

**CHAPTER 5. BLASTING, DEMOLITION, FIREWORKS AND EXPLOSIVES**

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**Subchapter A. BLASTING OPERATIONS**

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**Authority**

The provisions of this Subchapter A issued under act of July 10, 1957 (P. L. 685, No. 362) (73 P. S. § 161), unless otherwise noted.

**Source**

The provisions of this Subchapter A adopted January 19, 1958, amended through July 1, 1968, unless otherwise noted.

**GENERAL PROVISIONS**

**§ 5.1. Scope.**

This subchapter sets forth rules to safeguard the public and the lives, limbs and health of workers in blasting operations and places the responsibility of compliance with the rules upon both employer and employe.

**§ 5.2. Penalty.**

A person who violates this chapter, or the regulations of the Department or who interferes with the Department or its authorized representatives in the enforcement of this subchapter or the regulations shall, upon conviction, be punishable in accordance with section 5 of the act of July 10, 1957 (P. L. 685, No. 362) (73 P. S. § 168).

**§ 5.3. Examining boards and examinations.**

(a) The Department will appoint examining boards for the purpose of conducting examinations for blaster's licenses and issuing credentials to eligible persons. There will be established in each district office of the Bureau of Inspection, an examining board consisting of five members, one to represent manufacturers of explosives, one to represent the mining and quarry industries, one to represent highway and heavy construction industries, one to represent insurance underwriters and a representative of the Department who will be chairperson. Three members attending a board meeting will constitute a quorum.

(b) The examining boards shall hold regular meetings quarterly in each district office and shall at that time conduct the examination of applicants for blaster's licenses. Special meetings for the purpose of conducting examinations may also be held if in the judgment of the chairperson, the number of applicants for examination warrants the action.

(c) The questions comprising examinations will be prepared by the Division of Mines, Quarries Explosives of the Department and will be forwarded to each district office, with acceptable answers, in sealed envelopes, which seals are not to be broken until the start of the examination. A score of 70% or more will establish a successful applicant.

(d) Forms for application will be furnished on request by the Bureau of Inspection, Division of Mines, Quarries and Explosives, Labor and Industry Building, 7th and Forster Streets, Harrisburg, Pennsylvania. Applications shall be mailed to the Chief of the Division at the above address and shall be accompanied by a check or money order in the amount of \$10, payable to the Commonwealth.

(e) Each application for a blaster's license shall be accompanied by a signed statement from the employer of the applicant, or other responsible person, certifying that, in the opinion of that person, the applicant is qualified by experience and is physically and mentally fit to hold a license for general blasting.

(f) Applicants for blaster's license will be notified as to when and where to appear for examination. Each applicant shall appear personally before the assigned examining board on the date designated and take the examination then given.

(g) Applicants failing to appear for scheduled examinations forfeit the fee paid unless they have submitted either written notice to the Division prior to the examination date or a valid certified medical excuse, also in writing. Final determination of refund of fee or admittance to subsequent examination without a reapplication fee will be at the discretion of the examining board.

(h) Examining boards may issue blaster's licenses without examination to applicants who have had at least three years experience in the handling and use of explosives prior to the effective date of the act. An applicant for a blaster's

license on the basis of prior experience shall attach to his application an affidavit itemizing the experience, indicating dates and employers.

(i) Applicants will be notified in writing as to whether they have qualified for the license. Applicants failing to qualify in examination may apply for reexamination by submitting a new application accompanied by a fee of \$10.

#### **Cross References**

This section cited in 34 Pa. Code § 5.4 (relating to issuance and status of licenses).

### **§ 5.4. Issuance and status of licenses.**

(a) A blaster license will be issued only to persons 21 years of age and older, upon written application signed by the individual who seeks to be licensed in conformity with § 5.3(e) and (g) (relating to examining boards and examinations).

(b) Applicants will be examined for licensing in six categories based on employment and experience, which include general blasting, trenching and construction, line pole work, mining, quarrying and black powder. Licenses issued will be restricted accordingly.

(c) Licensing for other categories will require reexamination based on the classification requested. Applications for reexamination shall be made in writing, on forms provided by the Division, and shall be accompanied by a fee of \$10.

(d) When an applicant passes the examination or qualifies on the basis of past experience, the examining board may issue a license to him upon the payment of an additional fee of \$5.00, by check or money order payable to the Commonwealth, which license will be effective until September 1 of the year of issuance.

(e) Any blaster shall, upon request, exhibit his license to any authorized representative of the Department, any police officer acting in the line of duty, or his employer or any authorized representative of his employer.

(f) Any blaster license may be suspended for due cause by the Director of the Bureau of Inspection, upon recommendation of the Chief of the Division of Mines, Quarries and Explosives. Any blaster's license may be revoked by the Board of the Department after written notice is accorded the licensee, and a hearing is held before the Board.

### **§ 5.5. Renewal of licenses.**

(a) A blaster may apply to renew his license each year by application to the Bureau of Inspection. Such application shall be made on forms supplied by the Bureau, signed by the applicant, and accompanied by check or money order payable to the Commonwealth for the annual renewal fee of \$3.50. Renewal forms will be mailed annually by the Bureau to each blaster at the address shown on the original application. An examining board may, in its discretion, refuse to renew any blaster license for due cause after notice to the applicant and a hearing

before the Board. Where a renewal of a license is granted, the renewal will be for the period from September 1 through August 31.

(b) Any licensee who fails to renew his license for one year shall apply for reexamination by submitting an application accompanied by a \$10 fee and shall, upon being approved by the examining board, pay the \$5.00 fee prior to the issuance of the license.

#### **§ 5.6. Transferability.**

A blaster license is not transferable. Any attempt to effect a transfer will automatically cancel such license.

#### **§ 5.7. Restrictions on blasting operations.**

(a) No person shall detonate explosives in blasting operations unless he has given satisfactory evidence to his employer that he has had practical experience in the handling and use of explosives under conditions existing at the site of the proposed blasting operation, is qualified to perform the duties of blaster at the site, and has a blaster license. A licensed blaster shall be in charge of and responsible for the preparation for, and the firing of, any blast. The blast shall be fired only by the blaster in charge. Where more than one licensed blaster is engaged in the preparation for a blast, the operations management shall designate the blaster in charge. The blaster in charge may authorize a laborer or other person not qualified to perform general blasting operations to load and unload explosives, prepare explosives for use in blasting, transport explosives at or near a job site, charge explosives into drill holes, and set fuses and detonating wires; all such duties shall be performed only under the direct supervision and direction and in the presence of the blaster in charge, who is responsible for the conduct of the persons acting under his direction.

