DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS

DIRECTOR'S OFFICE

GENERAL INDUSTRY SAFETY STANDARDS

(By authority conferred on the director of the department of licensing and regulatory affairs by sections 16 and 21 of 1974 PA 154, MCL 408.1016 and 408.1021, and Executive Reorganization Order Nos. 1996-2, 2003-1, 2008-4, and 2011-4, MCL 445.2001, 445.2011, 445.2025, and 445.2030)

PART 24. MECHANICAL POWER PRESSES

GENERAL PROVISIONS

R 408.12401 Scope.

Rule 2401. (1) This standard applies to power presses that shear, punch, form, or assemble metal or any other material by means of tools or dies attached to plungers or slides and that are commonly referred to as mechanical power presses.

(2) This standard does not apply to any of the following:

(a) Hydraulic presses.
(b) Iron workers.
(c) Press brakes.
(d) Bulldozers.
(e) Hot metal presses.
(f) Forging hammers.
(g) Hot-bending presses.
(h) Molding or riveting machines.
(i) Welder presses.
(j) Nut clinching machines.
(k) Metal stitching machines.
(l) Stationary engraving presses.
(m) Powdered metal presses.
(n) Multi-slide machines.

History: 1979 AC; 1990 AACS; 2016 AACS.

R 408.12402 Adopted and referenced standards.

Rule 2402. (1) The following standards are adopted by reference in these rules and are available from IHS Global, 15 Inverness Way East, Englewood, Colorado, 80112, USA, telephone number: 1-800-854-7179 or via the internet at website: http://global.ihs.com; at a cost as of the time of adoption of these rules, as stated in this subrule.

(a) American Society of Mechanical Engineers ASME "Pressure Vessel Code," Section VIII, "Unfired Pressure Vessels," 1974 edition. Cost: $514.00.

(b) ASME "Pressure Vessel Code," Section VIII, "Unfired Pressure Vessels," 1983 edition. Cost: $514.00

(2) The standards adopted in these rules are available for inspection at the Department of Licensing and Regulatory Affairs, MIOSHA Regulatory Services Section, 530 West Allegan Street, Lansing, Michigan, 48933.

(3) Copies of the standards adopted in these rules may be obtained from the publisher or may be obtained from the Department of Licensing and Regulatory Affairs, MIOSHA Regulatory Services Section, 530 West Allegan Street, P.O. Box 30643, Lansing, Michigan, 48909-8143, at the cost charged in this rule, plus $20.00 for shipping and handling.

(4) The Michigan occupational safety and health General Industry Safety Standard Part 1 "General Provisions," R 408.1001 to R 408.10098, is referenced in these rules. Up to 5 copies of this standard may be obtained at no charge from the Michigan Department of licensing and regulatory affairs, MIOSHA Regulatory Services Section, 530 West Allegan Street, P.O. Box 30643, Lansing, Michigan, 48909-8143 or via the internet at website: www.michigan.gov/mioshastandards. For quantities greater than 5, the cost, at the time of adoption of these rules, is 4 cents per page.

History: 2016 AACS.

R 408.12403 Definitions; A to C.

Rule 2403. (1) "Adjustable barrier guard" means a barrier that is adjustable for different jobs or die setups.

(2) "Anti-repeat" means the part of the clutch/brake control system designed to limit the press to a single stroke. Anti-repeat requires release of all tripping mechanisms before another stroke can be initiated. Anti-repeat is also called single stroke reset or reset circuit.

(3) "Automatic feeding" means feeding where the material or part being processed is placed within or removed from the point of operation by a method or means that does not require action by an operator on each stroke of the press.

(4) "Bolster plate" means the plate attached to the top of the bed of the press having drilled holes to T-slots for attaching the lower die or die shoe.

(5) "Brake" means the mechanism used on a mechanical press to stop or hold, or both, the crankshaft, either directly or through a gear train, when the clutch is disengaged.

(6) "Brake monitor" means the sensor designed, constructed, and arranged to monitor the effectiveness of the press braking system.

(7) "Clutch" means the coupling mechanism used on a mechanical press to couple the flywheel to the crankshaft, either directly or through a gear train. See R 408.12404(9), R 408.12405(7), and R 408.12407(4).

(8) "Concurrent" means acting in conjunction with, but not necessarily simultaneously with, and is used to describe a situation where 2 or more controls exist in an operated condition at the same time.

(9) "Continuous" means uninterrupted multiple strokes of the slide without intervening stops or other clutch control action at the end of individual strokes.

(10) "Control system" means the combination of controls that have an effect on the cycling or stopping of the ram where the safety of the operator would be influenced.

(11) "Counterbalance" means the mechanism that is used to balance or support the weight of the connecting rods, slide, and slide attachments.

History: 1979 AC; 1990 AACS; 2016 AACS.

R 408.12404 Definitions; D.

Rule 2404. (1) "Device" means a press control or attachment that performs any 1 of the following functions:

(a) Restrains the operator from inadvertently reaching into the point of operation.

(b) Prevents normal press operation if the operator's hands are inadvertently within the point of operation.

(c) Automatically withdraws the operator's hands if the operator's hands are inadvertently within the point of operation as the dies close. See R 408.12406(1) and (5), R 408.12407(7) and (9), R 408.12408(10), and R 408.12409(3).

(2) "Die" means the tooling used in a press for cutting or forming material. An upper and lower die make a complete set.

(3) "Die builder" means a person who builds dies for presses.

(4) "Die enclosure guard" means an enclosure that is attached to the die shoe or stripper, or both, in a fixed position.

