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Title 29: Labor

[PART 1910—OCCUPATIONAL SAFETY AND HEALTH STANDARDS](#)

[Subpart O—Machinery and Machine Guarding](#)

§1910.217

(h) *Presence sensing device initiation (PSDI)*—(1) *General.* (i) The requirements of paragraph (h) shall apply to all part revolution mechanical power presses used in the PSDI mode of operation.

(ii) The relevant requirements of paragraphs (a) through (g) of this section also shall apply to all presses used in the PSDI mode of operation, whether or not cross referenced in this paragraph (h). Such cross-referencing of specific requirements from paragraphs (a) through (g) of this section is intended only to enhance convenience and understanding in relating to the new provisions to the existing standard, and is not to be construed as limiting the applicability of other provisions in paragraphs (a) through (g) of this section.

(iii) Full revolution mechanical power presses shall not be used in the PSDI mode of operation.

(iv) Mechanical power presses with a configuration which would allow a person to enter, pass through, and become clear of the sensing field into the hazardous portion of the press shall not be used in the PSDI mode of operation.

(v) The PSDI mode of operation shall be used only for normal production operations. Die-setting and maintenance procedures shall comply with paragraphs (a) through (g) of this section, and shall not be done in the PSDI mode.

(2) *Brake and clutch requirements.* (i) Presses with flexible steel band brakes or with mechanical linkage actuated brakes or clutches shall not be used in the PSDI mode.

(ii) Brake systems on presses used in the PSDI mode shall have sufficient torque so that each average value of stopping times (Ts) for stops initiated at approximately 45 degrees, 60 degrees, and 90 degrees, respectively, of crankshaft angular position, shall not be more than 125 percent of the average value of the stopping time at the top crankshaft position. Compliance with

this requirement shall be determined by using the heaviest upper die to be used on the press, and operating at the fastest press speed if there is speed selection.

(iii) Where brake engagement and clutch release is effected by spring action, such spring(s) shall operate in compression on a rod or within a hole or tube, and shall be of non-interleaving design.

(3) *Pneumatic systems.* (i) Air valve and air pressure supply/control.

(A) The requirements of paragraphs (b)(7)(xiii), (b)(7)(xiv), (b)(10), (b)(12) and (c)(5)(iii) of this section apply to the pneumatic systems of machines used in the PSDI mode.

(B) The air supply for pneumatic clutch/brake control valves shall incorporate a filter, an air regulator, and, when necessary for proper operation, a lubricator.

(C) The air pressure supply for clutch/brake valves on machines used in the PSDI mode shall be regulated to pressures less than or equal to the air pressure used when making the stop time measurements required by paragraph (h)(2)(ii) of this section.

(ii) Air counterbalance systems.

(A) Where presses that have slide counterbalance systems are used in the PSDI mode, the counterbalance system shall also meet the requirements of paragraph (b)(9) of this section.

(B) Counterbalances shall be adjusted in accordance with the press manufacturer's recommendations to assure correct counterbalancing of the slide attachment (upper die) weight for all operations performed on presses used in the PSDI mode. The adjustments shall be made before performing the stopping time measurements required by paragraphs (h)(2)(ii), (h)(5)(iii), and (h)(9)(v) of this section.

(4) *Flywheels and bearings.* Presses whose designs incorporate flywheels running on journals on the crankshaft or back shaft, or bull gears running on journals mounted on the crankshaft, shall be inspected, lubricated, and maintained as provided in paragraph (h)(10) of this section to reduce the possibility of unintended and uncontrolled press strokes caused by bearing seizure.

(5) *Brake monitoring.* (i) Presses operated in the PSDI mode shall be equipped with a brake monitor that meets the requirements of paragraphs (b)(13) and (b)(14) of this section. In addition, the brake monitor shall be adjusted during installation certification to prevent successive stroking of the press if increases in stopping time cause an increase in the safety distance above that required by paragraph (h)(9)(v) of this section.

(ii) Once the PSDI safety system has been certified/validated, adjustment of the brake monitor shall not be done without prior approval of the validation organization for both the brake monitor adjustment and the corresponding adjustment of the safety distance. The validation organization shall in its installation validation, state that in what circumstances, if any, the

employer has advance approval for adjustment, when prior oral approval is appropriate and when prior approval must be in writing. The adjustment shall be done under the supervision of an authorized person whose qualifications include knowledge of safety distance requirements and experience with the brake system and its adjustment. When brake wear or other factors extend press stopping time beyond the limit permitted by the brake monitor, adjustment, repair, or maintenance shall be performed on the brake or other press system element that extends the stopping time.

(iii) The brake monitor setting shall allow an increase of no more than 10 percent of the longest stopping time for the press, or 10 milliseconds, whichever is longer, measured at the top of the stroke.

(6) *Cycle control and control systems.* (i) The control system on presses used in the PSDI mode shall meet the applicable requirements of paragraphs (b)(7), (b)(8), (b)(13), and (c)(5) of this section.

(ii) The control system shall incorporate a means of dynamically monitoring for decoupling of the rotary position indicating mechanism drive from the crankshaft. This monitor shall stop slide motion and prevent successive press strokes if decoupling occurs, or if the monitor itself fails.

(iii) The mode selection means of paragraph (b)(7)(iii) of this section shall have at least one position for selection of the PSDI mode. Where more than one interruption of the light sensing field is used in the initiation of a stroke, either the mode selection means must have one position for each function, or a separate selection means shall be provided which becomes operable when the PSDI mode is selected. Selection of PSDI mode and the number of interruptions/withdrawals of the light sensing field required to initiate a press cycle shall be by means capable of supervision by the employer.

(iv) A PSDI set-up/reset means shall be provided which requires an overt action by the operator, in addition to PSDI mode selection, before operation of the press by means of PSDI can be started.

(v) An indicator visible to the operator and readily seen by the employer shall be provided which shall clearly indicate that the system is set-up for cycling in the PSDI mode.

(vi) The control system shall incorporate a timer to deactivate PSDI when the press does not stroke within the period of time set by the timer. The timer shall be manually adjustable, to a maximum time of 30 seconds. For any timer setting greater than 15 seconds, the adjustment shall be made by the use of a special tool available only to authorized persons. Following a deactivation of PSDI by the timer, the system shall make it necessary to reset the set-up/reset means in order to reactivate the PSDI mode.

(vii) Reactivation of PSDI operation following deactivation of the PSDI mode from any other cause, such as activation of the red color stop control required by paragraph (b)(7)(ii) of this section, interruption of the presence sensing field, opening of an interlock, or reselection of

the number of sensing field interruptions/withdrawals required to cycle the press, shall require resetting of the set-up/reset means.

(viii) The control system shall incorporate an automatic means to prevent initiation or continued operation in the PSDI mode unless the press drive motor is energized in the forward direction of crankshaft rotation.

(ix) The control design shall preclude any movement of the slide caused by operation of power on, power off, or selector switches, or from checks for proper operations as required by paragraph (h)(6)(xiv) of this section.

(x) All components and subsystems of the control system shall be designed to operate together to provide total control system compliance with the requirements of this section.

(xi) Where there is more than one operator of a press used for PSDI, each operator shall be protected by a separate, independently functioning, presence sensing device. The control system shall require that each sensing field be interrupted the selected number of times prior to initiating a stroke. Further, each operator shall be provided with a set-up/reset means that meets the requirements of paragraph (h)(6) of this section, and which must be actuated to initiate operation of the press in the PSDI mode.

(xii) [Reserved]

(xiii) The Control system shall incorporate interlocks for supplemental guards, if used, which will prevent stroke initiation or will stop a stroke in progress if any supplemental guard fails or is deactivated.

(xiv) The control system shall perform checks for proper operation of all cycle control logic element switches and contacts at least once each cycle. Control elements shall be checked for correct status after power “on” and before the initial PSDI stroke.

(xv) The control system shall have provisions for an “inch” operating means meeting the requirements of paragraph (b)(7)(iv) of this section. Die-setting shall not be done in the PSDI mode. Production shall not be done in the “inch” mode.

(xvi) The control system shall permit only a single stroke per initiation command.