(b) No person is permitted to detonate explosives unless another person is present within calling distance and able to render assistance in the event of accident or injury.

(c) The use of explosives by licensed blasters shall be in accordance with all rules and regulations for the storage, handling and use of explosives, and the manner of transporting dynamite, black powder, fuse, blasting caps, electric blasting caps or detonators, electric squibs, primacord, sensitized ammonium nitrate or any other explosive shall be in accordance with the regulations relating to the marking or placarding of motor vehicles transporting dangerous articles on the public highways of the Department of Transportation of the Commonwealth.

#### **Source**

The provisions of this § 5.7 amended January 22, 1969.

**Notes of Decisions**

A licensed blaster may be held liable for injuries resulting from a blasting accident, even though the blasting company had an indemnification agreement with a construction company, since the agreement being contrary to public policy which imposes strict liability for damages incurred while performing ultra-hazardous activity. *Burgan v. City of Pittsburgh*, 542 A.2d 583 (Pa. Cmwlth. 1988); appeal denied 557 A.2d 344 (Pa. 1989).

**§ 5.8. Blaster learners.**

An employer may designate a reasonable number of employees over 21 years of age as “blaster learners.” No more than six such learners may be assigned to one licensed blaster. Learners shall work under the direct supervision and direction and in the presence of the licensed blaster, who shall be experienced in the use and handling of explosives at the site.

**Source**

The provisions of this § 5.8 amended January 22, 1969.

**Subchapter B. DEMOLITION WORK****GENERAL PROVISIONS**

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- 5.22. Scope.
- 5.23. Penalty.
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**SPECIFICATIONS**

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- 5.35. Removal of materials.
- 5.36. Stairs, passageways and ladders.
- 5.37. Removal of walls.
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- 5.39. Removal of floors.
- 5.40. Storage space.
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**Authority**

The provisions of this Subchapter B issued under act of May 18, 1937 (P. L. 654, No. 174) (43 P. S. § 25-12), unless otherwise noted.

**Source**

The provisions of this Subchapter B adopted May 29, 1952, amended through July 1, 1968, unless otherwise noted.

**GENERAL PROVISIONS****§ 5.21. Definitions.**

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

*Demolition*—The removal of a building or structure or part thereof.

*Lumber size*—Nominal stock size.

**§ 5.22. Scope.**

This subchapter sets forth rules to safeguard the lives, limbs and health of workers engaged in demolition work, places the responsibility of compliance with the rules upon both employer and employe, and requires notification to the Bureau of Inspection before demolition is begun in certain instances.

**§ 5.23. Penalty.**

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

**§ 5.24. Filing of notice required.**

No demolition may be commenced by a person except the owner of the building or structure or a part thereof, or his employes, until the person or firm, whether corporate or otherwise, which will perform the demolition work first notifies the Bureau of Inspection on prescribed forms. In the case of emergencies caused by fire, flood, riot, civil disorder or other acts of God, demolition work may be commenced without prior notice, if the notice is filed within 48 hours after the commencement of the work.

**SPECIFICATIONS****§ 5.31. General.**

(a) *Supervision.* Demolition of buildings or other structures shall be done under the direction of persons experienced in that work.

(b) *Allowable loading.* No structure, part of a structure, floor or temporary support, scaffold, sidewalk shed, bridge or device or equipment may be loaded in excess of the safe carrying capacity, but never more than 1/3 of its ultimate structural strength.

(c) *Walkways and passageways.* Walkways and passageways shall be provided for the use of workmen, who shall be instructed in such use, and all such walkways and passageways shall be kept adequately lighted and free from debris or other materials.

(d) *Protruding nails.* Protruding nails in any lumber shall be withdrawn, hammered in, or bent over as soon as it is removed from the structure being demolished, or all nail-bearing lumber shall be placed in piles for future cleaning or burning.

(e) *First aid kit.* There shall be provided and properly maintained on each job an approved type of first aid kit, in the charge of a person instructed in the application of first aid.

(f) *Posting of danger signs.* On every demolition job, danger signs shall be conspicuously posted around the property; all doorways or thoroughfares to the property shall be kept barricaded, except during the actual passage of men or equipment.

(g) *Sprinkling.* During demolition, all chutes, floors, stairways and other places affected shall be sprinkled frequently to keep down dust.

(h) *Cables, ropes, slings, and tackle.* Cables, ropes, slings, and tackle shall be thoroughly and frequently inspected. When not in use, they shall be stored in a dry place. Equipment showing any defect shall be removed from service at once. Splicing of ropes is prohibited.

(i) *Oxygen acetylene.* Oxygen acetylene and similar materials, when used in connection with demolition, shall be stored in steel cylinders, in a cool place shielded from the sun, at a point from which such cylinders cannot fall and fully protected from falling materials or objects. Such cylinders shall be chained or tied in position or set in cradles.

(j) *Personal protective devices.* Employees on demolition jobs shall wear approved hard hats and steel-toed shoes. Employees working in atmospheres containing excessive dust shall wear approved respirators. Employees subject to injury from flying particles shall wear approved goggles.

### § 5.32. Temporary sanitation.

(a) *Chemical closets.*

(1) Approved sanitary chemical closets shall be provided during demolition operations in the following ratio, and shall be located so that workmen are not obliged to walk more than three stories up or down to reach them:

<i>Number of Persons</i>	<i>Number of Closets</i>
1—15	1
16—30	2
31—60	3
61—100	4
101—150	5

- (2) For each additional 50 persons employed, or fractional part thereof, at least one additional closet shall be provided.
- (3) In buildings of three stories or less in height, facilities may be provided outside the building, but not more than 150 feet distant.
- (b) *Toilets.* Every toilet shall be constructed so that occupants are sheltered from view and protected against the weather and falling objects. Each toilet shall also be provided with natural or artificial illumination and shall be maintained in a clean and sanitary condition.
- (c) *Disinfectants or deodorizers.* A sufficient quantity of disinfectants or deodorizers shall be supplied and frequently used to keep the closets in a clean and sanitary condition.
- (d) *Washing facilities.* Adequate washing facilities with running water, shall be provided for workmen, and located within a reasonable distance of the place of work.
- (e) *Place to change clothing.* A clean, safe, enclosed place shall be provided in which workmen may change clothing.
- (f) *Drinking water.* Pure drinking water, of a quality approved by the Department of Health, shall be accessible to employes at all times. The use of common drinking cups is prohibited; individual drinking vessels or bubbling fountains shall be used.

