

## OSHA Directives

### STD 1-12.21 - 29 CFR 1910.217 Mechanical Power Presses, Clarifications

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OSHA PROGRAM DIRECTIVE #100-100

TO: REGIONAL ADMINISTRATORS/OSHA

THRU: DONALD E. MACKENZIE Field Coordinator

SUBJECT: 29 CFR 1910.217, Mechanical Power Presses, Clarifications

#### 1. Purpose

This directive provides a guide to aid in the recognition of mechanical power presses' point of operation hazards and uniform clarifications of definitions, guards, develop and methods of safeguarding.

#### 2. Documentation Affected

This directive cancels OSHA Program Directives #100-40 dated September 29, 1975, and #100-43 dated January 21, 1976.

#### 3. Background

a. On December 3, 1974, the final amendments to 29 CFR 1910.217 were published in the Federal Register, Volume 39, Number 233. The detailed statement of reasons preceding the amendments noted that while the previous "no hands in die" ruling had as its goal the elimination of any need for an operator to ever have his hands in the point of operation. that requirement alone did not result in hazard-free operation. The installation of redundant guards and devices as backup safeties were not judged to significantly improve safety. Moreover, questions of technological and economic infeasibility were raised. While it is believed that "no hands in die"

should continue to be an industry goal, the determination was made to reveal the absolute "no hands in die" requirement in favor of improving the utilization of a single means of press safeguarding. For most operations, adequate protection can be afforded, by a single guard or guarding device as long as that means of protection is properly designed, installed, maintained, and, most importantly, used under supervision. From an enforcement standpoint, employer adherence to each of these elements of a press guarding program in the workplace takes on increased importance. -2-

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b. 29 CFR 1910.217 covers the protection of press operators, die setters and maintenance personnel engaged in mechanical power press operations such as stroking, die tryout, die setting and maintenance. Press machines which are not mechanical power presses such as forging presses, press brakes, shears, iron workers, powder metal presses, die presses, brick presses, dinkers and clickers, engraving and others are covered by other sections of Subpart O. Most mechanical power presses work on metal, however, some mechanical power presses work on metal, however, some mechanical power presses are use on materials such as plastic, paper and fiberboard.

c. This directive is not intended as a training guide but is a tool to provide uniformity in interpretation and application of the existing standards.

#### 4. Clarifications

##### a. Mechanical Power Press Recognition

(1) A mechanical power press is defined as a mechanically powered machine that shears, punches, forms or assembles metal or other material by means of cutting, shaping or combination by dies attached to slides (29 CFR 1910.211(d)(46)). However, there are many machines, such as platen presses in the shoe industry, clickers and die presses in the shoe industry, ironworkers and many others that perform these functions but are not power presses. The question commonly arises as to whether a particular machine is in fact a mechanical power press under the standard. The two most important recognition points are that the tools or dies are mounted on a slide (also called a ram, plunger or platen) and the slide operates in a controlled reciprocating motion toward and away from the stationary bed or anvil, the slide being guided in a definite path by the frame of the press.

(2) The power presses to which 29 CFR 1910.217 applies can be divided into two categories depending on the type of clutches they are equipped with (the clutch being the means of transmitting energy from the flywheel to the crankshaft which in turn is connected to the slide). The two types are full revolution type clutches and part revolution type clutches. The full revolution type, once activated, makes one complete revolution of the crankshaft and a full cycle of the -3-

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slide before the clutch can be disengaged (29 CFR 1910. 211(d)(5)). The part revolution type can be disengaged at any point before the crankshaft has completed a full revolution and full stroke of the slide (29 CFR 1910.211(d)(6)).

NOTE: Direct drive presses have no clutches but some do have brakes. Direct drive presses can be stopped at any point by deenergized the drive motor, therefore, they are considered as a part revolution type press (29 CFR 1910.211(d)(7)).

(a) Recognition of full revolution type.

(i) The clutch mechanism is generally visible between the flywheel and the crankshaft (sometimes is on the countershaft on larger presses).

(ii) Will not normally have a brake monitor system.

(iii) Will not have a dual air control valve or clutch brake.

(iv) Will not have an inch mode of operation.

(v) Will complete a full cycle after activated.

(vi) Will be equipped with a brake which is usually continuously applied (band-type brake).

(vii) The clutch engaging mechanical linkage will usually be visible.

