

CHAPTER 29. MECHANICAL APPARATUS—MISCELLANEOUS

Subchap.		Sec.
A.	POWER, FOOT AND HAND COLD METAL PRESSES	29.1
B.	POWDER-ACTUATED TOOLS	29.41
C.	MECHANICAL POWER TRANSMISSION APPARATUS	29.111
D.	STATIONARY ENGINES	29.161
E.	MACHINE TOOLS	29.211
F.	ABRASIVE WHEELS	29.231

Cross References

This Chapter cited in 34 Pa. Code § 45.102 (relating to log handling equipment); 34 Pa. Code § 47.167 (relating to maintenance); and 34 Pa. Code § 47.342 (relating to apparatus).

Subchapter A. POWER, FOOT AND HAND COLD METAL PRESSES

GENERAL PROVISIONS

- Sec. 29.1. Definitions.
- 29.2. Scope.
- 29.3. Penalty.

GENERAL HAZARDS

- 29.11. All installations.
- 29.12. New installations.
- 29.13. Existing installations.

HAZARDS AT POINT OF OPERATION

- 29.21. All installations.

Authority

The provisions of this Subchapter A issued under the act of June 2, 1913 (P. L. 396, No. 267) (71 P. S. §§ 1441—1451); and section 15 of the act of May 18, 1937 (P. L. 654, No. 174) (43 P. S. § 25-15), unless otherwise noted.

Source

The provisions of this Subchapter A adopted November 1, 1926; amended through August 1, 1968, unless otherwise noted.

GENERAL PROVISIONS**§ 29.1. Definitions.**

The following words and terms, when used in this subchapter, have the following meanings, unless the context clearly indicates otherwise:

Automatic feeding—Placing material under the ram by a mechanically actuated device that does not require the attention of an operator at each stroke of the ram.

Foot press—A machine, operated by footpower, used for the same purposes as a power press on cold metal.

Gate guard—A barrier, completely enclosing the point of operation, which is operated by the tripping device of the press before the ram descends and which does not permit the ram to descend until the hand of the operator has been removed to a safe distance.

Hand press—A machine, operated by handpower, used for the same purposes as a power press on cold metal.

Knockout, kickout, or ejector—Any mechanical device for removing material.

Manual feeding—Placing material under the ram by hand or by hand tools.

Power press—A machine, operated by power, fitted with one or more rams (plungers) and dies for blanking, trimming, drawing, punching, or stamping cold metal. This term includes plate shears and plate punches, but it does not include bulldozers, hot metal presses, hammers, bending presses or brakes, power screw or feeding presses, air presses or hydraulic presses.

Ram—The moving part of the press which is sometimes called plunger, slide, gate, or mandrel.

Semi-automatic feeding—Placing material under the ram by some mechanical device or special die which is fed by an operator at each stroke of the ram.

Two-hand device—An arrangement, whenever the hands are used instead of or in connection with the feet to trip the press, so constructed that the simultaneous action of both hands is required at a point away from the point of feed.

§ 29.2. Scope.

This Subchapter sets forth rules to safeguard the lives, limbs, and health of workers operating power, foot and hand cold metal presses, and places the responsibility of complying with such rules upon both employer and employe.

§ 29.3. Penalty.

Any person who violates this subchapter or any regulations of the Department or who interferes with the Department or its duly authorized representative in the enforcement of this subchapter or regulations shall be penalized under section 15 of act of May 18, 1937 (P. L. 654, No. 174) (43 P. S. § 25-15).

GENERAL HAZARDS**§ 29.11. All installations.**

(a) *Foundation.* Each press shall be placed on a substantial foundation, floor, or other support and securely fastened or anchored in place.

(b) *Location.* All presses shall be so located as to provide the following:

(1) Enough clearance between machines so that the movement of one operator does not interfere with the work of another.

(2) Ample room for cleaning machines and handling the work, including material and scrap.

(3) Aisles of sufficient width to permit the free movement of employes bringing and removing material. All surrounding floors and flooring shall be kept in good condition and free from obstructions and grease.

(c) *Lighting.* Presses shall be so located, with respect to sources of both natural and artificial light, that light of sufficient intensity falls on the work. It is recommended that direct or reflected glare, and shadows, including moving shadows, be avoided.

(d) *Belts, pulleys, gears and shafts.* Belts, pulleys, gears, and shafts shall be guarded in accordance with the requirements of Subchapter C (relating to mechanical power transmission apparatus).

(e) *Switches.* Switches and other electrical apparatus shall be guarded in accordance with the requirements of Chapter 39, Subchapter B (relating to electric safety).

(f) *Feeding mechanisms.* Gears and feed rolls on press feeding mechanisms shall be guarded in accordance with the requirements of Subchapter C (relating to mechanical power transmission apparatus).

(g) *Protection.* If the nature of the operation or the kind of material used may create a hazard from flying particles, a shield, goggles, or other means of head or eye protection shall be provided in accordance with the requirements of Chapter 39, Subchapter C (relating to head and eye protection).

§ 29.12. New installations.

Disconnection of power. Each power press shall be provided with means for disconnecting all power from the press and from the pulley on the press. Any of the following methods may be used:

(1) An individual motor drive capable of disconnecting such power from the press. If the switch or starter is so constructed and located that the motor may be accidentally started, provision shall be made to permit locking or latching in the "off" position.

(2) Tight and loose pulleys on a countershaft with a belt shifter which may be locked or latched in the off position.

(3) Belt perch or idler pulleys to facilitate throwing belts off and on the drive pulley.

(4) A clutch on the drive pulley, with a clutch handle that can be locked or latched in the “off” position. It is recommended that large presses, such as friction clutch presses, have some provision for stopping the press instantly at any point of the stroke.

Cross References

This section cited in 34 Pa. Code § 29.13 (relating to existing installations).

§ 29.13. Existing installations.

The means of disconnecting power as set forth in § 29.12 (relating to new installations) may be required on existing presses when, in the opinion of the Department, operating conditions justify it.

HAZARDS AT POINT OF OPERATION

§ 29.21. All installations.

(a) *Methods of guarding.* Except when operators use both hands to handle stock which is of such size that it is impossible to get their hands under the die, means of safeguarding the press at the point of operation shall be provided and used on each press in accordance with the following table, depending on the method of feeding the press:

GUARDS FOR POINT OF OPERATION

<i>Method of Feeding Press</i>	<i>Safeguarding Required</i>
(1) Manual	(A) Enclosure of ram [§ 29.21(b)]; or (B) Limitation of ram stroke [§ 29.2(c)]; or (C) Gate guard [§ 29.21(d)]; or (D) Two-hand tripping device [§ 29.21(d)]; or (E) Sweep guard [§ 29.21(d)]; or (F) When the preceding preferred methods are not employed, special handtools may be used for holding or placing the material [§ 29.21(e)].
(2) Semi-automatic	
1. Chute feed	(A) Enclosure of ram [§ 29.21(b)];
2. Slide feed	or
3. Sliding dies	(B) Limitation of ram stroke [§ 29.21(c)];
4. Dial feed	or
5. Revolving dies	(C) Gate guard [§ 29.21(d)].
(3) Automatic	(A) Enclosure of ram [§ 29.21(b)]; or
1. Automatic roll feed	
2. Automatic push or pull feed	(B) Limitation of ram stroke [§ 29.21(c)]; or
3. Automatic plunger feed	(C) Gate guard [§ 29.21(d)].

(b) *Enclosure of ram.* If the press is safeguarded by enclosing the ram, the enclosure shall be substantially constructed. The opening between the bottom of the enclosure and the work or working surface shall not exceed $3/8$ inch. The top of the enclosure shall extend at least as high as the upper limit of travel of the ram. There shall be no dangerous shear points between the guard and any moving part. Openings in the guard shall not exceed $1/2$ inch, if within four inches of any moving point; if farther away than four inches, openings shall not exceed two square inches in area.

(c) *Ram stroke.* If the press is safeguarded by limiting the ram stroke, the stroke of the ram shall be such that the clearance between the ram and die or stripper shall not exceed $3/8$ inch.

(d) *Guards and devices.* If the press is safeguarded by a gate guard, a two-hand tripping device, or a sweep guard, such guards or devices shall be of an approved type and conform with the following specifications:

(1) Each such guard or device shall be simple and reliable in construction, application, and adjustment. It shall be permanently attached by cap screws or through bolts to the press frame. It shall not offer any accident hazard. It shall be designed and constructed to minimize the possibility of removing or misusing essential parts and to facilitate inspection of such parts.

(2) Each guard or device shall be so designed and constructed that no part of the hand of the operator is within the danger zone while the ram is descending. Two-hand tripping devices shall be so arranged as to prevent tying, locking, wedging, or otherwise securing one handle or button and operating the press with the other hand only, except by the use of a key which shall be kept only in the possession of the foreman.

(3) On slow acting presses each guard or device shall be arranged so as not to permit the operator to place his hand in the danger zone after the press has been tripped and while the ram is still descending.

(4) The openings in gate guards shall be not greater than specified in subsection (b). This requirement applies also to sweep guards which consist of a sliding gate or enclosure.

(5) Unless the guard or device is directly connected to the ram (for example, a sweep guard), a nonrepeat attachment shall be provided by which the tread or operating lever is disconnected after each stroke and a positive stop is introduced to stop the press. The nonrepeat attachment shall not be dependent upon the action of any spring except a compression spring operation in or on a closely fitting barrel or rod and so wound that the space between coils is less than the diameter of the wire. Such nonrepeat attachment, however, is not required for a gate guard so constructed as to insure its being in place to offer full protection if the press should repeat because of riding the treadle or breakage of the latch return spring. A nonrepeat attachment may be so arranged that it may be rendered inoperative in case continuous operation is desired, if for such operation the press is otherwise safeguarded as specified in subsection (a).