**§ 5.33. Preparatory procedures.**

- (a) Before beginning the demolition of any building or structure, the contractor or person in charge shall make a complete examination of such building or structure to ascertain any existing dangerous structural defects.
- (b) Where a structure to be demolished has been partially wrecked by fire, flood, explosion, or other causes, the walls shall be shored or braced in accordance with accepted engineering practice before any demolition work is started.
- (c) Electric, gas, water, steam, and other service lines from the outside, except those which are especially maintained for use in connection with the demolition work, shall be effectively cut off before demolition work is started. In each case, the service company in charge shall be notified in advance and the approval or cooperation obtained by the contractors or the property owner.
- (d) Power, water, or other service lines especially maintained for use in demolition work shall be relocated when necessary or protected with substantial covering to prevent damage.
- (e) Glazed sash, glazed doors, and other glass shall be removed before demolition work is begun.
- (f) Exterior wall openings which extend down to floor level shall be barricaded to a height not less than three feet above floor level. This subsection does not apply to a story after structural demolition of that story has been started, nor to the ground level.



(g) Floor openings and shafts not used for material chutes shall be floored over or enclosed with guardrails and toeboards.

(h) Except for the cutting of holes in floors for chutes and holes through which to drop materials, preparation of storage space and other necessary preparatory work, demolition of exterior walls and floor construction shall begin at the top of the structure and proceed downward, and each story of exterior walls and floor construction shall be removed and dropped into the storage space before commencing the removal of walls and floors in the story below. This requirement does not prohibit the demolition of a structure in sections where positive means are taken to prevent injury to persons or damage to property.

**§ 5.34. Sidewalk protection.**

(a) *Public thoroughfare.* Before demolition work is commenced, every sidewalk or public thoroughfare adjacent to the site shall be closed or protected as specified in this section. Such thoroughfares shall be kept clear and unobstructed at all times.

(b) *Sidewalk sheds.* When the structure to be demolished is more than two stories or 25 feet high, measured from sidewalk or street level, and the horizontal distance from the inside of the sidewalk to the structure is 15 feet or less, a sidewalk shed shall be constructed over the entire length of the sidewalk adjacent to the structure, of sufficient width to accommodate pedestrian traffic without causing congestion. The sidewalk shed shall be lighted by natural or artificial means sufficient to ensure safety at all times, and shall meet the following additional requirements:

(1) Each sidewalk shed shall be built to be capable of safely sustaining a load of 150 pounds per square foot, and when material is to be stored thereon it shall be capable of sustaining a load of at least 300 pounds per square foot.

(2) The outside edge and ends of the deck of a shed shall be provided with a substantial enclosure of at least 42 inches above the deck of the shed. Such enclosures may be vertical or inclined outward at approximately 45 degrees and shall consist of boards laid close together secured to braced uprights.

(3) Sidewalk shed openings for loading purposes shall be kept closed at all times except during actual loading operations.

(4) The deck flooring of a sidewalk shed shall consist of planking not less than two inches in thickness, closely laid and made watertight. Members of the shed shall be adequately braced and connected to resist displacement of members or distortion of the framework.

(5) Unless the top deck of the sidewalk shed is built solidly against the face of the structure to be demolished, the vertical face of the shed supports next to the building shall be solidly fenced throughout. This does not prohibit the construction and use of solid sliding or swinging gates necessary for the work.

(c) *Fence.* When the horizontal distance from the inside of the sidewalk to the structure is more than 15 feet and less than 25 feet, a sidewalk shed may be constructed over the sidewalk as described in subsection (b) or in place of such a shed, a substantial fence may be constructed along the inside edge of the sidewalk or, where permission has been granted to close the sidewalk, along the inside edge of the roadway. In addition, the following shall be complied with:

(1) Each fence shall be constructed at least 7 feet high, of wood or other suitable material, and shall be built solid for its entire height and length except that openings necessary for the proper prosecution of the work may be provided with solid sliding or swinging gates.

(2) When the entrances used by workers to buildings being demolished are not completely protected by sidewalk sheds, all such entrances shall be protected by canopies extending from the face of the building to a point not less than eight feet from it. Such overhead protection shall be at least 2 feet wider than the building entrance or opening and every canopy shall be at least as strong as the sidewalk shed specified in subsection (b).

#### Cross References

This section cited in 34 Pa. Code § 5.37 (relating to removal of walls).

### § 5.35. Removal of materials.

(a) *Through chutes.* The removal of materials through chutes shall comply with the following:

(1) No material shall be dropped to any point outside the exterior walls of the building except through enclosed wooden or metal chutes, except where buildings being demolished are not adjacent to other buildings or thoroughfares, in which case materials may be dropped to points outside the building walls, if a sufficient number of employees are assigned to keep the public and other employees from entering the danger area.

(2) Material chutes at an angle of more than 45 degrees from the horizontal shall be entirely enclosed on all four sides except for openings at or about floor level for the receiving of materials and debris.

(3) The openings specified in paragraph (2) shall not exceed 48 inches in height, measured along the wall of the chute, and in all stories below the top floor such openings shall be kept closed when not in use.

(4) Chutes at an angle of less than 45° with the horizontal may be left open on the upper side, if at the point where such a chute discharges into a chute steeper than 45° with the horizontal, the top of the steeper chute is boarded over to prevent the escape of material.

(5) A strong gate shall be installed in each chute at or near the discharge end and a responsible employe shall be designated to control the gate and the backing up and loading of trucks. Such employe shall be instructed to prevent any person from standing or passing under the discharge end of the chute.