(5) "Die set" means a tool holder which is held in alignment by guide posts and bushings and which consists of a lower shoe, an upper shoe or punch holder, and guide posts and bushings.

(6) "Die setter" means an individual who places dies in, or removes dies from, mechanical presses and who, as a part of assigned duties, makes the necessary adjustments to cause the tooling to function properly and safely.

(7) "Die setting" means the process of placing dies in, or removing dies from, a mechanical press, and the process of adjusting the dies, other tooling, and safeguarding means to cause them to function properly and safely.

(8) "Die shoe" means a plate or block upon which a die holder is mounted. A die shoe functions primarily as a base for the complete die assembly and, when used, is bolted or clamped to the bolster plate or the face of the slide.

(9) "Direct drive" means the type of driving arrangement where a clutch is not used and where coupling and decoupling of the driving torque is accomplished by energization and de-energization of a motor. Even though not employing a clutch, direct drives match the operational characteristics of part revolution clutches because the driving power may be disengaged during the stroke of the press.

History: 1979 AC; 1990 AACS.

R 408.12405 Definitions; E, F.

Rule 2405. (1) "Ejector" means a mechanism for removing work or material from between the dies.

(2) "Face of slide" means the bottom surface of the slide to which the punch or upper die is generally attached.

(3) "Feeding" means the process of placing material within, or removing material from, the point of operation. See R 408.12403(3), R 408.12407(2), and R 408.12408(3).

(4) "Fixed barrier guard" means a die space barrier attached to the press frame.

(5) "Foot control" means the foot-operated control mechanism designed to be used with a clutch or clutch/brake control system.

(6) "Foot pedal" means the foot-operated lever designed to operate the mechanical linkage that trips a full revolution clutch.

(7) "Full revolution clutch" means a type of clutch that, when tripped, cannot be disengaged until the crankshaft completes a full revolution and the press slide completes a full stroke.

History: 1979 AC.

R 408.12406 Definitions; G to K.

Rule 2406. (1) "Gate or movable barrier device" means a movable barrier arranged to enclose the point of operation before the press stroke can be started.

(2) "Guard" means a barrier that prevents entry of the operator's hands or fingers into the point of operation. See R 408.12403(1), R 408.12404(4), R 408.12405(4), and R 408.12406(7).

(3) "Guide post" means the pin attached to the upper or lower die shoe, operating within the bushing on the opposing die shoe, to maintain the alignment of the upper and lower dies.

(4) "Hand feeding tool" means a hand-held tool designed for placing or removing material or parts to be processed within or from the point of operation.

(5) "Holdout or restraint device" means a mechanism, including attachments for operator's hands, that, when anchored and adjusted, prevents the operator's hands from entering the point of operation.

(6) "Inch" means an intermittent motion imparted to the slide (on machines using part revolution clutches) by momentary operation of the "inch" operating means. Operation of the "inch" operating means engages the driving clutch so that a small portion of 1 stroke or indefinite stroking can occur, depending upon the length of time the "inch" operating means is held operated. "Inch" is a function used by the die setter for setup of dies and tooling, but is not intended for use during production operations by the operator.

(7) "Interlocked press barrier guard" means a barrier attached to the press frame and interlocked so that the press stroke cannot be started normally unless the guard itself, or its hinged or movable sections, enclose the point of operation.

(8) "Jog" means an intermittent motion imparted to the slide by momentary operation of the drive motor, after the clutch is engaged with the flywheel at rest.

(9) "Knockout" means a mechanism for releasing material from either die.

History: 1979 AC.

R 408.12407 Definitions; L to P.

Rule 2407. (1) "Liftout" means the mechanism also known as knockout.

(2) "Manual feeding" means feeding where the material or part being processed is handled by the operator on each stroke of the press.

(3) "Operator" means an individual who performs production work on a press.

(4) "Operator's station" means the complete complement of controls used by or available to an operator on a given operation for stroking the press.

(5) "Part revolution clutch" means a type of clutch that can be disengaged at any point before the crankshaft has completed a full revolution and the press slide has completed a full stroke.

(6) "Pinch point" means any point, other than the point of operation, at which it is possible for a part of the body to be injured by being caught between the moving parts of a press or auxiliary equipment, between moving and stationary parts of a press or auxiliary equipment, or between the material and moving part or parts of the press or auxiliary equipment.

(7) "Point of operation" means the area of the die where material is actually positioned and work is being performed during any process, such as shearing, punching, forming, or assembling.

(8) "Presence-sensing device" means a device that is designed, constructed, and arranged to create a sensing field or area and to deactivate the clutch control of the press when a hand or other body part of an operator is within such field or area and activate the brake of the press.

(9) "Press," as referred to in this part, means a mechanically powered machine that shears, punches, forms, or assembles metal or other material by means of cutting, shaping, or combination dies attached to slides and is commonly referred to as a mechanical power press. A press consists of a stationary bed or anvil and a slide having a controlled reciprocating motion toward and away from the bed surface, the slide being guided in a definite path by a frame of the press.

(10) "Pull-out device" means a mechanism that is attached to the operator's hands and connected to the upper die or slide of the press and that is designed, when properly adjusted, to withdraw the operator's hands as the dies close if the operator's hands are inadvertently within the point of operation.

History: 1979 AC; 1990 AACS; 2016 AACS.

R 408.12408 Definitions; R, S.

Rule 2408. (1) "Repeat" means an unintended or unexpected successive power stroke of the press resulting from a malfunction.

(2) "Safety block" means a prop that, when inserted between the upper and lower dies or between the bolster plate and the face of the slide, prevents the slide from falling of its own dead weight.

