

Machinery and Machine Guarding

Description:

OSHA machinery and machine guarding standards require the employer to assure that employees are protected from the hazards associated with operating specified metal and woodworking equipment, mechanical power presses, and the mechanical power-transmission apparatus for shaft driven or belt driven equipment such as pumps and compressors by maintaining required guards and machinery adjustments.

Regulatory Reference

29 CFR Subpart O Machinery and Machine Guarding

29 CFR § 1910.211 Definitions

29 CFR § 1910.212 General requirements for all machines.

29 CFR § 1910.215 Abrasive wheel machinery.

29 CFR § 1910.219 Mechanical power-transmission apparatus.

Applies to:

All employers that have operations incorporating shop and plant equipment requiring protection of the operator and other employees in the machine area from hazards such as those created by point of operation, rotating parts, flying chips and sparks are included in the OSHA standard. Examples of guarding methods are barrier guards, two-hand tripping devices, and electronic safety devices, maintaining prescribed work piece rest openings, protective shields, and hoods.

General Requirements:

- (1) 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.
- (2) Point of operation guarding. Point of operation is the area on a machine where work is actually performed upon the material being processed. 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 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.

Some of the machines which usually require point of operation guarding that may be used in propane or heating ventilation and air conditioning businesses include shears, power presses, portable power tools, and power saws. In addition to guarding, machines designed for a fixed location shall be securely anchored to prevent walking or moving.

- (3) Machine controls and equipment. A mechanical or electrical power control shall be provided on each machine to make it possible for the operator to cut off the power from each machine without leaving his position at the point of operation. On applications where injury to the operator might result if motors were to restart after power failures, provision shall be made to prevent machines from automatically restarting upon restoration of power. Power controls and operating controls should be located within easy reach of the operator

while he is at his regular work location, making it unnecessary for him to reach over the cutter or other hazard to make adjustments on woodworking and metal working equipment.

- (4) Woodworking Equipment. Devices to prevent kick back of fed wood stock, over feeding of stock, and protection from blades during operation or maintenance must meet the requirements of § 1910.213.
- (5) Abrasive wheel machinery. Abrasive wheel machinery such as bench grinders must be guarded and maintained as prescribed in § 1910.215. Basic requirements include:
- (a) Abrasive wheels shall be used only on machines provided with safety guards, except for heels used for internal work while within the work being ground; mounted wheels, used in portable operations, 2 inches and smaller in diameter; Types 16, 17, 18, 18R, and 19 cones, plugs, and threaded hole pot balls where the work offers protection.
 - (b) The safety guard shall cover the spindle end, nut, and flange projections.
 - (c) On grinding machines such as bench grinders, work rests shall be used to support the work. They shall be of rigid construction and designed to be adjustable to compensate for wheel wear. Work rests shall be kept adjusted closely to the wheel with a maximum opening of one-eighth inch to prevent the work from being jammed between the wheel and the rest, which may cause wheel breakage. The work rest shall be securely clamped after each adjustment. The adjustment shall not be made with the wheel in motion.
 - (d) Abrasive grinding wheels must be removed and replaced when they are cracked or damaged, worn to diameters smaller than outer supports and guarding devices, or to the points prescribed in the tables found in § 1910.215.
 - (e) Original equipment manufacturer eye protection devices must be maintained and replaced as needed. Original eye protection devices may be supplemented by the use of suitable eye protection equipment worn by operators. Specific warning signs must be posted to inform employees and operators of any eye protection requirements.
- (6) Mechanical power presses such as sheet metal fabrication equipment must be guarded and maintained as set out in § 1910.217.
- (7) Mechanical power-transmission apparatus. Belt and pulley-driven equipment such as pumps and compressors must be guarded and maintained as prescribed in § 1910.217. Shaft couplings shall be so constructed as to present no hazard from bolts, nuts, setscrews, or revolving surfaces. Bolts, nuts, and setscrews will, however, be permitted where they are covered with safety sleeves or where they are used parallel with the shafting and are countersunk or else do not extend beyond the flange of the coupling. Shaft coupling guards provided by original equipment manufacturers should be maintained in place during the operation of the equipment.

All power-transmission equipment shall be inspected at intervals not exceeding 60 days and be kept in good working condition at all times. Shafts shall be kept in alignment, free from rust and excess oil or grease. Cracked or damaged belt pulleys and sheaves must be replaced upon determining that they are damaged. Pulleys shall be kept in proper alignment to prevent belts from running off. Bearings shall be kept in alignment and properly adjusted and lubricated.

Training Requirements:

There are no specified training requirements for the machine guarding standards.

Maintenance and Review

Many employers set up periodic equipment inspection schedules and assign inspection responsibilities to designated supervisors or managers to assure the OSHA standards are met. Particular attention should be given to guarding and work piece support adjustments on bench grinders and guarding of pump and compressor belt and pulleys and drive shaft connectors. Violation of these items is a common citation for shop and bulk plant operations when OSHA site inspections occur.

Maintaining files that include equipment manufacturers' operating instructions, maintenance guidelines, parts lists and related information for equipment located in company shops and bulk plants is useful for determining what guarding devices should be inspected and what replacement parts should be ordered if the need arises. Consult these information sources to determine machinery guarding and maintenance requirements, and incorporate these measures into a periodic maintenance and inspection program. Maintaining inspection and maintenance records will aid in demonstrating compliance efforts should the need arise.

When a guard or other protective device on equipment requires replacement or adjustment, be sure that the work is performed without delay. If repairs must be postponed, place warning tags on the equipment and disconnect the power source until the repairs are made.

Additional Information and Resources

Original equipment manufacturer's manuals are important resources and should be retained.