- (6) Gate guards which are attached to the ram and which move downward so that the hand of the operator may be caught between gate and lower die are prohibited.
- (e) *Handtools.* Handtools for placing and removing material shall permit easy handling of material without requiring the operator to place his hand in the danger zone. Such tools shall be accepted in lieu of a guard only when the preferred methods listed in subsection (c) are not employed and when the use of the tools is strictly enforced by the employer.
- (f) *Treadle guard.* Each foot-operated power press shall conform with any of the following:
- (1) A substantial guard shall be placed over the treadle to prevent accidental tripping.
 - (2) An equally effective special design of treadle shall be used.
 - (3) The treadle shall be located within the frame of the machine. Guards for treadles other than long bars extending across the machine shall be not more than twice the width of the foot.
- (g) *Latch.* Hand-operated power presses shall be equipped with a spring latch on the lever to prevent accidental or premature tripping.
- (h) *Interlocking device.* Each hand-operated power press, if tended by more than one person, shall have an interlocking lever or similar device controlled by the helper to prevent accidental or premature tripping.

Subchapter B. POWDER-ACTUATED TOOLS

GENERAL PROVISIONS

Sec.	
29.41.	Definitions.
29.42.	Scope.
29.43.	Liability.
29.44.	Penalty.

GENERAL REQUIREMENTS

29.51.	Approval of equipment.
29.52.	Securing approval of tools.
29.53.	Qualifications for instructors.
29.54.	Qualifications for operators.
29.55.	Safety precautions.
29.56.	Storage.

MANUFACTURERS, SALES AND RENTAL AGENTS

- 29.61. Registration.
- 29.62. Powerload description.
- 29.63. Safety locks.
- 29.64. Firing pin.
- 29.65. Firing position.
- 29.66. Variable power.
- 29.67. Studs and pins.

LOW VELOCITY TOOLS

- 29.68. Piston tool—low velocity type.
- 29.69. General requirements.

EMPLOYERS

- 29.81. Competency.

EMPLOYEES

- 29.91. Responsibility.

Authority

The provisions of this Subchapter B issued under act of June 2, 1913 (P. L. 396, No. 267) (71 P. S. §§ 1441—1451); and section 15 of the act of May 18, 1937 (P. L. 654, No. 174) (43 P. S. § 25-15), unless otherwise noted.

Source

The provisions of this Subchapter B adopted May 22, 1958, amended through February 1, 1970, unless otherwise noted.

GENERAL PROVISIONS**§ 29.41. Definitions.**

The following words and terms, when used in this subchapter, have the following meanings, unless the context clearly indicates otherwise:

Powder-actuated tool—A tool, dependent upon an explosive charge (normally powder) to provide the propelling force to drive studs, pins, fasteners, and other similar articles onto or into metal or other material or objects.

Powerload—Any substance in any form capable of producing a propellant force.

Qualified operator—A person licensed under rules of the Department to operate powder-actuated tools.

Trainee—A person undergoing training in the safe and efficient operation of powder-actuated tools and licensed as such under rules of the Department.

§ 29.42. Scope.

This Subchapter applies to the design, construction, handling, and operation of powder-actuated tools and to the licensing of operators of tools, sets forth rules to safeguard the lives, limbs and health of workers in places where actuated tools are used, and places the responsibility of complying with such rules upon both employer and employe.

§ 29.43. Liability.

Each owner or lessee of any powder-actuated tool that is defective or is not approved by the Board, which tool is not removed from service, assumes joint and several liability for any injury or damage caused by the operation of such tool.

§ 29.44. Penalty.

Any person who violates any of the provisions of this subchapter or any regulations of the Department or who interferes with the Department or its duly authorized representative in the enforcement of this subchapter or regulations shall be subject to summary proceedings before an alderman, magistrate or district justice, and upon conviction shall be penalized under (P. L. 654, No. 174) (43 P. S. § 25-15).

GENERAL REQUIREMENTS

§ 29.51. Approval of equipment.

(a) No powder-actuated tool shall be operated or used within this Commonwealth unless it meets the following requirements:

- (1) The tool, including protective shield and all other accessories is of an approved type.
- (2) It shall be inspected as required by this subchapter.
- (3) Its storage, handling, and use shall meet all of the requirements and conform to the provisions of this Subchapter.

(b) No person shall use or cause or permit such tool to be used within this Commonwealth except in strict compliance with this subchapter.

(c) Tools of a special design not anticipated by this Subchapter shall be of an approved type.

§ 29.52. Securing approval of tools.

In order to secure approval of tools, the applicant shall do the following:

- (1) Apply for approval in writing and give a full description of the operation of the tool.
- (2) Send a complete set of specifications of the tool for which approval is requested.
- (3) Send a sketch or drawing showing the details of construction.
- (4) When advised by the Department, the tool shall be presented for inspection and test.
- (5) Test reports performed by nationally recognized testing agencies shall accompany applications for approval. Such test reports shall indicate compliance with applicable requirements as contained in this Subchapter.
- (6) Address all communications or shipments to the Secretary of the Industrial Board, Department of Labor and Industry, Labor and Industry Building, Harrisburg, Pennsylvania 17120.

§ 29.53. Qualifications for instructors.

(a) Only persons who have been trained in the use of powder-actuated tools and who hold a current powder-actuated tool operator’s license, issued in this Commonwealth for at least 60 days, qualify for permission to undergo an examination for an instructor’s license. Instructors licensed by the Board shall be issued operators’ cards. All instructors shall be at least 21 years of age.

(b) The purpose of the instructor’s card is to certify that the instructor has been duly authorized by the Board to issue operator’s card. The instructor’s card shall be of wallet size (approximately 2 1/2 inches by 3 1/2 inches). The face of the card shall include the following text:

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF LABOR AND INDUSTRY

Authorized Instructor	Powder-actuated Tools
Date ____	Serial Number _____
This certifies that _____ (Name) having met the standards required by the Commonwealth of Pennsylvania Regulations Governing Operators of Powder-actuated Tools is an Authorized Instructor in _____ (Name of manufacturer’s tools) and is authorized to train and qualify operators of such tools.	

(Industrial Board)

(c) Examinations for authorized instructors shall be given by the Department under the supervision of the advisory board. Examinations are given separately for each tool. If, in the opinion of the advisory board, the applicant fails his examination to qualify as an instructor in a particular tool, he shall be eligible to

apply for reexamination within 30 days; if the applicant fails his reexamination to qualify as an instructor in a particular tool, he shall not be eligible for reexamination in that particular tool for a period of one year.

(d) To qualify as an instructor, an applicant shall be at least 21 years of age. He shall be able to disassemble (field strip) and reassemble the tool correctly, demonstrate ability to use the tool safely under varying conditions, and be able to properly clean and maintain the tool in accordance with the operating instruction of the manufacturer. The applicant shall bring with him one of each model tool for demonstration.

Cross References

This section cited in 34 Pa. Code § 29.54 (relating to qualifications for operations).

§ 29.54. Qualifications for operators.

(a) No person shall operate or be asked or allowed to operate any powder actuated tool within this Commonwealth unless he has been licensed by having issued to him an operator's card, as provided in § 29.53 (relating to qualifications for instructors).

(b) Blank forms of applications for operator's cards may be obtained from the Board.

(c) All completed applications for operator's cards shall be submitted to the Board and shall include the signature of the instructor and identification number. Under no circumstances shall a rubber stamp be used as a signature.

(d) To qualify as an operator, an applicant shall be at least 21 years of age. He shall be able to disassemble (field strip) and reassemble the tool correctly, demonstrate ability to use the tool safely under varying conditions, and be able to properly clean and maintain the tool in accordance with the operating instruction of the manufacturer.

(e) Only persons considered to have good judgment and a familiarity with safe work practices and procedures shall be selected as operators. Competency shall be substantiated by a written examination prior to issuance of an operator's card.

(f) When the authorized instructor is satisfied that the applicant for an operator's card has had a minimum of 100 hours of experience in powder-actuated tools prior to examination, he may be given an oral examination in lieu of a written examination. When the written examination is waived because of this past experience, the authorized instructor shall note that fact on the copy of the operator's card filed with the Board.

(g) The application of the operator shall be filed by an authorized instructor and identified by the ID number of the instructor. Such application shall be filed with the Board by the authorized instructor within four days of the date of issuance.

(h) The purpose of the operator’s card shall be to certify that the operator has completed the required training and is licensed as a qualified operator. The card shall be of a size (approximately 2 1/2 inches by 3 1/2 inches) which may readily fit into a wallet.

(i) The face of the card shall include the following text:

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF LABOR AND INDUSTRY

Qualified Operator _____ Powder-actuated Tools
Date _____ Serial Number _____
This certifies that _____ (Name of Operator) has received
the prescribed training in the operation of powder-actuated tools
manufactured by _____ (Name of Manufacturer) and hav-
ing met the standards required by the Commonwealth of Penn-
sylvania Regulations Governing Operations of Powder-actuated
Tools is a Qualified Operator.

(Signature of
Authorized Instructor)

(j) The signature of the operator in the designated space shall follow a state-
ment on the card reading as follows:

I have received instruction in the safe operation of powder-actuated tools of the
makes and models specified, and I agree to conform to the rules and regulations
governing their use.

(k) Trainees, may obtain special permits from any authorized instructor or
from the Department, under rules approved by the Board, but such trainees shall
not operate powder-actuated tools except under the direct supervision of a quali-
fied operator. Trainees shall be at least 18 years of age.

(l) Operators and trainees shall keep their operator’s cards or permits in their
personal possession at all times when at work, and produce and display such card
upon request of any authorized person properly on the job site where a powder-
actuated tool is being used.

(m) Operator’s cards and trainee’s permits may be suspended or revoked by
the Department for failure to comply with any or all of the regulations or rules
governing operation of powder-actuated tools.

(n) Instructors’ and operators’ cards shall remain the property of the Com-
monwealth and if lost or stolen should be reported to the Board of the Depart-
ment.

§ 29.55. Safety precautions.

(a) *Protective shield.* Powder-actuated tools shall not be used without an
approved protective shield or muzzle attachment appropriate for the particular

tool and designed to confine flying particles and minimize the possibility of ricocheting of studs, pins, or fragmentation. Only those tools shall be used which cannot be fired without the protective shield, muzzle attachment, or guard in proper place.

(b) *Special protective shield.* When a standard shield or guard cannot be used, or when it does not cover all apparent avenues through which flying particles might escape, a special approved shield or guard fixture of the jig, designed and built by the manufacturer of the tool being used to provide this degree of protection, shall be used as a substitute.