(6) When operations are not in progress, the danger area at the discharge end of a chute shall be completely enclosed with a substantial fence or otherwise made inaccessible.

(7) Any opening into which workmen dump debris at the top of a chute shall be guarded by a substantial guardrail extending at least 36 inches above the level of the floor or other surface on which men stand to dump material into chutes.

(8) A toeboard or bumper, not less than 2 inches thick and 6 inches high, shall be provided at each chute opening where material is dumped from wheelbarrows. Any space between the chute and the edge of openings in floors through which it passes shall be solidly planked over.

(b) *Through holes in floors.* The removal of materials through holes in the floor shall comply with the following:

(1) Where debris is dropped through holes in the floor without the use of chutes, the total area of the hole cut in any intermediate floor (one which lies between the floor that is being demolished and the storage floor) shall not exceed 25% of such floor area.

(2) The total area of a floor shall be computed from measurements taken to the inside faces of the exterior walls. The area of floor openings which existed before the beginning of the demolition of the structure shall not be deducted in computing the total area.

(3) Where a structure is demolished in sections, the total area of the holes cut in any section of the floor shall not exceed 25% of such sectional floor area.

(4) Openings in all floors below the floor from which walls, partitions or floor construction is being removed shall be protected by standard railings and toeboards or preferably planked over where the holes are not being used for dumping materials.

(5) All intermediate floor openings for the passage of material shall be completely enclosed with barricades or substantial guardrails not less than 36 inches high and not less than 6 feet from the edge of any opening. No barricade or guardrail shall be removed until the story immediately above has been demolished down to the floor line and all debris cleared from that floor.

(6) Where the cutting of a hole in an intermediate floor between the storage floor and the floor which is being demolished makes the intermediate floor or any portion of it unsafe, such intermediate floor shall be properly shored.

#### Cross References

This section cited in 34 Pa. Code § 5.37 (relating to removal of walls).

### § 5.36. Stairs, passageways and ladders.

(a) Except for stairways, passageways, and ladders for the use of workmen, access to any building being demolished shall be entirely closed off at all times.

(b) Ladders shall meet the material and construction requirements in Chapter 21 (relating to ladders), and shall be maintained in a safe condition.

(c) Ladders or their side rails shall not extend less than 42 inches above the floor or platform to which such ladders give access.

(d) Ladders shall be secured against slipping out at the bottom and against any movement at the top.

**§ 5.37. Removal of walls.**

(a) Masonry walls or other sections of masonry shall not be permitted to fall upon floors in such masses as to exceed the safe carrying capacity of the floors.

(b) No section of wall whose height is more than 22 times its thickness shall be permitted to stand without lateral bracing unless such wall is in good condition and was originally designed to stand to a greater height without such lateral support.

(c) Workmen shall not be permitted to work on top of a wall when weather conditions constitute a hazard.

(d) Structural or load supporting members on any floor shall not be cut or removed until all stories above that floor have been demolished and removed. This provision does not prohibit the cutting of floor beams for the purposes stated in § 5.35 (relating to removal of materials) or in § 5.40(e) (relating to storage space).

(e) Before demolishing any interior or exterior wall within ten feet of any opening in the floor immediately below, such opening shall be substantially planked over unless all workmen are removed from all floors below and access to such floors is positively prevented.

(f) In buildings of "skeleton" construction, the steel framing may be left in place during the demolition of masonry work. Where this is done, all steel beams, girders, and the like shall be cleared of all loose material as the masonry work progresses downward.

(g) Walkways shall be provided to enable workmen to reach or leave their work on any scaffold or wall. Such walkways shall be not less than three planks, nor less than 30 inches wide.

(h) Each day, at the completion of work, all walls shall be left stable and in no danger of being overturned.

(i) Foundation walls which serve as retaining walls to support earth or adjoining structures shall not be demolished until the adjoining structures have been underpinned or braced, and earth removed or supported by sheet piling or sheathing.

(j) In the demolition of brick and masonry chimneys which cannot safely be toppled or dropped, all materials shall be dropped down on the inside of such chimneys.

(k) The landing point at the discharge end of any chute at or near the bottom of a chimney shall be completely protected by means of an overhead timber

canopy having a strength equal to a sidewalk shed, as specified in § 5.34 (relating to sidewalk protection).

(l) Construction sheds and tool boxes shall be so located as to protect workers from the danger of falling walls and all other falling objects.

**§ 5.38. Catch platforms.**

(a) During the demolition of the exterior walls of a structure originally more than 70 feet high, catch platforms shall be erected along the exterior faces of such walls where necessary to prevent injury to the public or workmen below.

(b) Such catch platforms shall be constructed and maintained not more than three stories below the story from which the exterior walls are being removed. Where demolition has progressed to within three stories of ground level, catch platforms are no longer required.

(c) Catch platforms shall be not less than 5 feet in width, measured in a horizontal direction from the face of the structure, and shall consist of outriggers and planks. Planks shall be laid tightly together, without openings between them and the wall.

(d) Catch platforms may be constructed of material other than wood, if such material is of equal strength and does not otherwise lessen the security against falling material.

(e) Catch platforms shall be capable of sustaining a live load of not less than 125 pounds per square foot.

(f) Catch platforms shall be so inclined that the outer edge is at least 10 inches higher than the inner edge.

(g) Supports shall consist of outriggers of ample strength, secured against turning and spaced not more than 10 feet apart.

(h) Each outrigger shall have ample support against the building or in window openings and shall be adequately secured. Planks supported by the outrigger shall be not less than 2 inches thick and the ends shall overlap each other for a distance of at least 1 foot over the supports. All planks shall be secured against displacement.

(i) The outer edge of each catch platform shall be provided with a substantial enclosure, constructed at an angle of approximately 45° with the horizontal and having its outer edge not less than 48 inches from the platform, measured along the slope of the enclosure.

(j) The enclosure wall shall consist of boards nailed closely together. Such enclosure shall be secured to supports placed not more than 10 feet apart.

(k) There shall be no openings between the platform and the enclosure.

(l) Supports for the enclosure shall be not less than 2 by 6 inches, in sections with the greater dimension at right angles to the enclosures.