(xvii) Controls with internally stored programs (e.g., mechanical, electro-mechanical, or electronic) shall meet the requirements of paragraph (b)(13) of this section, and shall default to a predetermined safe condition in the event of any single failure within the system. Programmable controllers which meet the requirements for controls with internally stored programs stated above shall be permitted only if all logic elements affecting the safety system and point of operation safety are internally stored and protected in such a manner that they cannot be altered or manipulated by the user to an unsafe condition.

(7) *Environmental requirements.* Control components shall be selected, constructed, and connected together in such a way as to withstand expected operational and environmental stresses, at least including those outlined in appendix A. Such stresses shall not so affect the control system as to cause unsafe operation.

(8) *Safety system.* (i) Mechanical power presses used in the PSDI mode shall be operated under the control of a safety system which, in addition to meeting the applicable requirements of paragraphs (b)(13) and (c)(5) and other applicable provisions of this section, shall function such that a single failure or single operating error shall not cause injury to personnel from point of operation hazards.

(ii) The safety system shall be designed, constructed, and arranged as an integral total system, including all elements of the press, the controls, the safeguarding and any required supplemental safeguarding, and their interfaces with the operator and that part of the environment which has effect on the protection against point of operation hazards.

(9) *Safeguarding the point of operation.* (i) The point of operation of presses operated in the PSDI mode shall be safeguarded in accordance with the requirements of paragraph (c) of this section, except that the safety distance requirements of paragraph (h)(9)(v) of this section shall be used for PSDI operation.

(ii)(A) PSDI shall be implemented only by use of light curtain (photo-electric) presence sensing devices which meet the requirements of paragraph (c)(3)(iii)(c) of this section unless the requirements of the following paragraph have been met.

(B) Alternatives to photo-electric light curtains may be used for PSDI when the employer can demonstrate, through tests and analysis by the employer or the manufacturer, that the alternative is as safe as the photo-electric light curtain, that the alternative meets the conditions of this section, has the same long term reliability as light curtains and can be integrated into the entire safety system as provided for in this section. Prior to use, both the employer and manufacturer must certify that these requirements and all the other applicable requirements of this section are met and these certifications must be validated by an OSHA-recognized third-party validation organization to meet these additional requirements and all the other applicable requirements of paragraphs (a) through (h) and appendix A of this section. Three months prior to the operation of any alternative system, the employer must notify the OSHA Directorate of Safety Standards Programs of the name of the system to be installed, the manufacturer and the OSHA-recognized third-party validation organization immediately. Upon request, the employer must make available to that office all tests and analyses for OSHA review.

(iii) Individual sensing fields of presence sensing devices used to initiate strokes in the PSDI mode shall cover only one side of the press.

(iv) Light curtains used for PSDI operation shall have minimum object sensitivity not to exceed one and one-fourth inches (31.75 mm). Where light curtain object sensitivity is user-adjustable, either discretely or continuously, design features shall limit the minimum object

sensitivity adjustment not to exceed one and one-fourth inches (31.75 mm). Blanking of the sensing field is not permitted.

(v) The safety distance (D_s) from the sensing field of the presence sensing device to the point of operation shall be greater than or equal to the distance determined by the formula:

$$D_s = H_s \times (T_s + T_p + T_r + 2T_m) + D_p$$

Where:

D_s = Minimum safety distance.

H_s = Hand speed constant of 63 inches per second (1.6 m/s).

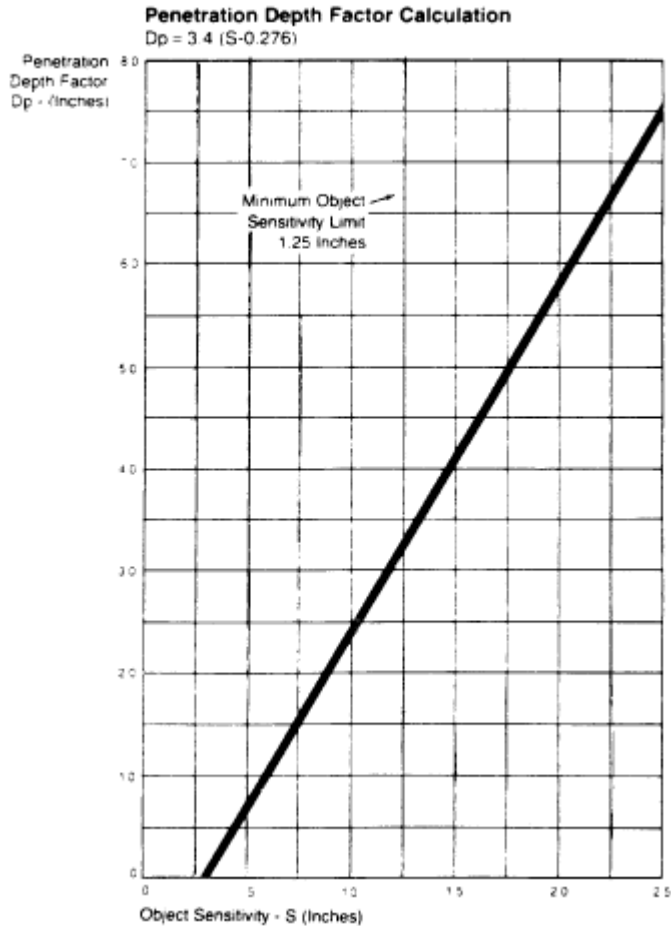
T_s = Longest press stopping time, in seconds, computed by taking averages of multiple measurements at each of three positions (45 degrees, 60 degrees, and 90 degrees) of crankshaft angular position; the longest of the three averages is the stopping time to use. (T_s is defined as the sum of the kinetic energy dissipation time plus the pneumatic/magnetic/hydraulic reaction time of the clutch/brake operating mechanism(s).)

T_p = Longest presence sensing device response time, in seconds.

T_r = Longest response time, in seconds, of all interposing control elements between the presence sensing device and the clutch/brake operating mechanism(s).

T_m = Increase in the press stopping time at the top of the stroke, in seconds, allowed by the brake monitor for brake wear. The time increase allowed shall be limited to no more than 10 percent of the longest press stopping time measured at the top of the stroke, or 10 milliseconds, whichever is longer.

D_p = Penetration depth factor, required to provide for possible penetration through the presence sensing field by fingers or hand before detection occurs. The penetration depth factor shall be determined from Graph h-1 using the minimum object sensitivity size.



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(vi) The presence sensing device location shall either be set at each tool change and set-up to provide at least the minimum safety distance, or fixed in location to provide a safety distance greater than or equal to the minimum safety distance for all tooling set-ups which are to be used on that press.

(vii) Where presence sensing device location is adjustable, adjustment shall require the use of a special tool available only to authorized persons.

(viii) Supplemental safeguarding shall be used to protect all areas of access to the point of operation which are unprotected by the PSDI presence sensing device. Such supplemental safeguarding shall consist of either additional light curtain (photo-electric) presence sensing devices or other types of guards which meet the requirements of paragraphs (c) and (h) of this section.

(A) Presence sensing devices used as supplemental safeguarding shall not initiate a press stroke, and shall conform to the requirements of paragraph (c)(3)(iii) and other applicable provisions of this section, except that the safety distance shall comply with paragraph (h)(9)(v) of this section.

(B) Guards used as supplemental safeguarding shall conform to the design, construction and application requirements of paragraph (c)(2) of this section, and shall be interlocked with the press control to prevent press PSDI operation if the guard fails, is removed, or is out of position.

(ix) Barriers shall be fixed to the press frame or bolster to prevent personnel from passing completely through the sensing field, where safety distance or press configuration is such that personnel could pass through the PSDI presence sensing field and assume a position where the point of operation could be accessed without detection by the PSDI presence sensing device. As an alternative, supplemental presence sensing devices used only in the safeguard mode may be provided. If used, these devices shall be located so as to detect all operator locations and positions not detected by the PSDI sensing field, and shall prevent stroking or stop a stroke in process when any supplemental sensing field(s) are interrupted.

(x) Hand tools. Where tools are used for feeding, removal of scrap, lubrication of parts, or removal of parts that stick on the die in PSDI operations:

(A) The minimum diameter of the tool handle extension shall be greater than the minimum object sensitivity of the presence sensing device(s) used to initiate press strokes; or

(B) The length of the hand tool shall be such as to ensure that the operator's hand will be detected for any safety distance required by the press set-ups.