(3) "Semiautomatic feeding" means feeding wherein the material or part being processed is placed within, or removed from, the point of operation by an auxiliary means controlled by an operator on each stroke of the press.

(4) "Single stroke" means 1 complete stroke of the slide, usually initiated from a full open (or up) position, followed by closing (or down), and then a return to the full open position.

(5) "Single stroke mechanism" means an arrangement used on a full revolution clutch to limit the travel of the slide to 1 complete stroke at each engagement of the clutch.

(6) "Slide" means the main reciprocating press member. A slide is also called a ram, plunger, or platen.

(7) "Stop control" means an operator control designed to immediately deactivate the clutch control and activate the brake to stop slide motion.

(8) "Stripper" means a mechanism or die part for removing the parts or material from the punch.

(9) "Stroking selector" means the part of the clutch/brake control that determines the type of stroking when the operating means is actuated. The stroking selector generally includes positions for "off" such as clutch control, "inch," "single stroke," and "continuous" such as when continuous is furnished.

(10) "Sweep device" means a single or double arm(rod) attached to the upper die or slide of the press and designed to move the operator's hands to a safe position, as the dies close, if the operator's hands are inadvertently within the point of operation.

History: 1979 AC; 2016 AACS.

R 408.12409 Definitions; T, U.

Rule 2409. (1) "Trip" or "tripping" means activation of the clutch to "run" the press.

(2) "Turnover bar" means a bar used in die setting to manually turn the crankshaft of the press.

(3) "Two-hand control device" means a 2-hand actuating device that further requires concurrent pressure from both hands of the operator during a substantial part of the die-closing portion of the stroke of the press.

(4) "Two-hand trip" means a clutch actuating means requiring the concurrent use of both hands of the operator to trip the press.

(5) "Unitized tooling" means a type of die in which the upper and lower members are incorporated into a self-contained unit so arranged as to hold the die members in alignment.

History: 1979 AC.

R 408.12411 Employer responsibilities.

Rule 2411. (1) An employer shall train and instruct an operator in the safe method of work before starting work on any operation covered by this standard. The employer shall ensure that correct operating procedures are being followed, that all required safeguards are installed, and that the safeguards are functional and are being used.

(2) An employer shall train and instruct maintenance and inspection personnel who are responsible for the care, inspection, and maintenance of mechanical power presses and assure that they are knowledgeable in these rules.

(3) An employer shall provide clearance between machines so that movement of one operator does not interfere with the work of another. Ample room for cleaning machines and for handling material, work-pieces, and scrap shall also be provided. All surrounding floors shall be kept in good condition and free from obstructions, grease, oil, and water.

(4) An employer shall operate each press within the tonnage and attachment weight ratings specified by the manufacturer.

(5) An employer shall obtain, from any outside firm that modifies a press, instructions that are needed to establish new or changed guidelines for the care and use of the modified press.

History: 1979 AC; 1990 AACS; 1993 AACS; 2016 AACS.

R 408.12412 Inspection and maintenance records.

Rule 2412. (1) An employer shall establish and follow an inspection program having a general component and a directed component according to the following:

(a) Under the general component of the inspection program, the employer shall do the following:

(i) Conduct periodic and regular inspections of each power press to ensure that all of its parts, auxiliary equipment, and safeguards, including the clutch/brake mechanism, anti-repeat feature, and single-stroke mechanism, are in a safe operating condition and adjustment.

(ii) Perform and complete necessary maintenance or repair, or both, before operating the press.

(iii) Maintain a certification record of each inspection, and each maintenance and repair task performed, under the general component of the inspection program that includes the date of the inspection, maintenance, or repair work, the signature of the person who performed the inspection, maintenance, or repair work, and the serial number, or other identifier, of the power press inspected, maintained, and repaired.

(b) Under the directed component of the inspection program, the employer shall do all of the following:

(i) Inspect and test each press on a regular basis at least once a week to determine the condition of the clutch/brake mechanism, anti-repeat feature, and single-stroke mechanism.

(ii) Perform and complete necessary maintenance or repair, or both, on the clutch/brake mechanism, anti-repeat feature, and single-stroke mechanism before operating the press.

(iii) Maintain a certification record of each maintenance task performed under the directed component of the inspection program that includes the date of the maintenance task, the signature of the person who performed the maintenance task, and the serial number, or other identifier, of the power press maintained.

Note to subdivision (b) of this rule: Inspections of the clutch/brake mechanism, anti-repeat feature, and single-stroke mechanism conducted under the directed component of the inspection program are exempt from the requirement to maintain certification

records specified by subdivision (a)(iii) of this subrule, but inspections of the clutch/brake mechanism, anti-repeat feature, and single-stroke mechanism conducted under the general component of the inspection program are not exempt from this requirement.

(c) Subdivision (b) of this subrule does not apply to presses that comply with R 408.12422 (2) and R 408.12429.

(2) When an inspection of a press reveals a condition that is likely to lead to a component failure that could cause an injury to the operator or other employee, the condition shall be corrected before the press is operated.

History: 1979 AC; 1990 AACS; 1993 AACS; 2016 AACS.

Editor's Note: An obvious error in R 408.12412 was corrected at the request of the promulgating agency, pursuant to Section 56 of 1969 PA 306, as amended by 2000 PA 262, MCL 24.256. The rule containing the error was published in *Michigan Register,* 2016 MR 22. The memorandum requesting the correction was published in *Michigan Register,* 2017 MR 5.

R 408.12413 Reports of injuries.

Rule 2413. An employer shall, within 30 days of the occurrence, report to the director of the Michigan Occupational Safety and Health Administration (MIOSHA), 530 West Allegan Street, Lansing, Michigan 48933, all point of operation injuries or injuries within the confines of the die to operators or other employees. All of the following information shall be included in the report:

(a) Employer's name, address, and location of the workplace and establishment.