(m) Materials shall not be dumped on catch platforms, nor shall such platforms be used for the storage of materials.

**§ 5.39. Removal of floors.**

(a) As used in this section, the term “floor arches” shall mean the masonry filling between the floor beams and girders, irrespective of the type of floor system; and the term “planks of ample strength” shall mean planks of not less than two inches thick by ten inches wide.

(b) In cutting holes in floor arches which span in one direction between two beams or supports, the section of floor arch to be removed in making the hole may be of any width and shall include the entire span of the floor arch which is between the two beams or supports on which it bears.

(c) Where workmen are engaged in removing floors, planks of ample strength shall be provided and used in breaking down floor arches. Such planks shall be so placed as to give the workmen firm support should the arch collapse unexpectedly. Where it is necessary for a workman to straddle a space between two planks, such space shall not exceed 16 inches.

(d) Walkways not less than 30 inches wide, formed of planks of ample strength, shall be provided and used by workmen when necessary to enable them to reach any work place without walking on exposed beams.

(e) Stringers of ample strength shall be installed to support the planks where necessary and the ends of such stringers shall be supported by floor beams or girders and not by floor arches alone.

(f) When floor arches are being removed, no workmen shall work in the area directly underneath and such area shall be barricaded to prevent access to it.

(g) The demolition of floor arches shall not be started until they and the surrounding floor area for a distance of 20 feet have been entirely cleared of debris and other unnecessary material.

(h) Planks used for temporary protection shall be sound and at least 2 inches thick. They shall be laid close together with the ends overlapping at least 4 inches over solid bearings to prevent tipping under a load.

**§ 5.40. Storage space.**

(a) The storage of debris on any floor of the structure being demolished may not exceed the original allowable floor load.

(b) In buildings having wooden floor construction, the flooring boards may be removed from not more than one floor above the curb to provide storage space for debris where falling material is not permitted to endanger the stability of the structure.

(c) Where wooden floor beams are required to brace interior walls or free standing exterior walls, such beams shall be left in place until some other adequate support is substituted.

(d) In buildings of fireproof construction, floor arches of not more than 10 feet above the curb may be removed to provide storage for debris, where such removal does not endanger the stability of the structure.

(e) Intermediate steel floor beams not required for the stability of the structure may be removed from the storage space defined in subsection (d).

(f) The dumping of material from upper floors into the storage space shall cease during all periods when workmen are performing any work in such storage space.

(g) Walls shall not be subjected to lateral pressure from stored material or lateral impact from falling material.

(h) The storage space into which material is dumped shall be blocked off, except for openings necessary for the removal of material. Such openings shall be closed at all times when material is not being removed.

#### Cross References

This section cited in 34 Pa. Code § 5.37 (relating to removal of walls).

### § 5.41. Demolition of steel construction.

(a) Where floor arches have been removed, the entire tier of beams on which any derrick is supported shall be completely planked over, except for openings required for handling material or equipment.

(b) In the operation of cranes and derricks, a standard signal system shall be used and all men assigned to the operation of such equipment shall be fully instructed on such signals.

(c) A tagline or guide rope shall be used on all hoisted or lowered loads.

(d) The riding of the load line in any lifting device is strictly prohibited.

(e) Wherever acetylene or oxygen cylinders are transported or lifted by crane or derrick, such cylinders shall be placed in substantial stands or cradles.

(f) A beam may not be cut until precautions have been taken to prevent it from swinging freely and possibly striking a workman, piece of equipment or part of the structure being demolished.

(g) Structural steel shall be lowered from the building and never allowed to drop, except where buildings being demolished are not adjacent to other buildings or thoroughfares, in which case materials may be dropped, if a sufficient number of employes are assigned to keep the public and other workmen from entering the danger area.

(h) When a structural steel frame is demolished without a derrick, the entire tier of beams next below that from which the beams and columns are being removed shall be completely planked over. This does not apply to floors from which arches have not been removed nor to openings for the passage of material or equipment.

**Subchapter C. FIREWORKS****GENERAL PROVISIONS**

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**Authority**

The provisions of this Subchapter C issued under act of May 18, 1937 (P. L. 654, No. 174) (43 P. S. § 25-12), unless otherwise noted.

**Source**

The provisions of this Subchapter C adopted June 14, 1930, amended through July 1, 1968, unless otherwise noted.

**GENERAL PROVISIONS****§ 5.51. Definitions.**

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

*Fireworks*—A combustible or explosive composition, substance or combination of substances, or article prepared for the purpose of producing a visible or an audible effect by combustion, explosion, deflagration or detonation.

*Fireworks factory building*—A building or structure in which the manufacture of fireworks, other than sparklers, or in which processing involving fireworks, is carried on.

*Fireworks plant*—Lands with buildings thereon, used in connection with the manufacturing or processing of fireworks, as well as the storehouses for the storage of finished fireworks.

*Fireworks storage building*—A building in a fireworks plant used exclusively for the storage of finished or unfinished fireworks of less than 100 pounds.



*Magazine*—A box or building used exclusively for the storage of explosive raw materials used in the manufacture of fireworks or for the storage of finished or unfinished fireworks in excess of 100 pounds.

**§ 5.52. Scope.**

This subchapter sets forth rules to safeguard the lives, limbs and health of workers in fireworks plants, and places the responsibility of compliance with the rules upon both employer and employe.

**§ 5.53. Penalty.**

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

### SPECIFICATIONS

**§ 5.61. General.**

No fireworks factory building or fireworks storage building shall contain more than 100 pounds of explosives at any one time, except finished or unfinished fireworks stored in class A magazines; “100 pounds of explosives” shall mean the sum total of raw material and processing material.

**§ 5.62. Location.**

(a) No fireworks plant may be located nearer than 2,000 feet from any inhabited building, 1,300 feet from railroad tracks or 650 feet from the nearest highway. For quantities of explosives greater than 25,000 pounds, the American Quantity and Distance Tables shall be used to govern the location of the fireworks plant, under act of April 27, 1927 (No. 291) (35 P. S. § 119.4) (Repealed).

(b) No fireworks factory building shall be located nearer than 80 feet from any other fireworks factory building, 100 feet from any fireworks storage building, or 300 feet from any magazine.