(10) *Inspection and maintenance.* (i) Any press equipped with presence sensing devices for use in PSDI, or for supplemental safeguarding on presses used in the PSDI mode, shall be equipped with a test rod of diameter specified by the presence sensing device manufacturer to represent the minimum object sensitivity of the sensing field. Instructions for use of the test rod shall be noted on a label affixed to the presence sensing device.

(ii) The following checks shall be made at the beginning of each shift and whenever a die change is made.

(A) A check shall be performed using the test rod according to the presence sensing device manufacturer's instructions to determine that the presence sensing device used for PSDI is operational.

(B) The safety distance shall be checked for compliance with (h)(9)(v) of this section.

(C) A check shall be made to determine that all supplemental safeguarding is in place. Where presence sensing devices are used for supplemental safeguarding, a check for proper operation shall be performed using the test rod according to the presence sensing device manufacturer's instructions.

(D) A check shall be made to assure that the barriers and/or supplemental presence sensing devices required by paragraph (h)(9)(ix) of this section are operating properly.

(E) A system or visual check shall be made to verify correct counterbalance adjustment for die weight according to the press manufacturer's instructions, when a press is equipped with a slide counterbalance system.

(iii) When presses used in the PSDI mode have flywheel or bullgear running on crankshaft mounted journals and bearings, or a flywheel mounted on back shaft journals and bearings, periodic inspections following the press manufacturer's recommendations shall be made to ascertain that bearings are in good working order, and that automatic lubrication systems for these bearings (if automatic lubrication is provided) are supplying proper lubrication. On presses with provision for manual lubrication of flywheel or bullgear bearings, lubrication shall be provided according to the press manufacturer's recommendations.

(iv) Periodic inspections of clutch and brake mechanisms shall be performed to assure they are in proper operating condition. The press manufacturer's recommendations shall be followed.

(v) When any check of the press, including those performed in accordance with the requirements of paragraphs (h)(10)(ii), (iii) or (iv) of this section, reveals a condition of noncompliance, improper adjustment, or failure, the press shall not be operated until the condition has been corrected by adjustment, replacement, or repair.

(vi) It shall be the responsibility of the employer to ensure the competence of personnel caring for, inspecting, and maintaining power presses equipped for PSDI operation, through initial and periodic training.

(11) *Safety system certification/validation.* (i) Prior to the initial use of any mechanical press in the PSDI mode, two sets of certification and validation are required:

(A) The design of the safety system required for the use of a press in the PSDI mode shall be certified and validated prior to installation. The manufacturer's certification shall be validated by an OSHA-recognized third-party validation organization to meet all applicable requirements of paragraphs (a) through (h) and appendix A of this section.

(B) After a press has been equipped with a safety system whose design has been certified and validated in accordance with paragraph (h)(11)(i) of this section, the safety system installation shall be certified by the employer, and then shall be validated by an OSHA-recognized third-party validation organization to meet all applicable requirements of paragraphs (a) through (h) and appendix A of this section.

(ii) At least annually thereafter, the safety system on a mechanical power press used in the PSDI mode shall be recertified by the employer and revalidated by an OSHA-recognized third-party validation organization to meet all applicable requirements of paragraphs (a) through (h) and appendix A of this section. Any press whose safety system has not been recertified and revalidated within the preceding 12 months shall be removed from service in the PSDI mode until the safety system is recertified and revalidated.

(iii) A label shall be affixed to the press as part of each installation certification/validation and the most recent recertification/revalidation. The label shall indicate the press serial number, the minimum safety distance (Ds) required by paragraph (h)(9)(v) of this section, the fulfillment of design certification/validation, the employer's signed certification, the identification of the OSHA-recognized third-party validation organization, its signed validation, and the date the certification/validation and recertification/revalidation are issued.

(iv) Records of the installation certification and validation and the most recent recertification and revalidation shall be maintained for each safety system equipped press by the employer as long as the press is in use. The records shall include the manufacture and model number of each component and subsystem, the calculations of the safety distance as required by paragraph (h)(9)(v) of this section, and the stopping time measurements required by paragraph (h)(2)(ii) of this section. The most recent records shall be made available to OSHA upon request.

(v) The employer shall notify the OSHA-recognized third-party validation organization within five days whenever a component or a subsystem of the safety system fails or modifications are made which may affect the safety of the system. The failure of a critical component shall necessitate the removal of the safety system from service until it is recertified and revalidated, except recertification by the employer without revalidation is permitted when a non-critical component or subsystem is replaced by one of the same manufacture and design as the original, or determined by the third-party validation organization to be equivalent by similarity analysis, as set forth in appendix A.

(vi) The employer shall notify the OSHA-recognized third-party validation organization within five days of the occurrence of any point of operation injury while a press is used in the PSDI mode. This is in addition to the report of injury required by paragraph (g) of this section; however, a copy of that report may be used for this purpose.

(12) *Die setting and work set-up.* (i) Die setting on presses used in the PSDI mode shall be performed in accordance with paragraphs (d) and (h) of this section.

(ii) The PSDI mode shall not be used for die setting or set-up. An alternative manual cycle initiation and control means shall be supplied for use in die setting which meets the requirements of paragraph (b)(7) of this section.

(iii) Following a die change, the safety distance, the proper application of supplemental safeguarding, and the slide counterbalance adjustment (if the press is equipped with a counterbalance) shall be checked and maintained by authorized persons whose qualifications include knowledge of the safety distance, supplemental safeguarding requirements, and the manufacturer's specifications for counterbalance adjustment. Adjustment of the location of the PSDI presence sensing device shall require use of a special tool available only to the authorized persons.

(13) *Operator training.* (i) The operator training required by paragraph (f)(2) of this section shall be provided to the employee before the employee initially operates the press and as needed

to maintain competence, but not less than annually thereafter. It shall include instruction relative to the following items for presses used in the PSDI mode.

(A) The manufacturer's recommended test procedures for checking operation of the presence sensing device. This shall include the use of the test rod required by paragraph (h)(10)(i) of this section.

(B) The safety distance required.

(C) The operation, function and performance of the PSDI mode.

(D) The requirements for hand tools that may be used in the PSDI mode.

(E) The severe consequences that can result if he or she attempts to circumvent or by-pass any of the safeguard or operating functions of the PSDI system.

(ii) The employer shall certify that employees have been trained by preparing a certification record which includes the identity of the person trained, the signature of the employer or the person who conducted the training, and the date the training was completed. The certification record shall be prepared at the completion of training and shall be maintained on file for the duration of the employee's employment. The certification record shall be made available upon request to the Assistant Secretary for Occupational Safety and Health.

APPENDIX A TO §1910.217—MANDATORY REQUIREMENTS FOR CERTIFICATION/VALIDATION OF SAFETY SYSTEMS FOR PRESENCE SENSING DEVICE INITIATION OF MECHANICAL POWER PRESSES

Purpose

The purpose of the certification/validation of safety systems for presence sensing device initiation (PSDI) of mechanical power presses is to ensure that the safety systems are designed, installed, and maintained in accordance with all applicable requirements of 29 CFR 1910.217 (a) through (h) and this appendix A.

General

The certification/validation process shall utilize an independent third-party validation organization recognized by OSHA in accordance with the requirements specified in appendix C of this section.

While the employer is responsible for assuring that the certification/validation requirements in §1910.217(h)(11) are fulfilled, the design certification of PSDI safety systems may be initiated by manufacturers, employers, and/or their representatives. The term *manufacturers* refers to the manufacturer of any of the components of the safety system. An employer who assembles a PSDI safety system would be a manufacturer as well as employer for purposes of this standard and appendix.

The certification/validation process includes two stages. For design certification, in the first stage, the manufacturer (which can be an employer) certifies that the PSDI safety system meets the requirements of 29 CFR 1910.217 (a) through (h) and this appendix A, based on appropriate design criteria and tests. In the second stage, the OSHA-recognized third-party validation organization validates that the PSDI safety system meets the requirements of 29 CFR 1910.217 (a) through (h) and this appendix A and the manufacturer's certification by reviewing the manufacturer's design and test data and performing any additional reviews required by this standard or which it believes appropriate.