(b) Employee's name, injury sustained, date of injury, and the task being performed such as operation, setup, maintenance, or other tasks.

(c) Type of clutch used on the press such as full revolution, part revolution, or direct drive.

(d) Type of safeguard being used such as 2-hand control, 2-hand trip, pull-outs, or other safeguards. If the safeguard is not described herein, give a complete description.

(e) Cause of the accident such as repeat of press, safeguard failure, removing stuck part or scrap, no safeguard provided, no safeguard in use, or other causes.

(f) Type of feeding such as manual with hands in dies or with hands out of dies, semiautomatic, automatic, or other types of feeding.

(g) Means used to actuate press stroke such as foot trip, foot control, hand trip, hand control, or other means.

(h) Number of operators required for the operation and the number of operators provided with controls and safeguards.

History: 1979 AC; 1990 AACS; 2016 AACS.

CONSTRUCTION--GENERAL

R 408.12421 Broken or falling machine components.

Rule 2421. Machine components shall be designed, secured, or covered to minimize hazards caused by breakage, loosening and falling, or release of mechanical energy.

History: 1979 AC.

R 408.12422 Brakes.

Rule 2422. (1) Friction brakes provided for stopping or holding the slide movement shall be set with compression springs. Brake capacity shall be sufficient to stop the motion of the slide quickly and shall be capable of holding the slide and its attachments at any point in its travel.

(2) When required by R 408.12461 of this part, the brake monitor shall meet the following requirements:

(a) Be so constructed as to automatically prevent the activation of a successive stroke if the stopping time or braking distance deteriorates to a point where the safety distance being utilized does not meet the requirements prescribed in R 408.12463(1) and (7). The brake monitor used with the type B gate or movable barrier device shall be installed in a manner to detect slide top-stop overrun beyond the normal limit reasonably established by the employer.

(b) Be installed on a press in such a way that it indicates when the performance of the braking system has deteriorated to the extent described in subdivision (a) of this subrule.

(c) Be constructed and installed in a manner to monitor brake system performance on each stroke or each time the brakes are applied.

History: 1979 AC.

R 408.12423 Electrical.

Rule 2423. All A.C. control circuits and solenoid valve coils shall be powered by not more than a nominal 120-volt A.C. supply obtained from a transformer with an isolated secondary. Higher voltages that may be necessary for operation of machine or control mechanisms shall be isolated from any control mechanism handled by the operator, but motor starters with integral start-stop buttons may utilize line voltage control. All D.C. control circuits shall be powered by not more than a nominal 240-volt D.C. supply isolated from any higher voltages.

History: 1979 AC.

R 408.12424 Component failure.

Rule 2424. Electrical clutch/brake control circuits shall incorporate features to minimize the possibility of an unintended stroke in the event of the failure of a control component to function properly, including relays, limit switches, and static output circuits.

History: 1979 AC.

R 408.12425 Slide counterbalance systems.

Rule 2425. (1) Spring counterbalance systems, when used, shall incorporate means to retain system parts in event of breakage.

(2) Spring counterbalances, when used, shall have the capability to hold the slide and its attachments at mid-stroke, without brake applied.

(3) An air counterbalance cylinder shall have all of the following:

(a) Incorporate means to retain the piston and rod in case of breakage or loosening.

(b) Have adequate capability to hold the slide and its attachments at any point in stroke, without brake applied.

(c) Incorporate means to prevent failure of capability (sudden loss of pressure) in event of air supply failure.

History: 1979 AC; 2016 AACS.

R 408.12426 Air controlling equipment.

Rule 2426. (1) Air controlling equipment shall be protected against foreign material and water entering the pneumatic system of the press.

(2) A means of air lubrication shall be provided when needed.

History: 1979 AC.

R 408.12427 Hydraulic equipment.

Rule 2427. The maximum anticipated working pressures in any hydraulic system on a press shall not exceed the safe working pressure rating of any component used in that system.

History: 1979 AC.

R 408.12428 Pressure vessels.

Rule 2428. (1) A pressure vessel that is used in conjunction with a press before June 15, 1990, shall be as prescribed in American Society of Mechanical Engineers ASME "Pressure Vessel Code," Section VIII, "Unfired Pressure Vessels," 1974 edition, as adopted in R 408.12402.

(2) A pressure vessel that is installed in conjunction with a press after June 15, 1990, shall be as prescribed in ASME "Pressure Vessel Code," Section VIII, "Unfired Pressure Vessels," 1983 edition, as adopted in R 408.12402.

History: 1979 AC; 1990 AACS; 2016 AACS.

R 408.12429 Control reliability.

Rule 2429. When required by R 408.12461 of this part, the control system shall be constructed so that a failure within the system does not prevent the normal stopping action from being applied to the press when required, but does prevent initiation of a successive stroke until the failure is corrected. The failure shall be detectable by a simple test, or indicated by the control system. This requirement does not apply to those elements of the control system which have no effect on the protection against point of operation injuries.

History: 1979 AC.

R 408.12431 Single stroke.

Rule 2431. (1) Presses using full-revolution clutches shall incorporate a single-stroke mechanism, except that the single-stroke mechanism may be omitted if either of the following conditions is met:

(a) A press has barrier guards as prescribed in R 408.12462(1), (2), and (3) on all 4 sides and a second action is required to initiate the cycle after the machine has been energized by the start switch.

(b) A press is operated by 2 hand anti-repeat trips.