(b) Recognition of the part revolution type.

(i) May have an inch-control.

(ii) Will usually have a chain or direct drive from the crankshaft to a limit switch assembly.

(iii) The clutch/brake mechanism is one unit mounted on the crankshaft or countershaft and is generally enclosed.

(iv) Will usually have a control panel with a press stroke selector switch.

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(v) May have clutch brake dual air control valve.

(vi) The ram will stop on the down stroke when the two-hand controls are released.

(vii) Will be equipped with a friction brake that is applied when a clutch is deactivated.

## b. Guards, Devices, Other Methods and Handy Feeding Tools

(1) Guards or fixed barriers are attached to the frame, die, or base of a press and prevent the operator from putting his hands or fingers into the point of operation even when the press is not cycling (29 CFR 1910.211(d)(32)).

(2) Devices are press controls or attachments which either stop normal press operation before the operator can reach into the point of operation or automatically withdraw his hands before the die closes, if the operator's hands are inadvertently within the point of operation. Examples of such devices are two hand-controls and two-hand trips, Type A and B gates, pull-outs and presence sensing devices (29 CFR 1910.211(d)(11)-(17)).

(3) Other Methods. Occasionally a machine without guards or devices may be adequately safeguarded by reason of its location, the location of other equipment, or the location of the other operator's station. To be guarded by location, the hazardous area must be inaccessible to all employees during the operating cycle. For example, the feeding equipment of an automatically fed press may function as a barrier in preventing entry into the point of operation. Such circumstances must be carefully analyzed to determine if additional guards or devices are needed.

(4) Hand Feeding Tools. The use of hand feeding tools (regardless of their length or size) does not replace guards or devices (29 CFR 1910.217(c)(4)). When used, close supervision is essential because of the tendency to put such tools aside to expedite feeding. The use of hand tools also involves other hazards. For example, should the die close while a hand tool is in the point of operation, the operator could have the tool wrenched from his grasp and be struck by it or he could be forcibly jerked against the machine and injured.

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## c. Types of Guards

(1) The following information is intended to clarify, with reference to the standards, the various means of protecting operators from the point of operation hazard. An employer is required to provide and insure the usage of "point of operation guards" or properly installed devices on every operation performed on a press when the opening of the die is more than one-fourth inch (29 CFR 1910.217(c)(1)(i) and (ii)). 29 CFR 1910.217(c)(2) and (3) describe the guards and devices as they shall be used to protect the operator.

(2) A guard is the most positive form of protection if designed and constructed to prevent entry of hand or fingers into the point of operation by reaching through, over, under or around the guard (29 CFR 1910.217(c)(2)(i)(a)).

(3) An inadequate enclosure is not a guard and may be used only in conjunction with point of operation devices (29 CFR 1910.217(c)(2)(vii)). If guards are installed and function correctly, no other guard or device is required.

(a) A die enclosure guard is a barrier attached to the die shoe or stripper (29 CFR 1910.211(d)(33); 29 CFR 1910.217(c)(2)(ii)).

(b) A fixed barrier guard is a guard attached to the press frame or bolster plate (base) (29 CFR 1910.211 (d)(34); 29 CFR 1910.217(c)(2)(iii)).

(c) An interlocked barrier guard is attached to the press frame and bolster plate and be equipped with hinged, or movable sections. The guard itself or the hinged or movable sections are locked in the closed position. The interlock also prevents opening the guard or the movable sections as long as the slide is in motion (29 CFR 1910.211(d)(35); 29 CFR 1910.217(c)(2)(iv) and(v)). The hinged or movable sections, of the guard are intended for infrequent use such as setup or adjustment and not for manual feeding (29 CFR 1910.217(c)(2)(v)).

(d) An adjustable barrier guard is attached to the press bed, bolster plate, or die shoe and requires adjustment (by authorized personnel only) for each job or die setup (29 CFR 1910.211(d)(36) and 29 CFR 1910.217 (c)(2)(vi)).