For installation certification/validation and annual recertification/revalidation, in the first stage the employer certifies or recertifies that the employer is installing or utilizing a PSDI safety system validated as meeting the design requirements of 29 CFR 1910.217 (a) through (h) and this appendix A by an OSHA-recognized third-party validation organization and that the installation, operation and maintenance meet the requirements of 29 CFR 1910.217 (a) through (h) and this appendix A. In the second stage, the OSHA-recognized third-party validation organization validates or revalidates that the PSDI safety system installation meets the requirements of 29 CFR 1910.217 (a) through (h) and this appendix A and the employer's certification, by reviewing that the PSDI safety system has been certified; the employer's certification, designs and tests, if any; the installation, operation, maintenance and training; and by performing any additional tests and reviews which the validation organization believes is necessary.

Summary

The certification/validation of safety systems for PSDI shall consider the press, controls, safeguards, operator, and environment as an integrated system which shall comply with all of the requirements in 29 CFR 1910.217 (a) through (h) and this appendix A. The certification/validation process shall verify that the safety system complies with the OSHA safety requirements as follows:

A. Design Certification/Validation

1. The major parts, components and subsystems used shall be defined by part number or serial number, as appropriate, and by manufacturer to establish the configuration of the system.
2. The identified parts, components and subsystems shall be certified by the manufacturer to be able to withstand the functional and operational environments of the PSDI safety system.
3. The total system design shall be certified by the manufacturer as complying with all requirements in 29 CFR 1910.217 (a) through (h) and this appendix A.
4. The third-party validation organization shall validate the manufacturer's certification under paragraphs 2 and 3.

B. Installation Certification/Validation

1. The employer shall certify that the PSDI safety system has been design certified and validated, that the installation meets the operational and environmental requirements specified by the manufacturer, that the installation drawings are accurate, and that the installation meets the requirements of 29 CFR 1910.217 (a) through (h) and this appendix A. (The operational and installation requirements of the PSDI safety system may vary for different applications.)

2. The third-party validation organization shall validate the employer's certifications that the PSDI safety system is design certified and validated, that the installation meets the installation and environmental requirements specified by the manufacturer, and that the installation meets the requirements of 29 CFR 1910.217 (a) through (h) and this appendix A.

C. Recertification/Revalidation

1. The PSDI safety system shall remain under certification/validation for the shorter of one year or until the system hardware is changed, modified or refurbished, or operating conditions are changed (including environmental, application or facility changes), or a failure of a critical component has occurred.

2. Annually, or after a change specified in paragraph 1., the employer shall inspect and recertify the installation as meeting the requirements set forth under B., Installation Certification/Validation.

3. The third-party validation organization, annually or after a change specified in paragraph 1., shall validate the employer's certification that the requirements of paragraph B., Installation Certification/Validation have been met.

(NOTE: Such changes in operational conditions as die changes or press relocations not involving disassembly or revision to the safety system would not require recertification/revalidation.)

Certification/Validation Requirements

A. General Design Certification/Validation Requirements

1. *Certification/Validation Program Requirements.* The manufacturer shall certify and the OSHA-recognized third-party validation organization shall validate that:

(a) The design of components, subsystems, software and assemblies meets OSHA performance requirements and are ready for the intended use; and

(b) The performance of combined subsystems meets OSHA's operational requirements.

2. *Certification/Validation Program Level of Risk Evaluation Requirements.* The manufacturer shall evaluate and certify, and the OSHA-recognized third-party validation organization shall validate, the design and operation of the safety system by determining conformance with the following:

a. The safety system shall have the ability to sustain a single failure or a single operating error and not cause injury to personnel from point of operation hazards. Acceptable design features shall demonstrate, in the following order or precedence, that:

(1) No single failure points may cause injury; or

(2) Redundancy, and comparison and/or diagnostic checking, exist for the critical items that may cause injury, and the electrical, electronic, electromechanical and mechanical parts and components are selected so that they can withstand operational and external environments. The safety factor and/or derated percentage shall be specifically noted and complied with.

b. The manufacturer shall design, evaluate, test and certify, and the third-party validation organization shall evaluate and validate, that the PSDI safety system meets appropriate requirements in the following areas.

(1) Environmental Limits

(a) Temperature

(b) Relative humidity

(c) Vibration

(d) Fluid compatibility with other materials

(2) Design Limits

(a) Power requirements

(b) Power transient tolerances

(c) Compatibility of materials used

(d) Material stress tolerances and limits

(e) Stability to long term power fluctuations

(f) Sensitivity to signal acquisition

(g) Repeatability of measured parameter without inadvertent initiation of a press stroke

(h) Operational life of components in cycles, hours, or both

(i) Electromagnetic tolerance to:

(1) Specific operational wave lengths; and

(2) Externally generated wave lengths

(3) *New Design Certification/Validation*. Design certification/validation for a new safety system, i.e., a new design or new integration of specifically identified components and subsystems, would entail a single certification/validation which would be applicable to all identical safety systems. It would not be necessary to repeat the tests on individual safety systems of the same manufacture or design. Nor would it be necessary to repeat these tests in the case of modifications where determined by the manufacturer and validated by the third-party validation organization to be equivalent by similarity analysis. Minor modifications not affecting the safety of the system may be made by the manufacturer without revalidation.

Substantial modifications would require testing as a new safety system, as deemed necessary by the validation organization.

B. Additional Detailed Design Certification/Validation Requirements

1. *General*. The manufacturer or the manufacturer's representative shall certify to and submit to an OSHA-recognized third-party validation organization the documentation necessary to demonstrate that the PSDI safety system design is in full compliance with the requirements of 29 CFR 1910.217(a)-(h) and this appendix A, as applicable, by means of analysis, tests, or combination of both, establishing that the following additional certification/validation requirements are fulfilled.

2. *Reaction Times*. For the purpose of demonstrating compliance with the reaction time required by §1910.217(h), the tests shall use the following definitions and requirements:

a. *Reaction time* means the time, in seconds, it takes the signal, required to activate/deactivate the system, to travel through the system, measured from the time of signal initiation to the time the function being measured is completed.

b. *Full stop or No movement of the slide or ram* means when the crankshaft rotation has slowed to two or less revolutions per minute, just before stopping completely.

c. *Function completion* means for, electrical, electromechanical and electronic devices, when the circuit produces a change of state in the output element of the device.

d. When the change of state is motion, the measurement shall be made at the completion of the motion.

e. The generation of the test signal introduced into the system for measuring reaction time shall be such that the initiation time can be established with an error of less than 0.5 percent of the reaction time measured.

f. The instrument used to measure reaction time shall be calibrated to be accurate to within 0.001 second.

3. *Compliance with §1910.217(h)(2)(ii)*. For compliance with these requirements, the average value of the stopping time, T_s , shall be the arithmetic mean of at least 25 stops for each stop angle initiation measured with the brake and/or clutch unused, 50 percent worn, and 90 percent worn. The recommendations of the brake system manufacturer shall be used to simulate or estimate the brake wear. The manufacturer's recommended minimum lining depth shall be identified and documented, and an evaluation made that the minimum depth will not be exceeded before the next (annual) recertification/revalidation. A correlation of the brake and/or clutch degradation based on the above tests and/or estimates shall be made and documented. The results shall document the conditions under which the brake and/or clutch will and will not comply with the requirement. Based upon this determination, a scale shall be developed to indicate the allowable 10 percent of the stopping time at the top of the stroke for slide or ram overtravel due to brake wear. The scale shall be marked to indicate that brake adjustment and/or replacement is required. The explanation and use of the scale shall be documented.

The test specification and procedure shall be submitted to the validation organization for review and validation prior to the test. The validation organization representative shall witness at least one set of tests.

4. *Compliance with §§1910.217(h)(5)(iii) and (h)(9)(v)*. Each reaction time required to calculate the Safety Distance, including the brake monitor setting, shall be documented in separate reaction time tests. These tests shall specify the acceptable tolerance band sufficient to assure that tolerance build-up will not render the safety distance unsafe.

a. Integrated test of the press fully equipped to operate in the PSDI mode shall be conducted to establish the total system reaction time.

b. Brakes which are the adjustable type shall be adjusted properly before the test.