(c) *Cartridge container.* Cartridges of varied charges or force shall be kept separate from each other, and all cartridges shall be kept in original packages completely separated from other contents of the container.

(d) *Misfired cartridges.* Misfired cartridges shall be kept in a separate container immersed in oil or water. They shall be removed from the job site and disposed of each day.

(e) *Tool position.* The tool shall be perpendicular to the material being penetrated at the time of firing, except when protected in accordance with subsections (a) and (b).

(f) *Type of materials.* Projectiles, pins, studs or fasteners shall not be driven into very hard or brittle material including, but not limited to, cast iron, glazed tile, hardened steel, glass block, live rock, fire brick, or hollow tile. Easily pierced material or materials of unknown resistance to piercing shall be backed by a substance that prevents the projectile, stud, pin, or fastener from passing completely through to the other side. No fastening shall be attempted into a spalled area caused by an unsatisfactory fastening.

(g) *Tool handling.* When loading, tools shall be handled in a similar manner to the handling of firearms. Hands should be clear of the open barrel end pointed away from workers and other persons at all times. No unattended tool shall be allowed to remain loaded when not in actual use. No tool shall be loaded unless being prepared for immediate use and, while loaded, such tool shall be kept under the immediate and direct control of the operator.

(h) *Alignment guide.* Pins or studs shall not be driven through existing holes, unless a protective guide is used to secure accurate alignment.

(i) *Inspection.* Before using a tool the operator shall inspect it to determine that it is clean, that all moving parts operate freely and that the barrel is free from obstruction. The breech plug, barrel and its receptacle shall be examined after each firing to locate and remove any foreign material such as pieces of projectile, pins, fastener, stud, flang, cartridge or other fragmentation.

(j) *Explosive charge.* The projectile, pin, stud, fastener, charge and breech plug, shall be prescribed by the manufacturer of the tool for the work to be done and in no event shall the power be such that the projectile, pin, stud, or fastener penetration is beyond that which is prescribed by the manufacturer for the particular job.

(k) *Explosive atmosphere.* Powder-actuated tools shall not be used in an explosive or flammable atmosphere.

(l) *Protection.* Qualified operators and assistants using powder-actuated tools shall be provided with and shall wear approved-type eye protection while using such tools as well as approved head protection when there are obvious hazards from falling objects.

(m) *Maintenance.* Each tool shall be inspected, cleaned, and stored in a safe place with the barrel removed, whenever practical, after each day of use. Immediately upon discovery of any defect in a tool, whether caused by excessive wear or otherwise, the tool shall be removed from service and may not again be used until it has been examined, repaired and approved by a competent representative of the manufacturer. An accurate record of each inspection shall be entered in a report book. The book shall always be kept available for inspection by the duly authorized representative of the Department.

(n) *Warning sign.* A sign, at least 8 inches by 11 inches using bold faced type no less than 1 inch in height, shall be posted in plain sight of all construction projects where the tools are used at all points of access and within a distance of no less than 50 feet, the sign to read "Warning—Powder-actuated tools in use within 50 feet." Manufacturers of flip-open type powder-actuated fastener tools shall prepare appropriate warning stickers of the self-adhering type no less than 3 inches by 4 inches. The warning sticker shall conform with the following illustration:



(o) *Warning requirements.* Each manufacturer may, at his option, substitute a tool resembling his model in place of the model tool drawn into the illustration of subsection (n). The manufacturer shall permit no variances from this warning. The warning stickers shall be placed on the tool box in a conspicuous place inside or outside the box and inserted on all instruction books and service manuals. A question shall be added to the examination of the instructor referring to this requirement. Licensed instructors shall enforce this provision and apprise the training operator of the requirements of this section when demonstrating the tool.

(p) *Use of projectiles.* Tools shall not be used to fire pins, studs, fasteners, or other projectiles for any purpose except as the objects are specifically designed and specified by the manufacturer.

(q) *Misfire.* If a misfire occurs, the operator shall continue to hold the muzzle of the tool against the work in operating position for not less than 30 seconds, and while holding the tool in such position, the operator shall remove the power load. Misfired cartridges or cartridges which fail to explode shall be deposited in a special container for such purpose in accordance with subsection (d) and no attempt shall be made to explode or in any manner use any such cartridge or cartridges.

(r) *Testing.* Each powder-actuated tool shall be tested each day before loading to see that safety devices are in proper working condition. The tests shall be made only by a holder of a qualified operator's license. Tools found with defective parts shall be removed from service immediately and shall not again be used until proper repairs have been completed after following the procedure outlined in subsection (t).

(s) *Distance.* Studs or pins shall not be fired into materials such as brick or concrete, closer than 3 inches from the unsupported edge or corner or into steel surfaces closer than 1/2 inch from the unsupported edge or corner. Tools shall not be operated when their safety devices are ineffective.

(t) *Wear.* Each powder-actuated tool shall be completely dismantled periodically, depending on the type of service and recommendations of the manufacturer. At such times it shall be carefully inspected for wear and the proper operation of all safety devices. If any worn parts are discovered the tool shall be removed from service immediately and shall not be used again until it has been examined, repaired, with worn parts replaced, and approved for use by a duly authorized and qualified representative of the manufacturer of the particular tool. An accurate record of each inspection shall be made, dated, and signed by the employer and a copy forwarded to the Department.

(u) *Carrying devices.* Carrying devices worn by the operator for powder actuated tools may only be used within 50 feet of the immediate fastening being made.

Source

The provisions of this § 29.55 amended October 28, 1970, 1 Pa.B. 824.

Cross References

This section cited in 34 Pa. Code § 29.56 (relating to storage); and 34 Pa. Code § 29.69 (relating to general requirements).

§ 29.56. Storage.

(a) *Box.* A metal box or enclosure used exclusively for the powder-actuated tool shall be provided. It shall be equipped with a lid or cover that shall normally be kept closed and latched. The words “explosive tool” shall appear in plain sight on the box.

(b) *Cartridges.* Cartridges of varied charges or force shall be kept separate from each other. Cartridges shall be stored in original packages in the container prescribed by § 29.55(c) (relating to safety precautions).

(c) *Safe storage.* Powder-actuated tools shall be inspected, cleaned, deposited and locked in a box or container having its own lock and key, and stored in a safe place after each day of service. No tool shall be stored loaded. Tools shall be stored with barrel removed or breech open. No person shall hold a key to the box or container in which the tool is deposited except a qualified licensed operator or owner.

MANUFACTURERS, SALES AND RENTAL AGENTS**§ 29.61. Registration.**

(a) Owners or lessors possessing powder-actuated tools for use within this Commonwealth shall report such ownership or possession to the office of the Board of the Department. The report shall include the name of the manufacturer, the model and serial number of the tool and the date of its receipt by such owner or lessee. A shipper of any powder-actuated tool to a destination within this Commonwealth, may make such report on behalf of the recipient of the tool.

(b) Whenever the ownership of a tool is changed, it shall be the responsibility of the seller to notify the Board.

(c) Information on the safe use, testing and maintenance of each type of tool shall be contained in each powder-actuated tool kit. The recommendations shall be complete and lucid. The kit shall also be provided with necessary accessories and special tools for proper cleaning of the powder-actuated tool. The information, accessories and special tools provided for by this section shall accompany the powder-actuated tool in any transfer or sale of such tools from one user to another.

(d) The registration form shall be of a post card size, 3 1/4 by 5 1/2 inches, as follows:

Post card (Front of card)	Place Stamp Here
PA. DEPT. OF LABOR AND INDUSTRY INDUSTRIAL BOARD, ROOM 1408 7th AND FORSTER STS. HARRISBURG, PA. 17120	

(Back of Card) Registration of Powder-actuated Tools	
Name of Tool_____	
Model #_____	Serial #_____
Purchased_____	Rented_____
Loaned_____	
Company_____	
Address_____	
City and State_____	
Date of Transfer_____	
(Company name and address)_____	

§ 29.62. Powerload description.

(a) A standard means of identifying the strengths of powerload charges contained in various cartridges to be used in tools shall be used as provided in this section.

(b) The powerload strength shall be described by load numbers ranging from one to 12, with the strengths increasing in steps as the load numbers increase.

(c) Color identification as provided in this section shall be placed on the cartridge or wadding of each powerload. The cartridge case color for load numbers one through six shall be brass and the cartridge case color load numbers seven through 12 shall be nickel.

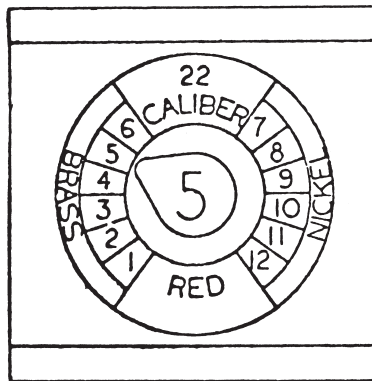
(d) The load color in combination with the cartridge case color shall identify each powerload strength as shown below:

COLOR IDENTIFICATION

<i>Load Number</i>	<i>Cartridges Color Case</i>	<i>Load Color</i>
1	Brass	Gray
2	Brass	Brown
3	Brass	Green
4	Brass	Yellow
5	Brass	Red
6	Brass	Purple
7	Nickel	Gray
8	Nickel	Brown
9	Nickel	Green
10	Nickel	Yellow
11	Nickel	Red
12	Nickel	Purple

(e) When means other than the size of the charge in powerload charges are used to control the penetration, an identification method acceptable to the Department shall be employed.

(f) Separate containers shall be used for different strength powerloads. At least one panel of each such container shall be clearly marked with a powerload dial to be not less than 1 3/8 inch in diameter. This powerload dial shall display the load number with a properly located pointer on the appropriate color background in accordance with subsection (d). In addition, the powerload caliber and identification of color in writing, such as, gray, brown or green, shall be clearly shown. The following is an example for cover container marking for number five powerloads (exact size recommended):



§ 29.63. Safety locks.

Powder-actuated tools shall be provided with safety locks so designed that failure of any part of the tool or lock causes the tool to be in an inoperative position. The lock shall be designed to be manually set and not get into firing position through fall or other accidental occurrence.

Cross References

This section cited in 34 Pa. Code § 29.65 (relating to firing position).

§ 29.64. Firing pin.