(c) No magazine containing up to and including 5,000 pounds of explosives shall be located nearer than 300 feet from any other magazine or fireworks storage building. No fireworks storage building shall be located nearer than 100 feet from any other fireworks storage building.

(d) Factory buildings, storage buildings, and magazines for quantities of fireworks in excess of 5,000 pounds shall be subject to the Intraplant Quantity and Distance Table in subsection (e).

(e) Unbarricaded factory buildings and magazines shall conform with the following:

(1) All unbarricaded factory buildings shall be located one from the other and from other buildings on explosives plants in which persons are regularly

employed, and all unbarricaded magazines shall be located from factory buildings and buildings on explosives plants in which persons are regularly employed, in conformity with the following table:

*Intraplant Quantity and Distance Table*

<i>Explosives (in pounds)</i>	<i>Distance (in feet)</i>
0—10	See paragraph (2)
10—25	40
25—50	60
50—100	80
100—200	100
200—300	120
300—400	130
400—500	140
500—750	160
750—1,000	180
1,000—1,500	210
1,500—2,000	230
2,000—3,000	260
3,000—4,000	280
4,000—5,000	300
5,000—6,000	320
6,000—7,000	340
7,000—8,000	360
8,000—9,000	380
9,000—10,000	400
10,000—12,500	420
12,500—15,000	450
15,000—17,500	470
17,500—20,000	490
20,000—25,000	530
25,000—30,000	560
30,000—35,000	590
35,000—40,000	620
40,000—45,000	640
45,000—50,000	660
50,000—55,000	680
55,000—60,000	700
60,000—65,000	720
65,000—70,000	740
70,000—75,000	770
75,000—80,000	780
80,000—85,000	790
85,000—90,000	800
90,000—95,000	820
95,000—100,000	830
100,000—125,000	900
125,000—150,000	950
150,000—175,000	1,000
175,000—200,000	1,050

<i>Explosives (in pounds)</i>	<i>Distance (in feet)</i>
200,000—225,000	1,100
225,000—250,000	1,150

(2) If up to ten pounds of explosives are involved, the only requirement is that they be stored in a separate building or within substantial dividing walls.

(f) Barricaded factory buildings and magazines shall conform with the following:

(1) The term means a physical barrier, natural or artificial, around the building or magazine to protect life and limb in buildings and on highways, railroads, and railways from damage by premature explosion.

(2) The methods of barricading are as follows:

(i) The building or magazine shall be located in an isolated ravine.

(ii) An excavation at the foot or side of a mountain shall be made sufficiently deep to provide protection on the sides and end of the building or magazine. A 2 foot space will be allowed between the building or magazine and the excavated sides.

(iii) A substantial barricade of concrete or timber shall be constructed.

(3) Barricaded magazines or factory buildings shall be located not less than 1/2 the distance from buildings, magazines, highways, railroads and railways as required for unbarricaded factory buildings or magazines, in subsection (e).

#### **Cross References**

This section cited in 34 Pa. Code § 5.120 (relating to cleanliness); 34 Pa. Code § 5.122 (relating to tables of quantity and distance); 34 Pa. Code § 5.145 (relating to machine mixing house); 34 Pa. Code § 5.191 (relating to distance limitations); and 34 Pa. Code § 5.192 (relating to operation).

### **§ 5.63. Enclosure.**

All fireworks plants shall be enclosed on all sides by a substantial fence and all openings to such enclosure shall be fitted with suitable gates, which when not locked shall be in the charge of a competent watchman who shall have charge of the fireworks plant when it is not in operation. No person other than authorized employes or representatives of authorized State or Federal departments having jurisdiction over such establishments shall be allowed in any fireworks plants, except upon written permission of the owner manager, or other person in authority. The fence shall not be nearer than 100 feet from the nearest building.

### **§ 5.64. Manufacturing.**

(a) No stove or exposed flame or electric heating device shall be used in any part of a fireworks plant, except in the boiler room or machine shop, if no fireworks or chemicals are stored therein.

(b) All parts of the buildings in fireworks plants shall be kept clean, orderly and free from accumulation of dust or rubbish. Powder or other explosive materials, when spilled on the floor, shall be immediately cleaned up.

(c) Electric motors, metallic belt fasteners or other devices which might cause a spark due to static electricity shall not be used. Metal tools shall not be utilized where explosive raw materials are being used. Kegs or containers containing explosives shall be opened with wooden or fibre mallets. No metal hammers, screw drivers or other tools shall be used.

(d) Fireworks in a finished or unfinished state shall not be kept or stored in buildings where other fireworks are in the process of manufacture, or where explosive raw material is stored.

(e) All explosive raw materials used in the manufacture of fireworks shall be kept in class A magazines, and each kind of explosive raw material shall be kept in a separate container. Covers shall be provided and used on all kegs or containers. Explosive raw materials used for current work each day may be kept in the factory building if they are kept in class C magazines when not actually being used. The amount remaining each day may be permitted to remain in the class C magazine if the amount does not exceed 100 pounds. The construction specifications for class A and class C magazines are as follows:

(1) *Class A magazines.* In class A magazines the following requirements shall be met:

(i) The magazine shall be constructed of one of the following materials:

(A) *Frame.* The walls shall be constructed of two by four inch studing with a two inch plank outside wall. The inside wall shall be lined with tongued and grooved roofers. The outer wall shall be covered with No. 26 gage galvanized corrugated iron or sheet steel on the outside. The space between the outer and inner wall shall be filled with dry, coarse sand (not crushed stone or gravel). All lumber shall be well-seasoned and free from loose knots, wind shakes, bark edges or decay.

(B) *Brick.* The wall shall be 8 inches in thickness. The bricks shall be of medium soft variety laid in cement mortar containing not over 25% lime.

(C) *Concrete.* The walls shall be 6 inches in thickness constructed of nine parts sand and one part cement, and 1/2 inch face surface of three parts sand and one part cement.

(D) *Tile.* The walls shall be constructed of either 6 inch or 8 inch tile. The spaces in the tile shall be filled with dry, coarse sand (not crushed stone or gravel).

(ii) The foundation shall be constructed of stone laid in cement, concrete, or brick piers, or a solid foundation may be used.