(2) If the single-stroke mechanism is dependent upon spring action, the spring shall be of the compression type, operating on a rod or guided within a hole or tube, and designed to prevent interleaving of the spring coils in event of breakage.

History: 1979 AC.

R 408.12432 Foot pedals.

Rule 2432. (1) The pedal mechanism shall be protected to prevent unintended operation from falling or moving objects, or by accidental stepping onto the pedal.

(2) A pad with a nonslip contact area shall be firmly attached to the pedal.

(3) The pedal return spring shall be of the compression type, operating on a rod or guided within a hole or tube, or designed to prevent interleaving of spring coils in event of breakage.

(4) If pedal counterweights are provided, the path of the travel of the weight shall be enclosed.

History: 1979 AC.

R 408.12433 Hand-operated levers.

Rule 2433. (1) Hand-lever-operated presses shall be equipped with a spring latch on the operating lever to prevent premature or accidental tripping.

(2) The operating levers on hand-tripped presses having more than 1 operating station shall be interlocked to prevent the tripping of the press except by the concurrent use of all levers.

History: 1979 AC; 2016 AACS.

R 408.12434 Two-hand trips.

Rule 2434. (1) A 2-hand trip shall have the individual operator's hand controls protected against unintentional operation, and shall have the individual operator's hand controls arranged by design and construction, separation, or both, to require the use of both hands to trip the press and use a control arrangement requiring concurrent operation of the individual operator's hand controls.

(2) Two-hand trip systems on full revolution clutch machines shall incorporate an anti-repeat feature.

(3) If 2-hand trip systems are used on multiple operator presses, each operator shall have a separate set of controls.

History: 1979 AC.

CONSTRUCTION--PART REVOLUTION CLUTCH PRESSES

R 408.12441 Removal of engaging force.

Rule 2441. The clutch shall release and the brake shall be applied when the external clutch engaging means is removed, deactivated, or deenergized.

History: 1979 AC.

R 408.12442 Stop control.

Rule 2442. (1) A red color stop control shall be provided with the clutch/brake control system and shall be located within the reach of the operator at the normal control station.

(2) Momentary operation of the stop control shall immediately initiate deactivation of the clutch and apply the brake.

(3) The stop control shall override any other control, and re-actuation of the clutch shall require use of the operating (tripping) means which has been selected.

History: 1979 AC; 1990 AACS; 2016 AACS.

R 408.12443 Stroking selector.

Rule 2443. Means of selecting "off," "inch," and all other modes that the press operates under shall be supplied with the clutch/brake control to select the type of operation of the press.

History: 1979 AC; 1990 AACS.

R 408.12444 Inch control.

Rule 2444. The "inch" operating means shall be designed to prevent exposure of the worker's hands within the point of operation by either of the following:

(a) Requiring the concurrent use of both hands to actuate the clutch.

(b) Being a single control protected against accidental actuation and so located that the worker cannot reach into the point of operation while operating the single control.

History: 1979 AC.

R 408.12445 Two-hand controls.

Rule 2445. Two-hand controls for single stroke shall conform to the following requirements:

(a) Each hand control shall be protected against unintended operation and arranged by design and construction, separation, or both, so that the concurrent use of both hands is required to trip the press.

(b) The control system shall be designed to permit an adjustment which will require concurrent pressure from both hands during a substantial part of the die-closing portion of the stroke.

(c) The control system shall incorporate an anti-repeat feature.

(d) Two-hand controls for single stroke operation, manufactured, and installed on or after August 31, 1971, shall be designed to require release of all operator's hand controls before a second stroke can be initiated.

History: 1979 AC.

R 408.12446 Multiple operating stations.

Rule 2446. (1) Controls for more than 1 operating station shall be designed to be activated and deactivated in complete sets of 2 hand controls per operating station by means capable of being supervised by the employer.

(2) The clutch/brake control system shall be designed and constructed to prevent actuation of the clutch if all operating stations are bypassed.

History: 1979 AC.

R 408.12447 Continuous functions.

Rule 2447. Those clutch/brake control systems which contain both single and continuous functions shall be designed so that completion of continuous circuits may be supervised by the employer. The initiation of continuous run shall require a prior action or decision by the operator, in addition to the selection of continuous on the stroking selector, before actuation of the operating means results in continuous stroking.

History: 1979 AC.

R 408.12448 Foot controls.

Rule 2448. (1) If foot control is provided, the selection method between hand and foot control shall be separated from the stroking selector, and shall be designed so that the selection may be supervised by the employer.

(2) Foot-operated tripping controls, if used, shall be protected so as to prevent operation from falling or moving objects, or from unintended operation by accidental stepping onto the foot control.

History: 1979 AC.

R 408.12449 Clutch/brake air valve failure.

Rule 2449. Air-clutch controls shall be designed to prevent a significant increase in the normal stopping time due to a failure within the operating valve mechanism, and to inhibit further operation if such failure does occur. This requirement shall apply only to those clutch/brake air-valve controls manufactured and installed on or after August 31, 1971, but shall not apply to presses intended only for continuous, automatic feeding applications.

History: 1979 AC.

R 408.12450 Drive motor interlock.

Rule 2450. The clutch/brake control shall incorporate an automatic means to prevent initiation or continued activation of the single stroke or continuous functions unless the press drive motor is energized and in the forward direction.

History: 1979 AC.

R 408.12451 Engaging means failure.

Rule 2451. The clutch/brake control shall automatically deactivate in event of failure of the electrical power or pressure supply for the clutch engaging means. Re-activation of the clutch shall require restoration of the electrical power or pressure supply and the use of the tripping mechanism.

History: 1979 AC; 2016 AACS.

R 408.12452 Counterbalance air supply failure.