Tools shall be designed to prevent contact of the firing pin with the cartridge, whether rim or center fire, except when intentionally placed in position and activated by the operator.

§ 29.65. Firing position.

(a) The firing mechanism shall be designed to prevent the tool from firing during loading or preparation to fire, or when the tool is dropped while loaded. Firing of the tool shall be dependent upon at least two separate and distinct operations of the operator, with the final firing movement being separate from the operation of bringing the tool into the firing position. The requirements of this section are in addition to those required by § 29.63 (relating to safety locks).

(b) The tool shall be so designed that it is not operable other than against a work surface and unless the operator is holding the tool against the work surface with a force of at least five pounds greater than the total weight of the tool.

(c) The tool shall be so designed that it does not operate when equipped with the standard guard indexed to the center position, if the bearing surface of the guard is tilted more than 8° from contact with the work surface.

Cross References

This section cited in 34 Pa. Code § 29.69 (relating to general requirements).

§ 29.66. Variable power.

(a) The tool shall be so designed that positive means of varying the power are available or may be made available to the operator as part of the tool, or as an auxiliary, in order to make it possible for the operator to select a power level adequate to perform the desired work without excessive force.

(b) The tool shall be so designed that all parts of the tool are of adequate strength to resist maximum stresses expected upon firing.

§ 29.67. Studs and pins.

Studs and pins used with powder-actuated tools shall be specifically designed for such use and shall be manufactured from a grade of metal which furnishes a maximum resistance to bending without being brittle.

LOW VELOCITY TOOLS

§ 29.68. Piston tool—low velocity type.

This tool utilizes a piston to drive a stud, pin, or fastener into a work surface. When it is used with any commercially available powerload that chambers in the tool and a proper stud, pin, or fastener, the piston does not cause the stud, pin or fastener to have a velocity in excess of 300 feet per second when measured 6 feet 5 inches from the muzzle end of the barrel. This measurement is obtained by use of accepted ballistic test methods. Piston tools of low velocity type shall be so designed that the piston or working element used at the time of discharge or firing remains captive in the tool.

§ 29.69. General requirements.

(a) *Safety precautions.* The muzzle end of the tool shall be so designed that suitable protective shields, guards, jigs or fixtures designed and built by the manufacturer of the tool being used, may be mounted perpendicular to the barrel.

(b) *Approval of equipment.* Powder-actuated piston tools of the low velocity type being considered tools of a special design not anticipated by this Subchapter are excepted from §§ 29.55(a) and (b), and 29.65(a) and (b) (relating to safety precautions; and firing position).

EMPLOYERS

§ 29.81. Competency.

(a) Employers shall familiarize themselves with instructions of the manufacturer on the proper handling, operation, maintenance, inspection, and storage of all parts and appurtenances comprising a powder-actuated tool.

(b) The employer shall ascertain the competency of operators.

(c) Employers shall establish and maintain complete expert supervision over projects involving the use of powder actuated tools.

(d) Care shall be taken in the training of operators and in particular, checking the ability of an operator to distinguish identification of explosive charges.

EMPLOYEES

§ 29.91. Responsibility.

Employes holding operator's or trainee's licenses shall carry out all safety precautions within their responsibility under this subchapter. Failure to do so may result in revocation of licenses.

**Subchapter C. MECHANICAL POWER TRANSMISSION
APPARATUS****GENERAL PROVISIONS**

- Sec.
29.111. Definitions.
29.112. Scope.
29.113. Applicability.
29.114. Penalty.

SPECIFICATIONS

- 29.121. Gears and silent chain drives.
29.122. Pulleys, sheaves and sprockets.
29.123. Belts, ropes and chains.
29.124. Cone pulley belts.
29.125. Belt shifters and stopping devices.
29.126. Shafting.
29.127. Location.
29.128. Friction drives.
29.129. Shaft projections and keyways.
29.130. Collars, couplings and clutches.
29.131. Prime movers.
29.132. Machine control.
29.133. Operating rules.
29.134. Construction of guards.
29.135. Materials and construction of guards.

RECOMMENDATIONS

- 29.141. Purpose.
29.142. Belt tighteners and shifters.
29.143. Care of belts.
29.144. Belts on overhead pulleys.
29.145. Pulleys.
29.146. Couplings and clutches.
29.147. Shafting, bearings and hangers.
29.148. Oiling and cleaning.
29.149. Power control.
29.150. Hand-operated gears.

Authority

The provisions of this Subchapter C issued under the act of June 2, 1913 (P. L. 396, No. 267) (71 P. S. §§ 1441—1451); and section 15 of the act of May 18, 1937 (P. L. 654, No. 174) (43 P. S. § 25-15), unless otherwise noted.

Source

The provisions of this Subchapter C adopted February 16, 1929; amended through August 1, 1968, unless otherwise noted.

Cross References

This subchapter cited in 34 Pa. Code § 5.118 (relating to transportation, machinery, and platforms); 34 Pa. Code § 29.11 (relating to all installations); 34 Pa. Code § 29.181 (relating to all installations); and 34 Pa. Code § 45.11 (relating to mechanical power transmission and machine layout).

GENERAL PROVISIONS**§ 29.111. Definitions.**

The following words and terms, when used in this subchapter, have the following meanings, unless the context clearly indicates otherwise:

Flywheels—Flywheels and balance wheels mounted and revolving on crank shaft of engine or other shafting.

Guarded by position—The object so located that contact which may result in injury is unlikely to occur.

Horizontal belt—A belt running in a horizontal direction.

Inclined belt—A belt running in a direction within 60° of the horizontal.

Nip-point belt and pulley guard—A device which encloses the pulley and is provided with round or rolled edge slots through which the belt passes.

Point of operation—That point at which cutting, shaping, or forming is accomplished upon the stock. This term includes such other points as may offer a hazard to the operator in inserting or manipulating the stock in the operation of the machine.

Prime mover—A steam, gas, oil or air engine, a steam or hydraulic turbine, or an electric motor.

Runway—Any permanent runway or platform used for oiling, maintenance, running adjustment or repair work, but not as a passageway.

Self-oiling bearing—A bearing that needs to be oiled only at infrequent intervals, at least for the duration of the shift or working day, so that all oiling may be done when the power is shut off. Ring oiling bearings and candle lubrication are considered self-oiling under these conditions.

Standard railing—A railing not less than 42 inches in height with an additional rail midway between the top rail and the floor or platform level placed not less than 15 inches or more than 20 inches from the point of hazardous contact.

Vertical belt—A belt running in a vertical direction or in a direction within 30° of the perpendicular.

§ 29.112. Scope.

This subchapter sets forth rules to safeguard the lives and limbs of workers in industries which use mechanical power transmission apparatus, and places the responsibility of complying with these rules upon both employer and employe.

§ 29.113. Applicability.

This subchapter applies to the following:

(1) All moving parts of equipment used in the mechanical transmission of power, including prime movers, intermediate equipment, and driven machines, excluding point of operation.

(2) Connecting rods, cranks, flywheels, shafting, spindles, pulleys, belts, link belts, chains, ropes and rope drives, gears, sprockets, friction drives, cams, couplings, clutches, counterweights, revolving or reciprocating parts, up to but not including point of operation; also all bolts, keys, set screws, oil cups or similar projections.

(3) The mere technical fulfillment of the requirements of this subchapter does not assure approval of a guard if examination shows lack of practicability or of durability.

(4) The Department may require guards not required by this subchapter if, in its opinion, a sufficient hazard exists to warrant this action.

(5) The guarding of all mechanical power transmission apparatus shall conform with the requirements of this subchapter, except that guards installed and accepted by the Department prior to February 16, 1929, need not be replaced unless the hazard so warrants.

§ 29.114. Penalty.

Any person who violates this subchapter or any regulations of the Department or who interferes with the Department or its duly authorized representative in the enforcement of this subchapter or regulations shall be penalized under section 15 of act of May 18, 1937 (P. L. 654, No. 174) (43 P. S. § 25-15).

SPECIFICATIONS**§ 29.121. Gears and silent chain drives.**

(a) Gears and silent chain drives shall be guarded, except for the following:

(1) Gears with a pitch of less than 3/8 inch or a face of less than 1 1/4 inch or a diameter of less than 12 inches and all other gears and silent chain drives making less than six revolutions per minute.

(2) Gears and silent chain drives located within the frame of the machine when the nip or run-in point is more than 12 inches from any opening in the machine lending access to it.

(b) Gears and silent chain drives shall be guarded in accordance with one of the following methods:

(1) A complete enclosure, or where access to the nip-point is difficult, a partial enclosure, such as a guard solid at the top, ends, and exposed sides down to the bottom of the gear, but open at the bottom.

(2) Band guards around the entire circumference of the gears with side flanges extending to the root of the teeth.

(3) When access to the nip-point is difficult, when there is danger of fire through the accumulation of fly or lint, and when permission is granted by the Department, a nip-point guard is permitted. This guard shall be such that the nip or run-in point is guarded for a distance of at least two inches around the face of each gear and shall be 1/4 inch or less from the gear teeth at its end and extend down to the root of the teeth on the exposed sides of the gears.

(c) This section does not apply to hand-operated gears used only to adjust machine parts and which do not continue to move after the handpower is removed. However, the guarding of these gears is highly recommended.

§ 29.122. Pulleys, sheaves and sprockets.

(a) Flange pulleys located 6 feet or less above the floor or working platform shall be guarded except for the following:

(1) Flange pulleys carrying belts less than 1 inch in width and laced with approved fasteners.

(2) Flange pulleys located within the frame of the machine and guarded by position.

(3) Flange pulleys located so that the point of contact is guarded by position, if the belt is laced with approved fasteners.

(b) Flat or crowned pulleys located six feet or less above the floor or working platform shall be guarded, except for the following:

(1) Flat or crowned pulleys carrying belts less than two inches single ply or 1 1/2 inches double ply and laced with approved fasteners.

(2) Flat or crowned pulleys located within the frame of the machine and guarded by position.

(3) Flat or crowned pulleys located so that the point of contact is guarded by position and the belt is laced with approved fasteners.

(4) When there is a danger from fire through the accumulation of fly or lint, flat or crowned pulleys carrying belts other than transmission or machine driving belts, located outside of machines and less than four feet center to center if belts are provided with approved fasteners.