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##### d. Types of Devices

Since fixed guarding is not always possible due to the nature of an operation, devices are acceptable as a means of protection against point of operation hazard. When the following devices are properly installed and function properly, no other point of operation guarding is required recess the operation is such that a combination of guards or devices is necessary:

(1) A movable barrier or gate device resembles an interlocked barrier guard in appearance since it is interlocked into the press' clutch so that slide motion cannot be initiated unless the gate is closed (29 CFR 1910.211(d)(13)). A Type "A" gate must enclose the point of operation before a stroke can be initiated and remain closed as long as the slide is moving (29 CFR 1910.217(c)(3)(ii)(a) and (c)(3)(i)(f)). A Type "B" gate when used on a press prevents entry only during the downstroke and must prevent access prior to cessation of motion or die closure (29 CFR 1910.217 (c)(3)(ii)(b) and (c)(3)(i)(g)).

(2) Pull-out devices consist of operator wristbands connected by cords and linkage to the slide or upper die so that when the die descends the operator's hands will be automatically withdrawn from the point of operation if he had not already withdrawn them (29 CFR 1910.211 (i)(15); 1910.217(c)(3)(iv) and (c)(3)(i)(b)). Close supervision is required to assure their use and proper adjustment. Records must be kept of safety checks (29 CFR 1910.217(c)(3)(iv)(d)).

(3) Holdout or restraint devices consist of attachments, for each of the operator's hands, which are securely anchored and adjusted to prevent the operator from reaching into the point of operation at any time (29 CFR 1910.211(d)(14); 1910.217(c)(3)(vi) and (c)(3)(i)(c)).

(4) Presence sensing devices are restricted to use only on part revolution clutch presses. A presence sensing device is a light curtain or other type sensing field between the operator and the point of operation interlocked into the control system so that slide motion is prevented or stopped prior to die closure if the operator's hands or any part of his body is within the sensing field (29 CFR 1910.211(d)(6) and (12); 1910.217(c)(3)(i)(a) and (c)(3)(iii)). Areas not protected by the pressure sensing devices must be guarded.

NOTE: Sweep type devices consist of single or double arm or rod attached to the slide of the press so that it will push the operator's hands away from the point of operation as the slide descends. This device cannot be used as a single safeguard for point of operation guarding after December 31, 1976 (29 CFR 1910.211(d)(16); 1910.217(c)(3)(v) and (c)(3)(i)(o)).

#### e. Types of Controls

(1) Two-hand control devices are used only on presses With a part revolution clutch, and the operator must depress two buttons concurrently to initiate slide action. The buttons must be depressed continuously disengages time) on the downstroke or else the clutch disengages, the brake is applied and the slide stops (29 CFR 1910.211(d)(17); 1910.217(c)(3)(vii) and (c)(3)(i)(e)).

(2) Two-hand trip devices once pressed do not have to be held during the downstroke, and the slide will stop only after it has completed a full cycle. The device be generally applicable to full revolution clutch presses (29 CFR 1910.211(d)(57); 1910.217(c)(3) (viii) and (c)(3)(i)(e)).

NOTE: In addition to proper design, installation and correct operation, it is required that two-hand controls, two-hand trips and presence sensing devices be located far enough away from the point of operation (depending on the stopping time of the press) that when the operator releases the control buttons or disturbs the presence sensing field, he does not have time to reach into the point of operation before the die closes or slide stops (29 CFR 1910.217(c)(3)(iii)(e), (c)(3)(vii)(c), and (c) (3)(viii)(c)). Safety distance formulas for two-hand, buttons and presence sensing devices are included, in the standard. Since time factors will actually be in milliseconds rather than seconds, the National Office is presently evaluating several units that will measure brake stopping time and distance for field use.

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#### f. Control Reliability and Brake Monitor Systems

A control reliability system detects a failure within the controls and prevents initiation of a successive stroke until the failure is corrected. (29 CFR 1910. 217(b)(13)).

A brake monitor system monitors the performance of the brake on each stroke and automatically prevents the activation of a successive stroke if the stopping time or braking distance has deteriorated beyond the predetermined safe stopping distance. (29 CFR 1910.217(b)(14)).

Safeguarding devices such as two-hand controls, presence sensing device, Type "B" gate, or movable barriers allow the operator to feed or remove parts by placing one or both hands in the point of operation. Therefore, when these devices are used on part revolution clutch presses, the control reliability system and brake monitor system are required to assure operator's safety from the point of operation hazard. (29 CFR 1910.217(c)(5) and 29 CFR 1910. 217(c)(5)(i)).

5. Effective Date This directive is effective immediately and will remain in effect until rescinded or revised by standards changes.

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