Rule 2452. The clutch/brake control shall automatically deactivate in event of failure of the counterbalance air supply. Reactivation of the clutch shall require restoration of normal air supply and use of the tripping mechanism.

History: 1979 AC.

R 408.12453 Turnover bar operation selection.

Rule 2453. Selection of turnover bar operation shall be by means capable of being supervised by the employer. A separate pushbutton shall be employed to activate the clutch, and the clutch shall be activated only if the driver motor is deenergized.

History: 1979 AC.

R 408.12454 Accidental grounding.

Rule 2454. All clutch/brake control electrical circuits shall be protected against the possibility of an accidental ground in the control circuit causing false operation of the press.

History: 1979 AC.

SAFEGUARDING THE POINT OF OPERATION

R 408.12461 General requirements.

Rule 2461.(1) An employer shall provide and ensure the usage of point of operation guards or properly applied and adjusted point of operation devices on every production operation performed on a press. Point of operation guards shall conform to the provisions of table 1 and figure 1, except when the point of operation opening is less than 1/4 of an inch.

(2) Where an operator feeds or removes parts by placing 1 or both hands in the point of operation and where a 2-hand control, presence-sensing device, type-B gate, or movable barrier, on a part revolution clutch, is used for safeguarding, both of the following provisions shall be complied with:

(a) An employer shall use a control system and a brake monitor which comply with the provisions of R 408.12422(2) and R 408.12429. This requirement shall be complied with by November 1, 1975.

(b) Air clutch controls shall be designed to prevent a significant increase in the normal stopping time due to a failure within the operating valve mechanism and to inhibit further operation if such failure does occur, where a part revolution clutch is employed.

(3) The August 31, 1971 exceptions in the provisions of R 408.12445 and R 408.12449 do not apply to the requirements of this rule.

(4) Running production with the press on inch mode is not an acceptable form of operator protection. A guard or device as prescribed in R 408.12463 is required.

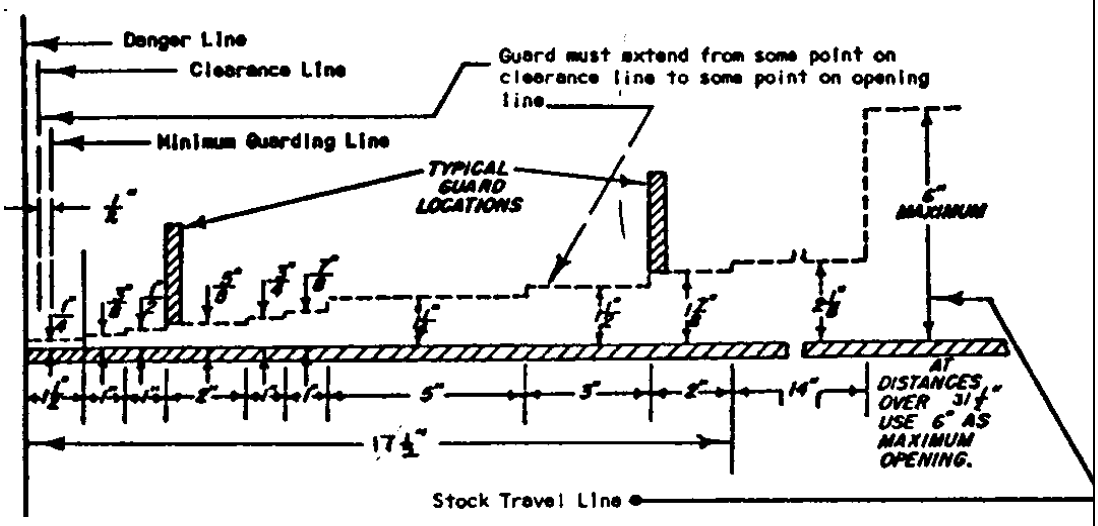
(5) Table 1 reads as follows:

TABLE 1

Distance of opening from point of operation hazard (inches)	Maximum width of opening (inches)
1/2 to 1 1/2	1/4
1 1/2 to 2 1/2	3/8
2 1/2 to 3 1/2	1/2
3 1/2 to 5 1/2	5/8
5 1/2 to 6 1/2	3/4
6 1/2 to 7 1/2	7/8
7 1/2 to 12 1/2	1 1/4
12 1/2 to 15 1/2	1 1/2
15 1/2 to 17 1/2	1 7/8
17 1/2 to 31 1/2	2 1/8
This table shows the distances that guards shall be positioned from the danger line in accordance with the required openings.	

(6) Figure 1 reads as follows:

SAFE OPENINGS DIAGRAM



EXPLANATION OF ABOVE DIAGRAM:

This diagram shows the accepted safe openings between the bottom edge of a guard and feed table at various distances from the danger line (point of operation).

The clearance line marks the distance required to prevent contact between guard and moving parts.
The minimum guarding line is the distance between the infeed side of the guard and the danger line which is one-half inch from the danger line.
The various openings are such that for average size hands an operator's fingers won't reach the point of operation.
After installation of point of operation guards and before a job is released for operation a check should be made to verify that the guard will prevent the operator's hands from reaching the point of operation.

History: 1979 AC; 1990 AACS; 2016 AACS.

R 408.12462 Point of operation guards.

Rule 2462. (1) A point of operation guard shall meet the following design, construction, application, and adjustment requirements:

(a) It shall prevent entry of hands or fingers into the point of operation by reaching through, over, under, or around the guard.

(b) It shall conform to the maximum permissible openings of table 1 and figure 1, except that a barrier guard may have feed holes for the stock, which shall be of such size and distance from the die as to prevent entry of a hand or finger of each operator into the point of operation or nip point.