(c) Pulleys carrying circular belts located 6 feet or less above the floor or working platform shall be guarded, except for the following:

(1) Pulleys carrying belts less than 1/4 inch in diameter and fastened with approved fasteners.

- (2) Pulleys located within the frame of the machine and guarded by position.
- (3) Pulleys located so that the point of contact is guarded by position, if the belt is laced with approved fasteners.
- (d) Pulleys serving as balance wheels, such as on punch presses, on which the point of contact between the belt and pulley is more than 6 feet from the floor or platform may be guarded with a disc covering the spokes.
- (e) When the bearings are not self-oiling and the clearance between the pulley and bearing on line and jack shafting is 18 inches or less, pulleys over 6 inches in diameter shall be completely guarded on the side nearest the bearing, and keyways in the shaft between such pulley and bearing shall be properly filled in or the shaft shall be enclosed.
- (f) When there are overhanging pulleys on line, jack or counter shaft with no bearing between the pulley and the outer end of the shaft, a guide to prevent the belt from running off the shaft shall be provided.
- (g) Cracked, broken, or welded pulleys, unless the welded pulleys are perfectly balanced, shall not be used. Pulleys shall be designed for the maximum service that they are expected to give.
- (h) Sheaves located 6 feet or less above the floor or working platform shall be guarded, except for the following:
 - (1) Sheaves located within the frame of the machine and guarded by position.
 - (2) Sheaves located so that the point of contact is guarded by position, and the belt is laced with approved fasteners.
- (i) Sprockets located 6 feet or less above the floor or working platform shall be guarded, except for the following:
 - (1) Sprockets located within the frame of the machine and guarded by position.
 - (2) Sprockets located so that point of contact is guarded by position.
- (j) The guarding of pulleys, sheaves and sprockets shall be by one of the following methods:
 - (1) By full enclosure when belt, rope or chain is entirely enclosed.
 - (2) By partial enclosure extending from the bottom to at least the top of the pulley, sheave or sprocket on all unprotected sides except the tops and bottoms of those carrying vertical belts, ropes or chains. For pulleys, sheaves or sprockets, carrying horizontal or inclined belts, ropes or chains, a guard placed over the pulley, sheave or sprocket in exactly the same manner as for vertically installed equipment may be used.
 - (3) By standard railing enclosure when acceptable to the Department.

§ 29.123. Belts, ropes and chains.

- (a) Belts located 6 feet or less above the floor or working platform shall be guarded except for the following:

- (1) Vertical belts fastened with approved fasteners.
- (2) Horizontal or inclined single ply belts less than 2 inches in width and double ply belts less than 1 1/2 inches in width if the belts are fastened with approved fasteners.
- (3) Belts located within the frame of the machine and guarded by position.
- (4) Horizontal or inclined belts so located that the run of the belt is guarded by position.
- (5) Belts and pulleys of grinding machines used in the manufacture of aluminum or bronze powder if they are guarded by one of the following methods:
 - (i) Eliminate metal lacers in belts and guard pinch point of pulley and belt.
 - (ii) Eliminate metal lacers and provide in lieu of pinch point guard a belt shifter which is of a type that in itself protects the pinch point of pulley and belt.
- (6) Horizontal or inclined belts, not including transmission or machine driving belts, running on pulleys less than 4 feet center to center and laced with approved fasteners, when there is a danger from fire through the accumulation of fly or lint.
- (b) Overhead belts, ropes and chains running over passageways or machines shall be guarded when, in the judgment of the Department, sufficient hazard exists.
 - (c) Cotton or fabric belts whenever used shall be guarded.
 - (d) When the guards for pulleys, sheaves or sprockets carrying vertical or inclined belts, ropes or chains which run through the floor or working platform are located more than 4 feet above the floor on working platform belt, ropes or chains shall be guarded.
 - (e) All ropes or chains located 6 feet or less above the floor or working platform shall be guarded, except for the following:
 - (1) Vertical ropes or chains.
 - (2) Ropes or chains located within the frame of the machine and guarded by position.
 - (3) Horizontal or inclined ropes or chains so located that the run of the rope or chain is guarded by position.
 - (4) When there is a danger from fire through an accumulation of fly or lint, horizontal or inclined ropes or chains, not including transmission or machine driving ropes or chains, running on pulleys or sprockets less than four feet center to center.
 - (f) American and Continuous System Rope drives, so located that the conditions of the rope, particularly the splice, cannot be constantly and conveniently observed, shall be equipped with a telltale device, preferably electric bell type that gives a warning when the rope begins to fray.
 - (g) The guarding of belts, ropes and chains shall be by one of the following methods:

(1) Vertical belts, ropes and chains when required to be guarded shall be enclosed to the upper pulley, sheave or sprocket guard or to a height of at least 6 feet from the floor or working platform when the guard is not more than 4 inches from the belt, rope or chain at any point, or to a height of 5 feet if it is between 4 inches and 12 inches from the belt, rope or chain at any point. Guarding by standard railing may be used when approved by the Department if the railing is at least 15 inches but not over 20 inches from the belt, rope or chain at all points.

(2) Inclined belts, ropes and chains shall be arranged in such a manner that a minimum clearance of 6 feet 6 inches is maintained between the belt, rope, or chain, and the floor at any point outside the guard.

(3) Horizontal belts, ropes, and chains shall be guarded as follows:

(i) Horizontal belts, ropes and chains shall be guarded to a height of at least 6 feet or to the top run of the belt, rope or chain. This guard may be an enclosure on all unprotected sides or a standard railing, when approved by the Department, placed at least 15 inches and not more than 20 inches from the belt, rope or chain at all points.

(ii) When the upper and lower runs of horizontal belts, ropes or chains are so located that passage of persons between them would be possible, passage shall be according to any of the following:

(A) Completely barred by standard guardrails or other barriers.

(B) When passage is regarded as necessary there shall be a platform over the lower run guarded on either side by a complete railing, completely filled with wire mesh or other filler, or by a solid barrier. The upper run shall be guarded to prevent contact either by the worker or by objects carried by him.

(4) Overhead belts, ropes and chains shall be guarded as follows:

(i) Horizontal and inclined belts, ropes or chains shall be guarded the entire run of the belt, rope or chain and follow the run of the pulley to the ceiling or to be carried to the nearest wall.

(ii) Vertical belts, ropes and chains running over a lower pulley more than 6 feet above the floor or working platform shall be guarded around the bottom and up to a distance equal to a height of half the distance between pulleys.

§ 29.124. Cone pulley belts.

(a) When cone pulleys are located less than 3 feet from the floor or working platform, the cone pulley and belt shall be guarded to a height of three feet regardless of whether the belt is shifted by a belt shifter or by hand.

(b) All belts shifted by hand shall be fastened with approved fasteners.

§ 29.125. Belt shifters and stopping devices.

(a) *Belt shifters.* Shifters with handles shall be provided for all tight and loose pulleys. The shifter handle shall be located outside the guards. Tight and loose pulleys on all new installations made after February 16, 1929, shall be equipped with a permanent belt shifter provided with mechanical means to prevent the belt from creeping from the loose to the tight pulley.

(b) *Location.* Belt shifters shall be rounded and located as far as possible from danger of accidental contact but within easy reach of the operator. Operators shall be able to stop machines from any operating position. When belt shifters are not located directly over the machines or bench or over the passageway they shall be at least 6 feet from the floor.

(c) *Locking device.* Mechanical belt shifters shall be equipped with a positive locking device which shall be normally in the off position.

(d) *Overhead shifters.* Shifters and disengaging levers when suspended overhead shall be so balanced and hung that by their own weight the belt is kept on the loose pulley or in a disengaged position.

(e) *Tighteners.* Suspended counterbalanced tighteners and all of its parts shall be of substantial construction and securely fastened, and the bearing shall be securely capped. Means shall be provided to prevent tighteners from falling in case the belt breaks. This may be accomplished by securely fastening cables or chains of sufficient strength to the tightener and to the roof, or some substantial object above, to prevent it from falling far enough to strike a person.

(f) *Encasing.* When suspended counterweights are used in connection with belt tighteners and are not guarded by location they shall be so encased as to prevent accidents.

§ 29.126. Shafting.

(a) *Endwise movement.* Each continuous line of shafting shall be secured in position against excessive endwise movement.

(b) *Endwise thrust.* Vertical and inclined shafts shall be secured in position against endwise thrust.

(c) *Over driveway.* Whenever shafting extends over a driveway it shall be protected unless the shaft and any pulleys, gears or other equipment fastened to it are located 15 feet or more above the driveway.

(d) *Under machines.* Shafting under bench machines shall be enclosed by a stationary casing or by a trough at the sides and the top, or the sides and the bottom as the location requires. The sides of the trough shall come to within at least 6 inches of the underside of the table, or if shafting is located near the floor to within 6 inches of the floor. In each case the sides of the trough shall extend at least 2 inches above or below the shafting as the case may be.

(e) *Guard.* All shafting located less than six feet above the floor or working platform shall be guarded in accordance with subsection (g) except for the following:

- (1) Shafting accessible for a distance of less than 2 feet between bearings, clutches, handwheels, pulleys, gears, sprockets or sheaves.
- (2) Shafting within the frame of the machine when guarded by position.

(f) *Shaft ends.* Shaft ends less than 6 feet above the floor or working platform and 4 or more inches beyond outside parts of the machine or transmission shaft equipment shall be removed or enclosed with a stationary cover. When they are less than four inches from other equipment, such shaft ends shall be polished smooth or be enclosed with a stationary cover.

(g) *Method of guarding.* The guarding of shafting shall be by one of the following methods:

- (1) An enclosure which may be by sheet metal in the shape of an inverted U open at the bottom.
- (2) Standard railing if acceptable to the Department.

§ 29.127. Location.

(a) *Guarding.* Transmission equipment located in transmission basements, towers or rooms used exclusively for power transmission equipment shall be guarded in accordance with the requirements of this subchapter or the basements shall be locked at all times when machinery is in motion, so that access may be had only upon application to the superintendent or his agent. An additional key may be kept under glass for emergency use. The key shall be so located as to require the breaking of glass to get the key.

(b) *Set screws.* Set screws shall be made flush or enclosed regardless of the plan adopted to comply with subsection (a).

