent accidental contact with the saw.

(13) Revolving double arbor saws shall be fully guarded in accordance