5. *Compliance with §1910.217(h)(2)(iii)*. a. Prior to conducting the brake system test required by paragraph (h)(2)(ii), a visual check shall be made of the springs. The visual check shall include a determination that the spring housing or rod does not show damage sufficient to degrade the structural integrity of the unit, and the spring does not show any tendency to interleave.

b. Any detected broken or unserviceable springs shall be replaced before the test is conducted. The test shall be considered successful if the stopping time remains within that which is determined by paragraph (h)(9)(v) for the safety distance setting. If the increase in press stopping time exceeds the brake monitor setting limit defined in paragraph (h)(5)(iii), the test shall be considered unsuccessful, and the cause of the excessive stopping time shall be investigated. It shall be ascertained that the springs have not been broken and that they are functioning properly.

6. *Compliance with §1910.217(h)(7)*. a. Tests which are conducted by the manufacturers of electrical components to establish stress, life, temperature and loading limits must be tests which are in compliance with the provisions of the National Electrical Code.

b. Electrical and/or electronic cards or boards assembled with discrete components shall be considered a subsystem and shall require separate testing that the subsystems do not degrade in any of the following conditions:

(1) Ambient temperature variation from $-20\text{ }^{\circ}\text{C}$ to $+50\text{ }^{\circ}\text{C}$.

(2) Ambient relative humidity of 99 percent.

(3) Vibration of 45G for one millisecond per stroke when the item is to be mounted on the press frame.

(4) Electromagnetic interference at the same wavelengths used for the radiation sensing field, at the power line frequency fundamental and harmonics, and also from outogenous radiation due to system switching.

(5) Electrical power supply variations of ± 15 percent.

c. The manufacturer shall specify the test requirements and procedures from existing consensus tests in compliance with the provisions of the National Electrical Code.

d. Tests designed by the manufacturer shall be made available upon request to the validation organization. The validation organization representative shall witness at least one set of each of these tests.

7. *Compliance with §1910.217(h)(9)(iv)*. a. The manufacturer shall design a test to demonstrate that the prescribed minimum object sensitivity of the presence sensing device is met.

b. The test specifications and procedures shall be made available upon request to the validation organization.

8. *Compliance with §1910.217(h)(9)(x)*. a. The manufacturer shall design a test(s) to establish the hand tool extension diameters allowed for variations in minimum object sensitivity response.

b. The test(s) shall document the range of object diameter sizes which will produce both single and double break conditions.

c. The test(s) specifications and procedures shall be made available upon request to the validation organization.

9. *Integrated Tests Certification/Validation*. a. The manufacturer shall design a set of integrated tests to demonstrate compliance with the following requirements:

Sections 1910.217(h)(6) (ii); (iii); (iv); (v); (vi); (vii); (viii); (ix); (xi); (xii); (xiii); (xiv); (xv); and (xvii).

b. The integrated test specifications and procedures shall be made available to the validation organization.

10. *Analysis.* a. The manufacturer shall submit to the validation organization the technical analysis such as Hazard Analysis, Failure Mode and Effect Analysis, Stress Analysis, Component and Material Selection Analysis, Fluid Compatibility, and/or other analyses which may be necessary to demonstrate, compliance with the following requirements:

Sections 1910.217(h)(8) (i) and (ii); (h)(2) (ii) and (iii); (h)(3)(i) (A) and (C), and (ii); (h)(5) (i), (ii) and (iii); (h)(6) (i), (iii), (iv), (vi), (vii), (viii), (ix), (x), (xi), (xiii), (xiv), (xv), (xvi), and (xvii); (h)(7) (i) and (ii); (h)(9) (iv), (v), (viii), (ix) and (x); (h)(10) (i) and (ii).

11. *Types of Tests Acceptable for Certification/Validation.* a. Test results obtained from development testing may be used to certify/validate the design.

b. The test results shall provide the engineering data necessary to establish confidence that the hardware and software will meet specifications, the manufacturing process has adequate quality control and the data acquired was used to establish processes, procedures, and test levels supporting subsequent hardware design, production, installation and maintenance.

12. *Validation for Design Certification/Validation.* If, after review of all documentation, tests, analyses, manufacturer's certifications, and any additional tests which the third-party validation organization believes are necessary, the third-party validation organization determines that the PSDI safety system is in full compliance with the applicable requirements of 29 CFR 1910.217(a) through (h) and this appendix A, it shall validate the manufacturer's certification that it so meets the stated requirements.

C. Installation Certification/Validation Requirements

1. The employer shall evaluate and test the PSDI system installation, shall submit to the OSHA-recognized third-party validation organization the necessary supporting documentation, and shall certify that the requirements of §1910.217(a) through (h) and this appendix A have been met and that the installation is proper.

2. The OSHA-recognized third-party validation organization shall conduct tests, and/or review and evaluate the employer's installation tests, documentation and representations. If it so determines, it shall validate the employer's certification that the PSDI safety system is in full conformance with all requirements of 29 CFR 1910.217(a) through (h) and this appendix A.

D. Recertification/Revalidation Requirements

1. A PSDI safety system which has received installation certification/validation shall undergo recertification/revalidation the earlier of:

a. Each time the systems hardware is significantly changed, modified, or refurbished;

b. Each time the operational conditions are significantly changed (including environmental, application or facility changes, but excluding such changes as die changes or press relocations not involving revision to the safety system);

c. When a failure of a significant component has occurred or a change has been made which may affect safety; or

d. When one year has elapsed since the installation certification/validation or the last recertification/revalidation.

2. *Conduct or recertification/revalidation.* The employer shall evaluate and test the PSDI safety system installation, shall submit to the OSHA-recognized third-party validation organization the necessary supporting documentation, and shall recertify that the requirements of §1910.217(a) through (h) and this appendix are being met. The documentation shall include, but not be limited to, the following items:

a. Demonstration of a thorough inspection of the entire press and PSDI safety system to ascertain that the installation, components and safeguarding have not been changed, modified or tampered with since the installation certification/validation or last recertification/revalidation was made.

b. Demonstrations that such adjustments as may be needed (such as to the brake monitor setting) have been accomplished with proper changes made in the records and on such notices as are located on the press and safety system.

c. Demonstration that review has been made of the reports covering the design certification/validation, the installation certification/validation, and all recertification/revalidations, in order to detect any degradation to an unsafe condition, and that necessary changes have been made to restore the safety system to previous certification/validation levels.

3. The OSHA-recognized third-party validation organization shall conduct tests, and/or review and evaluate the employer's installation, tests, documentation and representations. If it so determines, it shall revalidate the employer's recertification that the PSDI system is in full conformance with all requirements of 29 CFR 1910.217(a) through (h) and this appendix A.

APPENDIX B TO §1910.217—NONMANDATORY GUIDELINES FOR CERTIFICATION/VALIDATION OF SAFETY SYSTEMS FOR PRESENCE SENSING DEVICE INITIATION OF MECHANICAL POWER PRESSES

Objectives

This appendix provides employers, manufacturers, and their representatives, with nonmandatory guidelines for use in developing certification documents. Employers and manufacturers are encouraged to recommend other approaches if there is a potential for improving safety and reducing cost. The guidelines apply to certification/validation activity from design evaluation through the completion of the installation test and the annual recertification/revalidation tests.

General Guidelines

A. The certification/validation process should confirm that hazards identified by hazard analysis, (HA), failure mode effect analysis (FMEA), and other system analyses have been eliminated by design or reduced to an acceptable level through the use of appropriate design features, safety devices, warning devices, or special procedures. The certification/validation process should also confirm that residual hazards identified by operational analysis are addressed by warning, labeling safety instructions or other appropriate means.

B. The objective of the certification/validation program is to demonstrate and document that the system satisfies specification and operational requirements for safe operations.

Quality Control

The safety attributes of a certified/validated PSDI safety system are more likely to be maintained if the quality of the system and its parts, components and subsystem is consistently controlled. Each manufacturer supplying parts, components, subsystems, and assemblies needs to maintain the quality of the product, and each employer needs to maintain the system in a non-degraded condition.