(c) It shall, in itself, create no pinch point between the guard and moving machine parts.

(d) It shall utilize fasteners not readily removable by the operator so as to minimize the possibility of misuse or removal of essential parts.

(e) It shall facilitate its inspection.

(f) It shall offer maximum visibility of the point of operation consistent with the other requirements.

(2) A die enclosure guard shall be attached to the die shoe or stripper in a fixed position.

(3) A fixed barrier guard shall be attached securely to the frame of the press or to the bolster plate.

(4) An interlocked press barrier guard shall be attached to the press frame or bolster, and shall be interlocked with the press clutch control so that the clutch cannot be activated unless the guard itself, or the hinged or movable sections of the guard, are in position to conform to the requirements of table 1 and figure 1.

(5) The hinged or movable sections of an interlocked press barrier guard shall not be used for manual feeding. The guard shall prevent opening of the interlocked section and reaching into the point of operation prior to die closure or prior to the cessation of slide motion. See R 408.12463(2) regarding manual feeding through interlocked press barrier devices.

(6) The adjustable barrier guard shall be securely attached to the press bed, bolster plate, or die shoe, and shall be adjusted and operated in conformity with table 1 and figure 1 and the requirements of this rule.

Adjustments shall be verified before the press is returned to production operations by authorized personnel whose qualifications include a knowledge of the provisions of table 1 and figure 1 and the requirements of this rule.

(7) A point of operation enclosure which does not meet the requirements of this rule and table 1 and figure 1 shall be used only in conjunction with point of operation devices.

History: 1979 AC.

R 408.12463 Point of operation devices.

Rule 2463. (1) Point of operation devices shall protect the operator by 1 of the following methods:

(a) Preventing or stopping, or both, the normal stroking of a press if the operator's hands are inadvertently placed in the point of operation.

(b) Withdrawing an operator's hands if they are inadvertently located in the point of operation as the dies close or preventing the operator from inadvertently reaching into the point of operation as the dies close.

(c) Preventing the operator from inadvertently reaching into the point of operation at all times.

(d) Requiring the application of both of the operator's hands to the machine's operating controls and locating the controls at a distance from the point of operation that will permit the slide to complete the downward travel or stop before the operator can reach into the point of operation with his or her hands.

(e) Enclosing the point of operation before a press stroke can be initiated and maintaining this closed condition until the motion of the slide ceases.

(f) Enclosing the point of operation before a press stroke can be initiated so as to prevent an operator from reaching into the point of operation before die closure or before cessation of slide motion during the downward stroke.

(2) A gate or movable barrier device shall protect the operator according to the following:

(a) A type-A gate or movable barrier device shall protect the operator as prescribed in subrule (1)(e) of this rule.

(b) A type-B gate or movable barrier device shall protect the operator as prescribed in subrule (1)(f) of this rule.

(3) The presence-sensing point of operation device shall protect the operator as provided in subrule (1)(a) of this rule and shall be interlocked into the control circuit to prevent or stop slide motion if the operator's hand or other body part is within the sensing field of the device during the down-stroke of the press slide. All of the following provisions apply to a presence-sensing point of operation device:

(a) The device shall not be used on machines that use full-revolution clutches.

(b) The device shall not be used as a tripping means to initiate slide motion.

(c) The device shall be constructed so that a failure within the system does not prevent the normal stopping action from being applied to the press when required, but does prevent the initiation of a successive stroke until the failure is corrected. The failure shall be indicated by the system.

(d) Bypassing the protection function of a presence-sensing device during the upstroke of the press slide is permitted for the purpose of parts ejection, circuit checking, and feeding.

(e) The safety distance (Ds) from the sensing field to the point of operation shall be greater than the distance that is determined by the following formula:

D(s)	=	63 inches/second X T(s)

where:

D(s)	=	minimum safety distance (inches); 63 inches/second = hand speed constant;

and

T(s)	=	stopping time of the press measured at approximately 90 deg. position of crankshaft rotation (seconds).

(f) Guards shall be used to protect all areas of entry to the point of operation that are not protected by the presence-sensing device.

(4) The pull-out device shall protect the operator as prescribed in subrule (1)(b) of this rule and shall include attachments for each of the operator's hands. All of the following provisions apply to a pull-out device:

(a) Attachments shall be connected to, and operated only by, the press slide or upper die.

(b) Attachments shall be adjusted to prevent the operator from reaching into the point of operation or to withdraw the operator's hands from the point of operation or other pinch points before the dies close.

(c) A separate pull-out device or other safeguarding device that is in compliance with the provisions of this standard shall be provided for each operator if more than 1 operator is used on a press.

(d) Each pull-out device in use shall be visually inspected and checked for proper adjustment at the start of each operator's shift, after a new die setup, or when operators are changed. Necessary maintenance or repair, or both, shall be performed and completed before the press is returned to production. The employer shall maintain records of these inspections and the maintenance work performed.

(e) Bolts, locator pins, or any other projections shall not be located in a manner that would catch the pullback cable or wristlet and hold an operator's hand in a pinch point or the point of operation.

(5) A sweep device shall not be used for point of operation safeguarding on a mechanical power press.

(6) A holdout or a restraint device shall protect the operator as prescribed in subrule (1)(c) of this rule and shall include attachments for each of the operator's hands. These attachments shall be securely anchored and adjusted so that the operator is restrained from reaching into the point of operation. A separate set of restraints or other safeguarding device that is in compliance with the provisions of this standard shall be provided for each operator if more than 1 operator is required on a press.