(c) *Illumination.* The intensity of illumination shall conform with the requirements of Chapter 27 (relating to lighting).

(d) *Oiling.* The route followed by the oiler shall be protected in such manner as to prevent accidents, and shall be dry, firm and level.

§ 29.128. Friction drives.

(a) The drive point of all friction drives when exposed to contact shall be guarded.

(b) Arm or spoke friction drives and web friction drives with holes in the web shall be entirely enclosed.

(c) Projecting bolts on friction drives when exposed to contact shall be guarded.

§ 29.129. Shaft projections and keyways.

- (a) Set screws wherever located shall be made flush or enclosed.

(b) Revolving projections on shafting and shaft equipment such as keys and bolts and grease cups shall be enclosed by a cylindrically smooth enclosure or made flush, except for bolts or grease cups located in the hubs or rims of pulleys, collars or couplings which do not project beyond the two planes formed by the rims of the pulley, collar or coupling.

(c) Keyways in the ends of shafting less than 6 feet above the floor or working platform, which project more than 2 inches beyond the bearings, or adjacent parts of a machine, shall be plugged so as to effect a smooth shaft, or they shall be enclosed.

§ 29.130. Collars, couplings and clutches.

(a) *Collars.* Revolving collars, including split collars, shall be cylindrical, and screws or bolts used in collars shall not project beyond the largest periphery of the collar, or they shall be encased.

(b) *Couplings.* Shaft couplings when located 7 feet or less above the floor or working platform or within less than 18 inches from the hand oil bearings shall be so constructed as to present no hazard from bolts, nuts, set screws, or revolving surfaces or shall be enclosed by a cylindrically smooth enclosure.

(c) *Clutches.* Clutches or clutch pulleys having projecting parts, when the clutches or clutch pulleys are located 7 feet or less above the floor or working platform or when they are less than 18 inches from hand oil bearings, shall be enclosed by a stationary guard constructed in accordance with this subchapter. However, when clutches, cutoff couplings or clutch pulleys are so located within a machine or otherwise guarded by location, compliance with the requirement of this section shall be within the discretion of the Department.

(d) *Handles.* Clutch handles shall be rounded and located as far as possible from danger but within easy reach of the operator. Control handles shall be so arranged that the operator can stop the machine from the usual operating position. The clutch handle shall be located outside the guard when clutch is guarded.

§ 29.131. Prime movers.

(a) *Flywheels.* Flywheels located so that any part is 6 feet or less above floor or platform shall be guarded in one of the following ways:

(1) With an enclosure of sheet, perforated or expanded metal, or woven wire.

(2) With guardrails placed not less than 15 inches or not more than 20 inches from the rim. When the flywheel extends into a pit or is within 12 inches of the floor, a standard toeboard shall be provided.

(3) When the upper rim of a flywheel protrudes through a working floor it shall be entirely enclosed or surrounded by a guardrail and toeboard.

(4) For flywheels with smooth rims five or less feet in diameter, when the preceding methods cannot be applied, a disc attached to the flywheel in such manner as to cover the spokes of the wheel on the exposed side and present a

smooth surface and edge, at the same time providing means for periodic inspection. An open width may be left between the outer edge of the disc and the rim of the wheel if desired to facilitate turning the wheel over. When a disc is used the keys or other dangerous projections not covered by the disc shall be cut off or covered.

(5) An adjustable guard to be used for starting the engine or for running adjustments may be provided at the flywheel of gas or oil engines. A slot opening for the jack bar is permitted. This does not apply to flywheels with solid web centers.

(b) *Crank and connecting rods.* Crank and connecting rods when exposed to contact shall be guarded.

(c) *Tail rods.* Tail rods or extension piston rods shall be guarded by a complete enclosure or by a guardrail on the sides and the end with a clearance of not less than 15 inches when the rod is fully extended.

(d) *Governor balls.* Governor balls 6 feet or less from the floor or working platform, when exposed to contact shall be provided with an enclosure extending to the top of the governor balls when at its highest position.

§ 29.132. Machine control.

(a) Unless all machinery can be easily seen from the control station, effective signals shall be provided which give ample warning before starting the machinery.

(b) Emergency stops or switches properly marked and easily accessible shall be provided in each room, section or department by which each complete and separate unit of power transmission may be quickly stopped.

§ 29.133. Operating rules.

(a) The hand dressing of belts while driving machinery is prohibited.

(b) Belts shall not be replaced on pulleys or taken off pulleys by direct hand method while the pulleys are in motion.

(c) The cleaning and oiling of machinery while in motion is prohibited in all places if exposure to hazardous contact is involved.

§ 29.134. Construction of guards.

(a) *Materials.* Guards or enclosures shall be constructed of cast iron, expanded metal, perforated or solid sheet metal, or wire mesh on a frame of angle iron or iron pipe securely fastened to the floor or to the frame of the machine. Existing guards may be allowed to remain in position if, in the judgment of the Department, they afford adequate protection.

(b) *Burrs.* Metal shall be free from burrs and sharp edges.

(c) *Wire mesh.* Wire mesh shall be of the type in which the wires are securely fastened at each cross point either by welding, soldering, or galvanizing, except in case of diamond or square wire mesh made of No. 14 gauge wire, 3/4 inch mesh or heavier.

(d) *Uprights.* The uprights used for supports shall be of angle iron one inch by one inch by 1/8 inch to 1 1/2 inches by 1 1/2 inches by 3/16 inch; iron pipe 3/4 inch to 1 1/2 inches inside diameter, or construction of equivalent strength. The sizes may vary between the above limits according to the weight and size of the guards and their location in respect to aisles and the possibility of being damaged by moving equipment. There shall be no unsupported panels of guards of greater dimensions than 42 inches.

(e) *Filling material.* The filling material between the supports of a guard shall be as follows:

Material	Clearance from Moving Part at All Points	Largest Mesh or Opening Allowable	Minimum Gauge (U. S. Stand.) or Thickness	Minimum Height of Guard from Floor or Platform Level
Woven Wire	Under 4" 4"-15"	1/2" 2"	No. 16 No. 12	6'-0" 5'-0"
Expanded Metal	Under 4" 4"-15"	1/2" 2"	No. 18 No. 13	6'-0" 5'-0"
Perforated Metal	Under 4" 4"-15"	1/2" 2"	No. 20 No. 14	6'-0" 5'-0"
Sheet Metal	Under 4" 4"-15"	No. 22 No. 22	6'-0" 5'-0"
Wood or Metal Strip	Under 4"	1/2"	Wood 3/4" Metal No. 16	6'-0"
Crossed	4"-15"	2"	Wood 3/4" Metal No. 16	5'-0"
Wood or Metal Strip not Crossed	Under 4" 4"-15"	1/2" 1"	width Wood 3/4" width Metal No. 16	6'-0" 5'-0"
Std. Rail	Min. 15" Max. 20"			

(f) *Fastening.* The filling materials shall be fastened to the supports by one of the following methods:

(1) *Angle iron supports.* By means of 3/4 inch by 1/8 inch flat iron fastened to the angle by means of 3/16 inch bolts or rivets, placed at intervals not exceeding ten inches, or by wooden strips one inch by one inch fastened to the angles by means of 3/16 inch bolts; or by other methods providing equivalent strength. Perforated or sheet metal shall be either bolted or riveted directly to the angle, or spot welded.

(2) *Piping.* Piping shall be clamped.

(g) *Standard railing.* When railings are used for the guarding of machinery, there shall be compliance with the following requirements:

(1) Railings shall be not less than 42 inches in height provided with an intermediate rail between the toprail and the floor, and shall be constructed in a permanent and substantial manner, smooth and free from protruding nails, bolts and splinters.

(2) If constructed of pipe, they shall be not less than 1/4 inches inside diameter.

(3) If constructed of structural metal bars, they shall be the equivalent of 1 1/2 inches by 1 1/2 inches by 3/16 inch angles.

(4) If constructed of wood, the posts shall be not less than 2 inches by 4 inches or the equivalent. Toprailings shall be not less than 2 inches by 4 inches or 1 inch by 4 inches if another board of not less than 1 inch by 4 inches is securely nailed to the sides of the posts and to the toprail. Center railings shall be not less than 1 inch by 4 inches.

(5) Posts and uprights shall be spaced not more than 8 feet apart.

(6) The rails, when of metal shapes, metal bars or wood, shall be placed on that side of the posts which afford the greater support and protection.

(7) When panels are fitted with substantial expanded metal or wire mesh, the middle rails may be omitted.

(8) Toeboards shall be 6 inches or more in height of wood, metal or of metal grill not exceeding one inch mesh. Toeboards at flywheel pits should be placed as close to the edge of the pit as possible.

(h) *Wood guards.* Wood guards may be used in chemical industries or in construction work when fumes or other manufacturing conditions may cause rapid deterioration of metal guards. In all other industries the use of wood guards is prohibited except by special permission of the Board.

Cross References

This section cited in 34 Pa. Code § 29.135 (relating to materials and construction of guards).

§ 29.135. Materials and construction of guards.

(a) Wood shall be sound, tough and free from any loose knots.

(b) Guards shall be made of planed lumber not less than 1 inch rough board measure and edges and corners rounded off.

(c) Wood guards shall be securely fastened together with wood screws, hard wood dowel pins, bolts or rivets.

(d) While no definite dimensions are given under this heading for framework or filler materials, wood guards shall be equal in strength and rigidity to metal guards specified in § 29.134(d) and (e) (relating to construction of guards).

(e) Construction of standard wood railings shall be according to the requirements of § 29.134(g).

(f) Machinery required to be guarded in the slate industry shall be equipped with guards of slate construction at least one inch in thickness except where the installation of the guards prevents proper light from being shed on any operation.

(g) Guards for horizontal overhead belts, ropes and chains shall be according to the following specifications:

(1) Guards for horizontal overhead belts, ropes and chains shall run the entire length of the belt, rope or chains and follow the line of the pulleys or sprockets to the ceiling or be carried to the nearest wall, thus enclosing the belt, rope or chain effectively. When belts, ropes or chains are so located as to make it impracticable to carry the guard to the wall or ceiling, construction of the guard shall be such as to enclose completely the top and bottom runs of the belt, rope or chain and the face of pulleys or sprockets.