(iii) Magazines of less than 30,000 pounds capacity shall have 7/8 inch tongued and grooved flooring. Magazines of larger capacity shall have double flooring.

(iv) The floor and ceiling shall be constructed to within 2 inches of the walls in order to provide a 2 inch ventilation space.

(v) All nail heads shall be countersunk. No metal shall be exposed within the building.

(vi) The door shall be 3 feet wide and 6 1/2 feet high, constructed of at least three layers of 7/8 inch hardwood lumber and metal covered.

(vii) A bulletproof sand roof shall be used, constructed as a form box by laying a floor of a good grade of tongued and grooved boards on ceiling joists and build a 1 by 4 inch rim, line with one layer of building paper and fill with 4 inches of dry, coarse sand (not crushed stone or gravel).

(viii) The outer roof shall be covered with No. 26 galvanized corrugated iron fastened to 7/8 inch sheathing with galvanized nails and lead washers. Galvanized iron ridge rool shall be used.

(ix) The cornice of the roof shall be constructed of No. 26 gauge galvanized flat iron, bent over roof sheathing and ends of rafters and extending three inches down the wall.

(x) Gutters and down spouts should be used on the door side only.

(xi) Ventilators shall be spaced not more than 5 feet center to center on sides and roof.

(xii) All materials and workmanship used in the construction of magazines shall be first class.

(2) *Class C magazines*. The following requirements shall be complied with:

(i) The principle of construction is simply placing one substantial box inside of another with a 5 inch space filled with dry, coarse sand (not crushed stone or gravel).

(ii) The outer box shall be built on the type of an ordinary contractor's tool box, equipped with a sloping hinged lid.

(iii) The box shall be constructed of 7/8 inch tongued and grooved boards or 1 1/8 inch plain lumber. The outside of the box shall be covered with not less than No. 24 gauge sheet iron if used in open quarry work.

(iv) The outer box will be 1 foot longer, 1 foot wider and 6 inches deeper than the inner box so that when the inner box is set inside the outer box the tops will be level with each other and there will be a 5 inch space on all sides for sand filling. The inner box shall be set inside of the larger box and fastened into place.

(v) The inside of all boxes shall be surfaced. No nail, bolt or metal screw heads shall be exposed on the inside of the box.

(vi) At the top, sides and ends of each box, there shall be cut 1/4 inch by 2 inch notches, spaced about 1 foot apart, and not directly opposite.

(vii) The box (magazine) shall be set so that it is level and supported either on wooden sills, bricks or piers. The bottom of the magazine shall be kept about 6 inches off the ground.

(viii) The space between boxes shall be filled with dry, coarse sand (not crushed stone or gravel) to within 1/4 inch of the top of the boxes. To pre-

vent sand from falling into the storage space or into a shifting position, a cover may be placed over the sand space.

(ix) All magazines shall be provided with substantial locks.

(x) Upon each end of the magazine, above the side walls, or upon its barricade, there shall be kept conspicuously posted at all times a sign with the words "MAGAZINE—EXPLOSIVES—DANGEROUS," legibly printed in letters not less than six inches in height.

(f) Employes handling loose explosives or working in or around factory buildings where there is a possibility of explosion by the attrition of metals shall wear powder or rubber soled shoes, without iron or steel nails. Neither iron nor steel buttons, nor other metal attachments, shall be worn on clothes, nor shall metal objects, such as knives, keys, and the like be carried in pockets. Suitable facilities shall be provided where employes may change their clothes. Washing facilities shall also be provided. No lockers are permitted in explosive buildings.

(g) All machinery and moving parts of machinery, ladders, floors, ventilation, lighting, sanitation and the like shall be in accordance with the regulations of the Department covering these subjects.

(h) Fireworks plants shall be lighted by electricity with vapor-proof keyless lamps where artificial light is necessary. Temporary or loose electric wiring or extension lights are prohibited. All wiring shall be of a permanent character installed in rigid metal conduit. No open knife switches may be used.

(i) Where heating is desired, it shall be by means of steam, indirect hot air radiation, or hot water. Radiators shall be so placed that they may readily be cleaned underneath and behind.

(j) Workrooms in factory buildings shall have at least two means of exit leading directly or ultimately to the outside.

(k) No fireworks shall be manufactured except such as are approved for transportation by the Interstate Commerce Commission.

(l) No fireworks, or component parts of fireworks, shall be dried in the open or outdoors. Where drying is necessary it shall be done in a dryhouse.

### § 5.65. Fire protection.

(a) Fireworks plants and all buildings situated within fireworks enclosures shall be equipped with suitable fire protection, commensurate with the hazard involved. Such fire protection shall be installed as directed by the Department.

(b) No person shall smoke or carry matches or other flame-producing device, or a lighted cigarette, cigar or pipe, within any room or enclosure or upon any part of a fireworks plant. Fireworks plants shall be posted with conspicuous "NO SMOKING" signs.

**§ 5.66. Transportation.**

(a) Any vehicle carrying fireworks upon a public highway shall display signs on both sides and the rear of the vehicle reading "FIREWORKS—DANGER—KEEP FIRE AWAY." The lettering on these signs shall not be less than 3 inches in height.

(b) No metal tools or other piece of metal shall be carried in the bed or body of a vehicle containing fireworks, unless contained in a suitable box or container.

(c) No exploders, detonators, blasting caps or other similar explosive materials shall be transported in a vehicle containing fireworks. Smoking is prohibited when the vehicle is transporting fireworks.

(d) Nothing in this section applies to the transportation of any article or thing shipped in conformity with the regulations of the Interstate Commerce Commission, nor to the military or naval forces of the United States, nor to the duly authorized militia of the State, nor to the use of signals necessary for the safe operation of railroads, steamboats, or aircraft.

**§ 5.67. Certificate of operation.**

(a) No fireworks plant shall open or continue to operate until a certificate of operation has been obtained from the Department.

(b) Application for such certificate shall be made by the owner, manager or operator of the plant, to the Department. The application shall include drawings or blueprints in quadruplicate of the general arrangement of buildings, showing the distances between buildings, the quantities of explosives to be stored in each building, and the location of the plant with respect to railroads, highways and other buildings.