Analysis Guidelines

A. Certification/validation of hardware design below the system level should be accomplished by test and/or analysis.

B. Analytical methods may be used in lieu of, in combination with, or in support of tests to satisfy specification requirements.

C. Analyses may be used for certification/validation when existing data are available or when test is not feasible.

D. Similarity analysis may be used in lieu of tests where it can be shown that the article is similar in design, manufacturing process, and quality control to another article that was previously certified/validated in accordance with equivalent or more stringent criteria. If previous design, history and application are considered to be similar, but not equal to or more exacting than earlier experiences, the additional or partial certification/validation tests should concentrate on the areas of changed or increased requirements.

Analysis Reports

The analysis reports should identify: (1) The basis for the analysis; (2) the hardware or software items analyzed; (3) conclusions; (4) safety factors; and (5) limit of the analysis. The assumptions made during the analysis should be clearly stated and a description of the effects of these assumptions on the conclusions and limits should be included.

Certification/validation by similarity analysis reports should identify, in addition to the above, application of the part, component or subsystem for which certification/validation is being sought as well as data from previous usage establishing adequacy of the item. Similarity analysis should not be accepted when the internal and external stresses on the item being certified/validated are not defined.

Usage experience should also include failure data supporting adequacy of the design.

APPENDIX C TO §1910.217—MANDATORY REQUIREMENTS FOR OSHA RECOGNITION OF THIRD-PARTY VALIDATION ORGANIZATIONS FOR THE PSDI STANDARD

This appendix prescribes mandatory requirements and procedures for OSHA recognition of third-party validation organizations to validate employer and manufacturer certifications that their equipment and practices meet the requirements of the PSDI standard. The scope of the appendix includes the three categories of certification/validation required by the PSDI standard: Design Certification/Validation, Installation Certification/Validation, and Annual Recertification/Revalidation.

If further detailing of these provisions will assist the validation organization or OSHA in this activity, this detailing will be done through appropriate OSHA Program Directives.

I. Procedure for OSHA Recognition of Validation Organizations

A. Applications

1. *Eligibility.* a. Any person or organization considering itself capable of conducting a PSDI-related third-party validation function may apply for OSHA recognition.

b. However, in determining eligibility for a foreign-based third-party validation organization, OSHA shall take into consideration whether there is reciprocity of treatment by the foreign government after consultation with relevant U.S. government agencies.

2. *Content of application.* a. The application shall identify the scope of the validation activity for which the applicant wishes to be recognized, based on one of the following alternatives:

(1) Design Certification/Validation, Installation Certification/Validation, and Annual Recertification/Revalidation;

(2) Design Certification/Validation only; or

(3) Installation/Certification/Validation and Annual Recertification/Revalidation.

b. The application shall provide information demonstrating that it and any validating laboratory utilized meet the qualifications set forth in section II of this appendix.

c. The applicant shall provide information demonstrating that it and any validating laboratory utilized meet the program requirements set forth in section III of this appendix.

d. The applicant shall identify the test methods it or the validating laboratory will use to test or judge the components and operations of the PSDI safety system required to be tested by the PSDI standard and appendix A, and shall specify the reasons the test methods are appropriate.

e. The applicant may include whatever enclosures, attachments, or exhibits the applicant deems appropriate. The application need not be submitted on a Federal form.

f. The applicant shall certify that the information submitted is accurate.

3. *Filing office location.* The application shall be filed with: PSDI Certification/Validation Program, Office of Variance Determination, Occupational Safety and Health Administration, U.S. Department of Labor, Room N3653, 200 Constitution Avenue, NW., Washington, DC 20210.

4. *Amendments and withdrawals.* a. An application may be revised by an applicant at any time prior to the completion of the final staff recommendation.

b. An application may be withdrawn by an applicant, without prejudice, at any time prior to the final decision by the Assistant Secretary in paragraph I.B.8.b.(4) of this appendix.

B. Review and Decision Process

1. *Acceptance and field inspection.* All applications submitted will be accepted by OSHA, and their receipt acknowledged in writing. After receipt of an application, OSHA may request additional information if it believes information relevant to the requirements for recognition have been omitted. OSHA may inspect the facilities of the third-party validation organization and any validating laboratory, and while there shall review any additional documentation underlying the application. A report shall be made of each field inspection.

2. *Requirements for recognition.* The requirements for OSHA recognition of a third-party validation organization for the PSDI standard are that the program has fulfilled the requirements of section II of this appendix for qualifications and of section III of this appendix for program requirements, and the program has identified appropriate test and analysis methods to meet the requirements of the PSDI standard and appendix A.

3. *Preliminary approval.* If, after review of the application, any additional information, and the inspection report, the applicant and any validating laboratory appear to have met the requirements for recognition, a written recommendation shall be submitted by the responsible OSHA personnel to the Assistant Secretary to approve the application with a supporting explanation.

4. *Preliminary disapproval.* If, after review of the application, additional information, and inspection report, the applicant does not appear to have met the requirements for recognition, the

Director of the PSDI certification/validation program shall notify the applicant in writing, listing the specific requirements of this appendix which the applicant has not met, and the reasons.

5. *Revision of application.* After receipt of a notification of preliminary disapproval, the applicant may submit a revised application for further review by OSHA pursuant to subsection I.B. of this appendix or may request that the original application be submitted to the Assistant Secretary with a statement of reasons supplied by the applicant as to why the application should be approved.

6. *Preliminary decision by Assistant Secretary.* a. The Assistant Secretary, or a special designee for this purpose, will make a preliminary decision whether the applicant has met the requirements for recognition based on the completed application file and the written staff recommendation, as well as the statement of reasons by the applicant if there is a recommendation of disapproval.

b. This preliminary decision will be sent to the applicant and subsequently published in the FEDERAL REGISTER.

7. *Public review and comment period.* a. The FEDERAL REGISTER notice of preliminary decision will provide a period of not less than 60 calendar days for the written comments on the applicant's fulfillment of the requirements for recognition. The application, supporting documents, staff recommendation, statement of applicant's reasons, and any comments received, will be available for public inspection in the OSHA Docket Office.

b. If the preliminary decision is in favor of recognition, a member of the public, or if the preliminary decision is against recognition, the applicant may request a public hearing by the close of the comment period, if it supplies detailed reasons and evidence challenging the basis of the Assistant Secretary's preliminary decision and justifying the need for a public hearing to bring out evidence which could not be effectively supplied through written submissions.

8. *Final decision by Assistant Secretary—*a. *Without hearing.* If there are no valid requests for a hearing, based on the application, supporting documents, staff recommendation, evidence and public comment, the Assistant Secretary shall issue the final decision (including reasons) of the Department of Labor on whether the applicant has demonstrated by a preponderance of the evidence that it meets the requirements for recognition.

b. *After hearing.* If there is a valid request for a hearing pursuant to paragraph I.B.7.b. of this appendix, the following procedures will be used:

(1) The Assistant Secretary will issue a notice of hearing before an administrative law judge of the Department of Labor pursuant to the rules specified in 29 CFR part 1905, subpart C.

(2) After the hearing, pursuant to subpart C, the administrative law judge shall issue a decision (including reasons) based on the application, the supporting documentation, the staff recommendation, the public comments and the evidence submitted during the hearing (the record), stating whether it has been demonstrated, based on a preponderance of evidence, that the

applicant meets the requirements for recognition. If no exceptions are filed, this is the final decision of the Department of Labor.

(3) Upon issuance of the decision, any party to the hearing may file exceptions within 20 days pursuant to subpart C. If exceptions are filed, the administrative law judge shall forward the decision, exceptions and record to the Assistant Secretary for the final decision on the application.

(4) The Assistant Secretary shall review the record, the decision by the administrative law judge, and the exceptions. Based on this, the Assistant Secretary shall issue the final decision (including reasons) of the Department of Labor stating whether the applicant has demonstrated by a preponderance of evidence that it meets the requirements for recognition.

b. *Publication.* A notification of the final decision shall be published in the FEDERAL REGISTER.