(2) The guard and all its supporting members shall be securely fastened to the wall or ceiling by gimlet-point lag screws or through bolts. In case of masonry construction, expansion bolts shall be used. The use of bolts placed horizontally through floor beams or ceiling rafters is recommended.

(3) Suitable reinforcements shall be provided for the ceiling rafters or overhead floor beams when such is necessary, to sustain safely the weight and stress likely to be imposed by the guard. The interior surface of all guards, by which is meant the surface of the guard with which a belt, rope, or chain comes in contact, shall be smooth and free from all projections of any character, except when construction demands it; protruding shallow roundhead rivets may be used. Overhead belt guards shall be at least 1/4 wider than the belt which they protect, except that this clearance need not in any case exceed 6 inches on each side. Overhead rope drive and block and roller-chain-drive guards shall be not less than 6 inches wider than the drive on each side. In overhead silent chain-drive guards where the chain is held from lateral displacement on the sprockets, the side clearance required on drives of 20 inch centers or under shall be not less than 1/4 inch from the nearest moving chain part and on drives of over 20 inch centers a minimum of 1/2 inch from the nearest moving chain part.

(4) In overhead rope or chain guards a side guard member of the same solid filling material shall be carried up in a vertical position 2 inches above the level of the lower run of the rope or chain drive and 2 inches within the periphery of the pulleys which the guard encloses thus forming a trough. These side filler members shall be reinforced on the edges with 1-1/2 inch by 1/4 inch flat steel, riveted to the filling material at not greater than 8 inch centers; the reinforcing strip shall be fastened or bolted to all guard-supporting members with at least one 3/8 inch rivet or bolt at each intersection, and the ends shall be secured to the ceiling with lag screws or bolts.

(h) A disc guard shall consist of a sheet metal disc not less than No. 22 gauge fastened by U-bolts or rivets to spokes of pulleys, flywheels, or gears. When possibility of contact with sharp edges of the disc exists, the edge shall be rolled or

wired. In all cases the nuts shall be provided with lock nuts which shall be placed on the unexposed side of the wheel.

(i) U-guards shall be constructed of materials specified in § 29.134 (e). Edges shall be smooth and if the size of the guard requires, these edges shall be reinforced by rolling, wiring, or by binding with angle or flat iron.

(j) The following table gives sizes of materials to be used and general construction of guards for belts ten inches or more in width. No material for overhead belt guards shall be smaller than that specified in this table for belts ten inches wide, even if the belt is less than ten inches in width. However, No. 20 gauge sheet metal may be used as a filler on guards for belts less than ten inches wide. Expanded metal, because of the sharp edges, should not be used as a filler in horizontal belt guards:

Horizontal Overhead Belts, Ropes, and Chains

Members	Width		Material
	Over 10" to 14" Incl.	Over 14" to 24" Incl.	
Framework	1 1/2" x 1 1/2" x 1/4"	2" x 2" x 5/16"	3" x 3" x 3/8"
Filler (belt guards)	1 1/2" x 3/16"	2" x 3/16"	2" x 5/16"
Filler and vertical side member	No. 20 A. W. G.	No. 18 A. W. G.	No. 18 A. W. G.
Filler supports	2" x 5/16" flat iron	2" x 3/8" flat iron	2 1/2" x 2 1/2" x 1/4" angle
Guard supports	2" x 5/16"	2" x 3/8"	2 1/2" x 3/8"
Fastenings			
Filler supports to framework	(2) 5/16"	(2) 3/8"	(3) 1/2"
Filler flats to supports (belt guards)	(1) 5/16"	(1) 5/16"	(2) 3/8"
Filler to frame and supports (rope and chain guards)	3/16" rivets spaced	8" centers on sides and 4" centers on bottom	Flush rivets
Guard supports to framework	(2) 3/8"	(2) 7/16"	(2) 5/8"
Guard and supports to overhead ceiling	1/4" x 3 1/2" lag screws or 1/2" bolts	3/8" x 4" lag screws or 3/8"	3/4" x 6" lag screws or 3/4" bolts
Details—Spacing, etc.			
Width of guards	One-quarter wider than belt, rope or chain drive		
Spacing between filler supports	20" C. to C. 16" C. to C. 16" C. to C.		
Spacing between filler flats (belt guards)	2" apart 2 1/2" apart 3" apart		
Spacing between guard supports	36" C. to C. 36" C. to C. 36" C. to C.		
Other Belt Guard Filling Permitted	Sheet metal fastened as in rope and chain guards		
Woven wire, 2" mesh	No. 20 A. W. G.	No. 18 A. W. G.	No. 18 A. W. G.
	No. 12 A. W. G.	No. 10 A. W. G.	No. 8 A. W. G.
Distance center to center of shafts	Clearance from Outside of Belt, Rope or Chain Drive to Guard		
Clearance from belt, rope or chain to guard	Up to 15' inclusive	Over 15' to 25' incl.	Over 25' to 40' incl.
	6"	10"	15"
			20"

RECOMMENDATIONS**§ 29.141. Purpose.**

The provisions of §§ 29.141—29.150 (relating to recommendations) are not mandatory but are suggestions, which, if put into practice, will be of benefit in accident prevention work. They may also help to clarify some of the provisions of this subchapter.

§ 29.142. Belt tighteners and shifters.

(a) *Belt poles.* The use of belt poles as substitutes for mechanical belt shifters is not recommended. When necessity compels their use they should be of sufficient size to enable workmen to grasp them securely. A two inch diameter or one and one-half inch by two inch cross section is suggested. Poles should be smooth and preferably of straight-grained hardwood, such as oak or hickory. The edge of rectangular poles should be rounded. Poles should extend from the top of the pulleys to within about 40 inches of the floor or working platform.

(b) *Belt perches.* When loose pulleys or idlers are not practicable, belt perches in form of brackets, rollers, and the like, should be used to keep idle belts away from the shafts. Perches should be substantially made and so designed that the shipping of belts to and from them may be safely accomplished.

Cross References

This section cited in 34 Pa. Code § 29.141 (relating to purpose).

§ 29.143. Care of belts.

(a) *Quarter twist.* Quarter twist belts when installed without an idler may be used on drives running in one direction only. They run off a pulley when direction of motion is reversed.

(b) *Inspection.* Inspection should be made of belts, lacings and fasteners and such equipment kept in good repair.

(c) *Static electricity.* The hazard of static electricity from belts should be carefully considered when explosives, explosive dust, flammable vapors or flammable liquids exist. Static electricity may be removed from belts by means of metallic flexible tooth combs the same width as the belt. One comb should be placed within 10 inches of the line of contact where the belt leaves each pulley or flywheel. These combs should be in contact with and placed transversely to the belt and also be well grounded with No. 12 insulated copper wire. The teeth of the comb should point in the direction of the belt motion. Other effective methods may be used.

Cross References

This section cited in 34 Pa. Code § 29.141 (relating to purpose).

§ 29.144. Belts on overhead pulleys.

- (a) *Belt pole.* A belt pole should be used to throw off or put on belts.
- (b) *Unshipping.* In unshipping a belt, it should always be thrown off the driving pulley, not the driven one.
- (c) *Care.* It is advisable to have one experienced man to take care of overhead belts and put them on and take them off pulleys.
- (d) *Belt perches.* Belts should not be allowed to ride on shafting but should be held from the shafting either by loops or belt perch.

Cross References

This section cited in 34 Pa. Code § 29.141 (relating to purpose).

§ 29.145. Pulleys.

- (a) *Alignment.* Pulleys should be kept in proper alignment to keep belts from running off.
- (b) *Crown-faced.* Both driving and driven pulleys carrying a nonshifting belt should have crowned faces.
- (c) *Cast iron.* Cast iron pulleys should be tested frequently with a hammer to disclose cracks in rim or spokes. It should be borne in mind that the sound is usually very different if the belt is or is not on the pulley. Pulleys with small pieces broken out of rim should not be used. The rough edges formed by pieces broken out of the pulley rim offer a decided accident hazard in case any one should come in contact with the rough edge of the pulley rim. Considerable unnecessary wear on the belt is also caused.
- (d) *Split.* Split pulleys should be inspected to ascertain if all bolts holding together the sections of the pulley are tight.

Cross References

This section cited in 34 Pa. Code § 29.141 (relating to purpose).

§ 29.146. Couplings and clutches.

- (a) The shifting part of jaw clutches and the shifting or mechanism part of the friction clutch coupling should be attached to the driven shaft, namely, the shaft that is idle when clutch is disengaged.
- (b) Clutch shifters of the same type in each shop should move in the same direction to stop machines, namely, either all right or all left. This does not apply to friction clutches on the counter shaft carrying two clutch pulleys with open and crossed belts, respectively. In this case the shifter handle has three positions and the machine is at a standstill when the clutch handle is in the neutral or center position.

Cross References

This section cited in 34 Pa. Code § 29.141 (relating to purpose).

§ 29.147. Shafting, bearings and hangers.

(a) Shafting should be kept in alignment, free from rust and excessive oil or grease.

(b) When explosives, explosive dusts, flammable vapors or flammable liquids are present, the hazard of static sparks from shafting should be carefully considered. Static electricity may be removed by means of a spring copper brush in contact with the shafting. This brush should be well grounded through No. 12 insulated copper wire. Other effective methods may be used.

(c) Bearings should be kept in alignment and properly adjusted.

(d) Hangers should be inspected to make certain that all supporting bolts and screws are tight and that supports of hanger boxes are properly adjusted.

Cross References

This section cited in 34 Pa. Code § 29.141 (relating to purpose).

§ 29.148. Oiling and cleaning.

(a) Oiling should be done only by an authorized person. He should wear tightfitting clothing and should use a can with a long spout to keep his hands out of danger. Drip pans and cups should be securely fastened.

(b) Self-lubricating bearings are recommended.

(c) Oilers' runways and platforms should conform with the requirements of Chapter 47, Subchapter G (relating to railings, toeboards, open-sided floors, platforms and runways).

(d) When ladders are used for oiling or repairing they shall be equipped with safety locks or antislip devices at the bottom. Reference should be made to Chapter 21 (relating to ladders).

Cross References

This section cited in 34 Pa. Code § 29.141 (relating to purpose).