(7) The 2-hand control device shall protect the operator as prescribed in subrule (1)(d) of this rule. All of the following provisions apply to a 2-hand control device:

(a) When used in press operations requiring more than 1 operator, separate 2-hand controls shall be provided for each operator and shall be designed to require concurrent applications of all operator's controls to activate the slide. The removal of a hand from any control button shall cause the slide to stop.

(b) Each 2-hand control that is used as a point of operation device shall be operated in the single-stroke mode only.

(c) When hand-in-die loading or unloading is used, the safety distance (Ds) between each 2-hand control device and the point of operation shall be greater than the distance determined by the formula prescribed in subrule (3)(e) of this rule.

(d) The position of the 2-hand controls shall be established and fixed in accordance with the provisions of subrule (1)(d) of this rule or subdivision (c) of this subrule, whichever shall apply. Only the supervisor or safety engineer may authorize relocating the controls.

(8) The 2-hand trip device shall protect the operator as prescribed in subrule (1)(d) of this rule. The device shall conform as follows:

(a) When used in press operations that require more than 1 operator, separate 2-hand trips shall be provided for each operator and shall be designed to require concurrent application of all operator's controls to activate the slide.

(b) Each 2-hand trip shall meet the construction requirements of R 408.12434.

(c) The safety distance (D(m)) between the 2-hand trip and the point of operation shall be greater than the distance determined by the following formula:

D(m)	=	63 inches/second X T(m);
where:		
D(m)	=	minimum safety distance (inches); 63 inches/second=hand speed constant;
And		
T(m)	=	the maximum time the press takes for the die closure after it has been tripped (seconds). For full revolution clutch presses with only one engaging point T(m) is equal to the time necessary for one and one-half revolutions of the crankshaft. For full revolution clutch presses with more than one engaging point, T(m) shall be calculated as follows:
T(m)	=	[1/2 + (1 divided by number of engaging points per revolution)] X time necessary to complete one revolution of the crankshaft (seconds).

(d) Two-hand trips shall be established and fixed and only a supervisor or safety engineer may authorize their relocation.

History: 1979 AC; 1990 AACS; 1993 AACS; 2016 AACS.

R 408.12464 Hand feeding tools.

Rule 2464. Hand feeding tools are intended for placing materials in, and removing materials from, the press. Hand feeding tools are not a point of operation guard or protection device, and shall not be used in lieu of the "guards" or devices required in this standard.

History: 1979 AC; 2016 AACS.

DIE DESIGN, CONSTRUCTION, SETTING, AND FEEDING

R 408.12471 Dies; employer duties generally.

Rule 2471. An employer shall do all of the following:

(a) Use dies and operating methods designed to control or eliminate hazards to operating personnel.

(b) Furnish, and enforce the use of, a hand tool for freeing and removing stuck work or scrap pieces from the die so that an employee need not reach into the point of operation for such purposes.

(c) Guard feed points, shuttle mechanisms, or other pinch points in accordance with General Industry Safety Standard Part 1 “General Provisions,” as referenced in R 408.12402.

History: 1979 AC; 1990 AACS; 2016 AACS.

R 408.12472 Scrap handling.

Rule 2472. An employer shall provide means for handling scrap from roll feed random length stock operations. Scrap cutters used in conjunction with scrap handling systems shall be safeguarded as prescribed in the provisions of R 408.12461 to R 408.12471, this rule, and R 408.12473.

History: 1979 AC; 1990 AACS.

R 408.12473 Guide post hazards.

Rule 2473. The hazard created by a guide post or heel block located in the immediate vicinity of the operator when separated from its bushing by more than 1/4 inch shall be considered as a point of operation hazard and be protected as prescribed in the provisions R 408.12461 to R 408.12463.

History: 1979 AC; 1990 AACS.

R 408.12474 Unitized tooling.

Rule 2474. If unitized tooling is used, the opening between the top of the punch holder and the face of the slide or striking pad shall be safeguarded as prescribed in the provisions of R 408.12421 to R 408.12464.

History: 1979 AC; 1990 AACS.

R 408.12475 Tonnage, stroke, and weight requirements.

Rule 2475. All dies shall be according to the following:

(a) Stamped with the tonnage and stroke requirements, or the requirements may be recorded if the records are readily available to the die setter.

(b) Stamped to indicate upper die weight when necessary for air counterbalance pressure adjustment.

(c) Stamped to indicate complete die weight when handling equipment may become overloaded.

History: 1979 AC; 2016 AACS.

R 408.12476 Die fastening.

Rule 2476. Provisions shall be made in both the upper and lower shoes for securely mounting the die to the bolster and slide. Where clamp caps or setscrews are used in conjunction with punch stems, additional means of securing the upper shoe to the slide shall be used.

History: 1979 AC.

R 408.12477 Die setting.

Rule 2477. (1) An employer shall establish a die setting procedure that will insure compliance with the provisions of R 408.12461 to R 408.12463.

(2) An employer shall provide spring-loaded turnover bars for presses designed to accept such turnover bars.

(3) An employer shall provide die stops or other means to prevent losing control of the die while setting or removing dies in presses which are inclined.

(4) An employer shall provide and enforce the use of safety blocks for use when dies are being adjusted or repaired in the press. Means shall be provided to prevent cycling a press with the safety block in place between the upper and lower dies or between the bolster plate and slide face.

(5) An employer shall provide brushes, swabs, lubricating rolls, and automatic or manual pressure guns so that operators and die setters shall not be required to reach into the point of operation or other hazard areas to lubricate material, punches, or dies.

(6) Handling equipment attach points shall be provided on all dies that require mechanical handling.

History: 1979 AC; 1990 AACS.