C. Terms and Conditions of Recognition, Renewal and Revocation

1. The following terms and conditions shall be part of every recognition:

a. The recognition of any validation organization will be evidenced by a letter of recognition from OSHA. The letter will provide the specific details of the scope of the OSHA recognition as well as any conditions imposed by OSHA, including any Federal monitoring requirements.

b. The recognition of each validation organization will be valid for five years, unless terminated before or renewed after the expiration of the period. The dates of the period of recognition will be stated in the recognition letter.

c. The recognized validation organization shall continue to satisfy all the requirements of this appendix and the letter of recognition during the period of recognition.

2. A recognized validation organization may change a test method of the PSDI safety system certification/validation program by notifying the Assistant Secretary of the change, certifying that the revised method will be at least as effective as the prior method, and providing the supporting data upon which its conclusions are based.

3. A recognized validation organization may renew its recognition by filing a renewal request at the address in paragraph I.A.3. of this appendix, above, not less than 180 calendar days, nor more than one year, before the expiration date of its current recognition. When a recognized validation organization has filed such a renewal request, its current recognition will not expire until a final decision has been made on the request. The renewal request will be processed in accordance with subsection I.B. of this appendix, above, except that a reinspection is not required but may be performed by OSHA. A hearing will be granted to an objecting member of the public if evidence of failure to meet the requirements of this appendix is supplied to OSHA.

4. A recognized validation organization may apply to OSHA for an expansion of its current recognition to cover other categories of PSDI certification/validation in addition to those included in the current recognition. The application for expansion will be acted upon and processed by OSHA in accordance with subsection I.B. of this appendix, subject to the possible reinspection exception. If the validation organization has been recognized for more than one year, meets the requirements for expansion of recognition, and there is no evidence that the recognized validation organization has not been following the requirements of this appendix and the letter of recognition, an expansion will normally be granted. A hearing will be granted to an objecting member of the public only if evidence of failure to meet the requirements of this appendix is supplied to OSHA.

5. A recognized validation organization may voluntarily terminate its recognition, either in its entirety or with respect to any area covered in its recognition, by giving written notice to OSHA at any time. The written notice shall indicate the termination date. A validation organization may not terminate its installation certification and recertification validation functions earlier than either one year from the date of the written notice, or the date on which another recognized validation organization is able to perform the validation of installation certification and recertification.

6.a. OSHA may revoke its recognition of a validation organization if its program either has failed to continue to satisfy the requirements of this appendix or its letter of recognition, has not been performing the validation functions required by the PSDI standard and appendix A, or has misrepresented itself in its applications. Before proposing to revoke recognition, the Agency will notify the recognized validation organization of the basis of the proposed revocation and will allow rebuttal or correction of the alleged deficiencies. If the deficiencies are not corrected, OSHA may revoke recognition, effective in 60 days, unless the validation organization requests a hearing within that time.

b. If a hearing is requested, it shall be held before an administrative law judge of the Department of Labor pursuant to the rules specified in 29 CFR part 1905, subpart C.

c. The parties shall be OSHA and the recognized validation organization. The decision shall be made pursuant to the procedures specified in paragraphs I.B.8.b.(2) through (4) of this appendix except that the burden of proof shall be on OSHA to demonstrate by a preponderance of the evidence that the recognition should be revoked because the validation organization either is not meeting the requirements for recognition, has not been performing the validation functions required by the PSDI standard and appendix A, or has misrepresented itself in its applications.

D. Provisions of OSHA Recognition

Each recognized third-party validation organization and its validating laboratories shall:

1. Allow OSHA to conduct unscheduled reviews or on-site audits of it or the validating laboratories on matters relevant to PSDI, and cooperate in the conduct of these reviews and audits;

2. Agree to terms and conditions established by OSHA in the grant of recognition on matters such as exchange of data, submission of accident reports, and assistance in studies for improving PSDI or the certification/validation process.

II. Qualifications

The third-party validation organization, the validating laboratory, and the employees of each shall meet the requirements set forth in this section of this appendix.

A. Experience of Validation Organization

1. The third-party validation organization shall have legal authority to perform certification/validation activities.

2. The validation organization shall demonstrate competence and experience in either power press design, manufacture or use, or testing, quality control or certification/validation of equipment comparable to power presses and associated control systems.

3. The validation organization shall demonstrate a capability for selecting, reviewing, and/or validating appropriate standards and test methods to be used for validating the certification of PSDI safety systems, as well as for reviewing judgements on the safety of PSDI safety systems and their conformance with the requirements of this section.

4. The validating organization may utilize the competence, experience, and capability of its employees to demonstrate this competence, experience and capability.

B. Independence of Validation Organization

1. The validation organization shall demonstrate that:

a. It is financially capable to conduct the work;

b. It is free of direct influence or control by manufacturers, suppliers, vendors, representatives of employers and employees, and employer or employee organizations; and

c. Its employees are secure from discharge resulting from pressures from manufacturers, suppliers, vendors, employers or employee representatives.

2. A validation organization may be considered independent even if it has ties with manufacturers, employers or employee representatives if these ties are with at least two of these three groups; it has a board of directors (or equivalent leadership responsible for the certification/validation activities) which includes representatives of the three groups; and it has a binding commitment of funding for a period of three years or more.

C. Validating Laboratory

The validation organization's laboratory (which organizationally may be a part of the third-party validation organization):

1. Shall have legal authority to perform the validation of certification;
2. Shall be free of operational control and influence of manufacturers, suppliers, vendors, employers, or employee representatives that would impair its integrity of performance; and
3. Shall not engage in the design, manufacture, sale, promotion, or use of the certified equipment.

D. Facilities and Equipment

The validation organization's validating laboratory shall have available all testing facilities and necessary test and inspection equipment relevant to the validation of the certification of PSDI safety systems, installations and operations.

E. Personnel

The validation organization and the validating laboratory shall be adequately staffed by personnel who are qualified by technical training and/or experience to conduct the validation of the certification of PSDI safety systems.

1. The validation organization shall assign overall responsibility for the validation of PSDI certification to an Administrative Director. Minimum requirements for this position are a Bachelor's degree and five years professional experience, at least one of which shall have been in responsible charge of a function in the areas of power press design or manufacture or a broad range of power press use, or in the areas of testing, quality control, or certification/validation of equipment comparable to power presses or their associated control systems.
2. The validating laboratory, if a separate organization from the validation organization, shall assign technical responsibility for the validation of PSDI certification to a Technical Director. Minimum requirements for this position are a Bachelor's degree in a technical field and five years of professional experience, at least one of which shall have been in responsible charge of a function in the area of testing, quality control or certification/validation of equipment comparable to power presses or their associated control systems.
3. If the validation organization and the validating laboratory are the same organization, the administrative and technical responsibilities may be combined in a single position, with minimum requirements as described in E.1. and 2. for the combined position.
4. The validation organization and validating laboratory shall have adequate administrative and technical staffs to conduct the validation of the certification of PSDI safety systems.

F. Certification/Validation Mark or Logo

1. The validation organization or the validating laboratory shall own a registered certification/validation mark or logo.

2. The mark or logo shall be suitable for incorporation into the label required by paragraph (h)(11)(iii) of this section.

III. Program Requirements

A. Test and Certification/Validation Procedures

1. The validation organization and/or validating laboratory shall have established written procedures for test and certification/validation of PSDI safety systems. The procedures shall be based on pertinent OSHA standards and test methods, or other publicly available standards and test methods generally recognized as appropriate in the field, such as national consensus standards or published standards of professional societies or trade associations.

2. The written procedures for test and certification/validation of PSDI systems, and the standards and test methods on which they are based, shall be reproducible and be available to OSHA and to the public upon request.

B. Test Reports

1. A test report shall be prepared for each PSDI safety system that is tested. The test report shall be signed by a technical staff representative and the Technical Director.

2. The test report shall include the following:

a. Name of manufacturer and catalog or model number of each subsystem or major component.

b. Identification and description of test methods or procedures used. (This may be through reference to published sources which describe the test methods or procedures used.)

c. Results of all tests performed.

d. All safety distance calculations.

3. A copy of the test report shall be maintained on file at the validation organization and/or validating laboratory, and shall be available to OSHA upon request.

C. Certification/Validation Reports

1. A certification/validation report shall be prepared for each PSDI safety system for which the certification is validated. The certification/validation report shall be signed by the Administrative Director and the Technical Director.