§ 29.149. Power control.

(a) Among the methods used for power control are motor switches, friction clutches, belt shifters, and engine stops. The means for controlling power should be positive and should be so arranged as to permit operation from a point not more than 100 feet from any machine driven from the source of power in question. It is highly advisable to arrange the stations within 50 feet of any machine. There are cases, as for example in the steel industry, when a greater distance from the machine becomes necessary.

(b) It is advisable to mark the stop station with a mark easily distinguishable; green bands on posts and green circles on walls are recommended, together with a sign "Stop Station" or "Emergency Stop." A light of characteristic color should be added in shops where night work is carried on.

(c) Electrical safety devices should operate by the opening of a normally closed circuit. Any failure of the current or device will thus be indicated by the stopping of the prime mover. It is advisable to test such devices daily by shutting off the power at noon or night by such means.

Cross References

This section cited in 34 Pa. Code § 29.41 (relating to purpose).

§ 29.150. Hand-operated gears.

Hand-operated gears need not be equipped with guards. Quite frequently, however, such gears are operated by a short lever or crank, and when the operator braces himself against the frame of the machine he may come in contact with the gears. It is always good practice to look into this matter carefully and whenever there is the slightest chance of injury, it is well to provide guards.

Cross References

This section cited in 34 Pa. Code § 29.41 (relating to purpose).

Subchapter D. STATIONARY ENGINES

GENERAL PROVISIONS

Sec.
29.161. Definitions.
29.162. Scope.
29.163. Penalty.

OPERATION

29.171. All installations.
29.172. New installations.

DESIGN

29.181. All installations.

REPAIR

29.191. All installations.

Authority

The provisions of this Subchapter D issued under the act of June 2, 1913 (P. L. 396, No. 267) (71 P. S. §§ 1441—1451); and section 15 of the act of May 18, 1937 (P. L. 654, No. 174) (43 P. S. § 25-15), unless otherwise noted.

Source

The provisions of this Subchapter D adopted May 4, 1920; amended through August 1, 1968, unless otherwise noted.

GENERAL PROVISIONS**§ 29.161. Definitions.**

The following words and terms, when used in this subchapter, have the following meanings, unless the context clearly indicates otherwise:

Engine—Any machine which converts air, gas, oil, steam or water into mechanical power, including belt or gear-driven reciprocating compressors, pumps and blowers.

Guarded, encased or enclosed—The object is so covered, fenced or surrounded that contact, which may result in injury, at the point of danger is remote.

Hazardous—The location of an object so accessible that it permits contact which may result in injury.

§ 29.162. Scope.

This subchapter sets forth rules to safeguard the lives, limbs and health of workers in industries in which stationary engines are used, and places the responsibility for complying with these rules upon the employer and employe.

§ 29.163. Penalty.

Any person who violates any of the provisions of this subchapter and any regulations of the Department or who interferes with the Department or its duly authorized representative in the enforcement of this subchapter or regulations shall be penalized under the provisions of section 15 of act of May 18, 1937 (P. L. 654, No. 174) (43 P. S. § 25-15).

OPERATION**§ 29.171. All installations.**

(a) *Starting signal*. When an engine is connected directly with the line shafting or remote machinery, notice shall be given by an effective alarm or signal before the engine is started.

(b) *Engine*. A safe method shall be provided for turning over the engine by hand.

(c) *Valves.* Fixed ladders or stairs shall be provided for access to such emergency throttle or stop valves that are not operated from the floor or other accessible places.

(d) *Platforms.* Platforms and walks on engines shall have railings and toeboards as specified in Chapter 47, Subchapter G (relating to railings, toeboards, open-sided floors, platforms and runways). This requirement applies also to the engine bed alongside the connecting rod or crosshead when it is used as a foot walk.

(e) *Lubrication.* The engine bearings, journals, eccentrics, crank pins and the like, shall be oiled from outside the guardrailing.

§ 29.172. New installations.

Steam traps used to discharge water from steam separators shall be so installed that their operation is evident.

DESIGN

§ 29.181. All installations.

(a) *Guarding.* Engines shall have all exposed wheels, pulleys, gears, clutches, couplings, collars, belts, shafting, keys and set screws guarded as specified in Subchapter C (relating to mechanical power transmission apparatus).

(b) *Safety valves.* Receivers between high pressure and intermediate and low pressure cylinders shall be protected by one or more safety valves of sufficient capacity adjusted to release at the maximum safe working pressure of such receivers. Relieving capacity of the safety valve shall be not less than the capacity of the live steam connection to such receivers.

(c) *Pressure gauges.* Receivers shall be provided with pressure gauges.

(d) *Separators.* Effective separators or ample drains shall be provided in the main steam line above the throttle.

(e) *Vacuum breaker.* The jet condenser shall be provided with an automatic vacuum breaker to prevent water from entering the engine cylinders.

(f) *Speed limit.* Engines of 300 horsepower or more shall be equipped with an approved automatic independent, speed limit device. This requirement does not apply to a reversing engine connected by shafting, couplings, or gears to a constant load.

(g) *Governor.* Each engine shall be equipped with an effective governor, which at all times automatically controls the speed of the engine, except when the load itself acts as an effective governor. Fly-ball governors shall be equipped with an automatic stop to shut off the supply of steam in the event of derangement of the governor.

(h) *Valve gears and belt stop.* Valve gears of engines not controlled by fly-ball governors shall be so arranged, or other provisions made, that when the load

is removed, the engine stops if the governor fails to function. A broken belt stop is considered sufficient for slide or four valve engines.

REPAIR

§ 29.191. All installations.

(a) *Blocking*. Positive means shall be provided for blocking and holding immovable vertical and large horizontal engines during adjustments and repairs.

(b) *Examination static*. A complete static examination of all engines shall be made at least once every three years and a complete record kept of conditions found, with full information relative to defective parts and of repairs made on the engines.

Subchapter E. MACHINE TOOLS

GENERAL PROVISIONS

Sec.	
29.211.	Definitions.
29.212.	Scope.
29.213.	Penalty.

SPECIFICATIONS

29.221.	All installations.
29.222.	New installations.
29.223.	Existing installations.

Authority

The provisions of this Subchapter E issued under the act of June 2, 1913 (P. L. 396, No. 267) (71 P. S. §§ 1441—1451); and section 15 of the act of May 18, 1937 (P. L. 654, No. 174) (43 P. S. § 25-15), unless otherwise noted.

Source

The provisions of this Subchapter E adopted July 8, 1920; amended through May 1, 1967, unless otherwise noted.

GENERAL PROVISIONS

§ 29.211. Definitions.

The following words and terms, when used in this subchapter, have the following meanings, unless the context clearly indicates otherwise:

Guarded, encased or enclosed—The object is so covered, fenced or surrounded that contact which may result in injury, at the point of danger is remote.

Hazardous—The location of an object so accessible that it permits contact that may result in injury.

Machine tool—Any power-driven machine that employs a tool for working on metal. The counter shaft shall be considered a part of the machine.

§ 29.212. Scope.

This subchapter sets forth rules to safeguard the lives and limbs of workers in industries in which machine tools are used, and places the responsibility for complying with such rules upon both employer and employe.

§ 29.213. Penalty.

Any person who violates any of the provisions of this subchapter or any regulations of the Board, or who interferes with the Department or its duly authorized representative in the enforcement of this subchapter or regulations shall be penalized under the provisions of section 15 of act of May 18, 1937 (P. L. 654, No. 174) (43 P. S. § 25-15).

SPECIFICATIONS

§ 29.221. All installations.

(a) *Starting and stopping.* Each machine tool shall be provided with a starting and stopping device such as belt shifter, clutch, switch, or the like, accessible to the operator, that effectively controls the machine tool. Machine tools that are part of a unit when the starting or stopping of one machine may interfere with others of the unit, are excepted from this requirement.

(b) *Clutches and couplings.* Clutches and couplings shall be of the safety type with nuts and bolts countersunk or protected by a flange.

(c) *Openings.* Openings in bed frames on planers and boring mills shall be covered with a sheet metal apron substantially fastened in place. All openings in planer housing up to seven feet shall be guarded.

(d) *Platforms.* Balconies or runways on machine tools shall be considered working platforms and so guarded.

(e) *Hollow spindle lathes.* Material being worked on hollow spindle lathes shall be guarded a full length back of chuck while revolving.

(f) *Cams and counterweights.* Cams shall be guarded. Counterweights that present a shearing or crushing hazard when exposed to hazardous contact, shall be guarded.

(g) *Chip guards.* Chip guards shall be provided at machine tools when there is an eye hazard from flying chips or cuttings.

(h) *Setting stops.* The practice of changing stops (dogs) is prohibited while the planer table is in motion.

(i) *Machine tools.* Oiling of moving parts of the machine tools is prohibited. Cleaning of machine tools while in motion is prohibited. Riding upon the machine tool table is prohibited.

(j) *Hazards.* Belts, gears, sprockets, pulleys, chains, friction drives, revolving couplings, and clutches, when exposed in hazardous contact within 6 feet of the floor or working platform, shall be encased. Spokes presenting a shearing hazard shall be guarded.

§ 29.222. New installations.

(a) *Face plates.* Face plates, chucks, and collets shall be cylindrical with no projecting parts beyond the rim.

(b) *Clearance.* Planers shall have not less than 24 inches clearance at sides and ends of travel of the planer table, the work being machined, and its chucking.

§ 29.223. Existing installations.

(a) *Clearance.* When the clearance at the sides and the ends of travel of the planer table, the work being machined, or its chucking is less than 24 inches at any point, means shall be provided to prevent hazardous contact.

(b) *Projections revolving.* Revolving set screws, couplings, clutches, keys, or other projections not encased by the housing of the machine, when exposed to hazardous contact, shall be guarded. The covering of set screws with leather or wood blocks is prohibited.

Subchapter F. ABRASIVE WHEELS

Sec.
29.231. Reference to national standards.

§ 29.231. Reference to national standards.

Specifications regarding the use, care, and protection of abrasive wheels are set forth in the American National Standards Institute Standard B7.1-1970, as amended July 22, 1971, 1 Pa.B. 1652, and which are adopted and made part of this subchapter.

[Next page is 31-1.]