2. The certification/validation report shall include the following:

- a. Name of manufacturer and catalog or model number of each subsystem or major component.
 - b. Results of all tests which serve as the basis for the certification.
 - c. All safety distance calculations.
 - d. Statement that the safety system conforms with all requirements of the PSDI standard and appendix A.
3. A copy of the certification/validation report shall be maintained on file at the validation organization and/or validating laboratory, and shall be available to the public upon request.
 4. A copy of the certification/validation report shall be submitted to OSHA within 30 days of its completion.

D. Publications System

The validation organization shall make available upon request a list of PSDI safety systems which have been certified/validated by the program.

E. Follow-up Activities

1. The validation organization or validating laboratory shall have a follow-up system for inspecting or testing manufacturer's production of design certified/validated PSDI safety system components and subassemblies where deemed appropriate by the validation organization.
2. The validation organization shall notify the appropriate product manufacturer(s) of any reports from employers of point of operation injuries which occur while a press is operated in a PSDI mode.

F. Records

The validation organization or validating laboratory shall maintain a record of each certification/validation of a PSDI safety system, including manufacturer and/or employer certification documentation, test and working data, test report, certification/validation report, any follow-up inspections or testing, and reports of equipment failures, any reports of accidents involving the equipment, and any other pertinent information. These records shall be available for inspection by OSHA and OSHA State Plan offices.

G. Dispute Resolution Procedures

1. The validation organization shall have a reasonable written procedure for acknowledging and processing appeals or complaints from program participants (manufacturers, producers, suppliers, vendors and employers) as well as other interested parties (employees or their

representatives, safety personnel, government agencies, etc.), concerning certification or validation.

2. The validation organization may charge any complainant the reasonable charge for repeating tests needed for the resolution of disputes.

APPENDIX D TO §1910.217—NONMANDATORY SUPPLEMENTARY INFORMATION

This appendix provides nonmandatory supplementary information and guidelines to assist in the understanding and use of 29 CFR 1910.217(h) to allow presence sensing device initiation (PSDI) of mechanical power presses. Although this appendix as such is not mandatory, it references sections and requirements which are made mandatory by other parts of the PSDI standard and appendices.

1. General

OSHA intends that PSDI continue to be prohibited where present state-of-the-art technology will not allow it to be done safely. Only *part revolution* type mechanical power presses are approved for PSDI. Similarly, only presses with a configuration such that a person's body cannot completely enter the bed area are approved for PSDI.

2. Brake and Clutch

Flexible steel band brakes do not possess a long-term reliability against structural failure as compared to other types of brakes, and therefore are not acceptable on presses used in the PSDI mode of operation.

Fast and consistent stopping times are important to safety for the PSDI mode of operation. Consistency of braking action is enhanced by high brake torque. The requirement in paragraph (h)(2)(ii) defines a high torque capability which should ensure fast and consistent stopping times.

Brake design parameters important to PSDI are high torque, low moment of inertia, low air volume (if pneumatic) mechanisms, non-interleaving engagement springs, and structural integrity which is enhanced by over-design. The requirement in paragraph (h)(2)(iii) reduces the possibility of significantly increased stopping time if a spring breaks.

As an added precaution to the requirements in paragraph (h)(2)(iii), brake adjustment locking means should be secured. Where brake springs are externally accessible, lock nuts or other means may be provided to reduce the possibility of backing off of the compression nut which holds the springs in place.

3. Pneumatic Systems

Elevated clutch/brake air pressure results in longer stopping time. The requirement in paragraph (h)(3)(i)(C) is intended to prevent degradation in stopping speed from higher air pressure. Higher pressures may be permitted, however, to increase clutch torque to free

“jammed” dies, provided positive measures are provided to prevent the higher pressure at other times.

4. Flywheels and Bearings

Lubrication of bearings is considered the single greatest deterrent to their failure. The manufacturer's recommended procedures for maintenance and inspection should be closely followed.

5. Brake Monitoring

The approval of brake monitor adjustments, as required in paragraph (h)(5)(ii), is not considered a *recertification*, and does not necessarily involve an on-site inspection by a representative of the validation organization. It is expected that the brake monitor adjustment normally could be evaluated on the basis of the effect on the safety system certification/validation documentation retained by the validation organization.

Use of a brake monitor does not eliminate the need for periodic brake inspection and maintenance to reduce the possibility of catastrophic failures.

6. Cycle Control and Control Systems

The PSDI set-up/reset means required by paragraph (h)(6)(iv) may be initiated by the actuation of a special momentary pushbutton or by the actuation of a special momentary pushbutton and the initiation of a first stroke with two hand controls.

It would normally be preferable to limit the adjustment of the time required in paragraph (h)(6)(vi) to a maximum of 15 seconds. However, where an operator must do many operations outside the press, such as lubricating, trimming, deburring, etc., a longer interval up to 30 seconds is permitted.

When a press is equipped for PSDI operation, it is recommended that the presence sensing device be active as a guarding device in other production modes. This should enhance the reliability of the device and ensure that it remains operable.

An acceptable method for interlocking supplemental guards as required by paragraph (h)(6)(xiii) would be to incorporate the supplemental guard and the PSDI presence sensing device into a hinged arrangement in which the alignment of the presence sensing device serves, in effect, as the interlock. If the supplemental guards are moved, the presence sensing device would become misaligned and the press control would be deactivated. No extra microswitches or interlocking sensors would be required.

Paragraph (h)(6)(xv) of the standard requires that the control system have provisions for an “inch” operating means; that die-setting not be done in the PSDI mode; and that production not be done in the “inch” mode. It should be noted that the sensing device would be by-passed in the “inch” mode. For that reason, the prohibitions against die-setting in the PSDI mode, and against

production in the “inch” mode are cited to emphasize that “inch” operation is of reduced safety and is not compatible with PSDI or other production modes.

7. Environmental Requirements

It is the intent of paragraph (h)(7) that control components be provided with inherent design protection against operating stresses and environmental factors affecting safety and reliability.

8. Safety system

The safety system provision continues the concept of paragraph (b)(13) that the probability of two independent failures in the length of time required to make one press cycle is so remote as to be a negligible risk factor in the total array of equipment and human factors. The emphasis is on an integrated total system including all elements affecting point of operation safety.

It should be noted that this does not require redundancy for press components such as structural elements, clutch/brake mechanisms, plates, etc., for which adequate reliability may be achieved by proper design, maintenance, and inspection.

9. Safeguarding the Point of Operation

The intent of paragraph (h)(9)(iii) is to prohibit use of mirrors to “bend” a single light curtain sensing field around corners to cover more than one side of a press. This prohibition is needed to increase the reliability of the presence sensing device in initiating a stroke only when the desired work motion has been completed.

Object sensitivity describes the capability of a presence sensing device to detect an object in the sensing field, expressed as the linear measurement of the smallest interruption which can be detected at any point in the field. Minimum object sensitivity describes the largest acceptable size of the interruption in the sensing field. A minimum object sensitivity of one and one-fourth inches (31.75 mm) means that a one and one-fourth inch (31.75 mm) diameter object will be continuously detected at all locations in the sensing field.

In deriving the safety distance required in paragraph (h)(9)(v), all stopping time measurements should be made with clutch/brake air pressure regulated to the press manufacturer's recommended value for full clutch torque capability. The stopping time measurements should be made with the heaviest upper die that is planned for use in the press. If the press has a slide counterbalance system, it is important that the counterbalance be adjusted correctly for upper die weight according to the manufacturer's instructions. While the brake monitor setting is based on the stopping time it actually measures, i.e., the normal stopping time at the top of the stroke, it is important that the safety distance be computed from the longest stopping time measured at any of the indicated three downstroke stopping positions listed in the explanation of T_s . The use in the formula of twice the stopping time increase, T_m , allowed by the brake monitor for brake wear allows for greater increases in the downstroke stopping time than occur in normal stopping time at the top of the stroke.

10. Inspection and Maintenance. [Reserved]

11. Safety System Certification/Validation

Mandatory requirements for certification/validation of the PSDI safety system are provided in appendix A and appendix C to this standard. Nonmandatory supplementary information and guidelines relating to certification/validation of the PSDI safety system are provided to appendix B to this standard.

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