(c) Upon receipt of an application, the Department will authorize an inspection of the premises of the applicant. If the conditions of the fireworks plant conform to the requirements of this subchapter, the Department will issue a certificate of operation.

(d) The certificate of operation shall be displayed under glass in the office or factory building and shall remain in force until revoked.

(e) The Department may revoke a certificate of operation any time a fireworks plant is not maintained in accordance with this subchapter.

**Subchapter D. EXPLOSIVES****GENERAL PROVISIONS**

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#### **Authority**

The provisions of this Subchapter D issued under act of May 18, 1937 (P. L. 654, No. 174) (43 P. S. § 25-12), unless otherwise noted.

#### **Source**

The provisions of this Subchapter D adopted October 8, 1918; amended through March 1, 1969, unless otherwise noted.

### **GENERAL PROVISIONS**

#### **§ 5.81. Scope.**

This subchapter sets forth rules to safeguard the lives, limbs and health of workers in plants manufacturing or using explosives, and places the responsibility of compliance with such rules upon both employer and employe.

**§ 5.82. Applicability.**

(a) *Places covered.* This subchapter governs the operation of all buildings, factories, establishments or other places where people are employed, wherein explosives are manufactured, used, handled, stored or in which they are produced as the result of manufacturing processes.

(b) *Materials covered.* Materials classed as explosives by the Board include black powder of all varieties, dry guncotton, nitroglycerine, dynamite, chlorates, fulminates, all sensitized ammonium nitrate compositions, and any other of their compounds or mixtures or any other substances which are subject to explosion by the aid of shock, friction, spark or heat. Smokeless powder, wet guncotton and wet nitrostarch are also included in this classification for the purposes of this subchapter.

**§ 5.83. Penalty.**

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

**GENERAL PRECAUTIONS: EXPLOSIVE VAPORS****§ 5.91. Construction of buildings.**

(a) Rooms or portions of explosives plants in which there are used, generated or found, explosive vapors and where persons are employed, shall be separated from other rooms or portions of plants by fire-resistive walls or partitions, pierced with only openings that are necessary except when the rooms or portions of plants consist of separate buildings. Where the material being used or which produces the explosive vapors does not exceed 10 gallons in quantity and is confined in safety cans, it is necessary only to prohibit the use of open flames, post danger signs and observe safe practices. Materials which give off explosive vapors may not be stored in workrooms where people are employed, unless the materials are stored in closed, properly vented containers. Where practical, safety cans should be used.

(b) Where materials giving off explosive vapors are stored in separated or underground storage systems outside of buildings, they may be distributed by pipelines throughout buildings where persons are employed.

(c) Openings necessary in fire-resistive walls shall be provided with fire-resistive doors. The doors shall be kept closed at all times except when in use to permit passage from one room or portion of a plant to another. On these doors danger signs shall be posted, warning against the carrying of matches or an open light and permitting the entrance of authorized employes or others designated by the manager or superintendent only.

**Cross References**

This section cited in 34 Pa. Code § 5.182 (relating to rooms containing ether vapor).

**§ 5.92. Number of employes.**

The number of employes in rooms or portions of a plant shall be kept to the minimum compatible with the process of manufacture. This may be done by building additional fire-resistant portions or by the addition of small unit buildings.

**Cross References**

This section cited in 34 Pa. Code § 5.182 (relating to rooms containing ether vapor).

**§ 5.93. Lighting.**

(a) Open or naked lights—such as lanterns, stoves, torches and the like—are not allowed in rooms or portions of plants, except for necessary repairs under proper supervision. Watchmen or others using portable lights shall be supplied with vapor-proof lights.

(b) The rooms or portions of plants shall be lighted, if artificial light is needed, by means of an electric system installed in conduit or in lead encased cables with vapor-proof keyless lamps. Switches or fuses shall be located away from the rooms or buildings in a protected place. It is preferable that lights be projected by reflectors into rooms from the outside through properly located windows. The use of electric motors other than the sparkless induction type is forbidden.

**Cross References**

This section cited in 34 Pa. Code § 5.166 (relating to electric apparatus and lighting); and 34 Pa. Code § 5.182 (relating to rooms containing ether vapor).

**§ 5.94. Ventilation.**

(a) Where the amount of gases or vapors produced is deemed by the Department or its authorized representative to be a menace to the safety or health of employes, an efficient exhaust system, the plans of which shall be approved by the Department, shall be installed in the rooms designated and kept operating at all times when persons are employed therein.

(b) During necessary repairs which might cause a spark, other operations shall cease, and the repairs shall be made only after adequate ventilation has been established to free the room or portion of the plant from explosive gas or vapor.

**§ 5.95. Prevention of explosions.**

(a) Oil lanterns, open lights, and any work which might generate a spark are prohibited in the vicinity of acid containers, except when necessary to apply heat for thawing purposes, which shall be done under proper supervision. The opening of drums by means of an iron chisel and hammer is prohibited. Suitable wrenches shall be provided.

(b) Localities where such material is stored shall be posted with warning signs calling attention to the danger of bringing open lights into the vicinity.

**§ 5.96. Nitric acid.**

(a) Due to the danger to workers from inhalation of nitrous fumes in case of fire or of the breakage of carboys, carboys containing nitric acid shall be stored in detached sheds with sandstone, brick, or other suitable flooring, in quantities not to exceed 100 carboys, in not more than four rows. Nitric acid in carboys may be stored in unlimited quantities in the open.

(b) The following notice will be supplied by the Department on application, and shall be posted at all places in plants where there is danger of poisoning by acid fumes:

**ACID FUMES**

**WARNING—The Inhalation of Dense Acid Fumes May Cause Death.**

Employes are strictly prohibited from entering buildings where acid fumes exist, or tanks, or confined spaces which are not entirely clear of acid fumes, unless they wear the proper protective equipment such as gas masks, hose masks, etc.

Employes working in tanks shall, in addition to the gas mask, hose mask, etc., wear a lifeline which is at all times in the hands of an assistant stationed outside of the tank.

Employes who have been exposed to acid fumes and who feel weak, sick, short of breath, or who are attacked with cramps or coughing shall report this condition to their foreman or to the hospital at once, so that proper treatment can be given. Don't wait to get home. Delay may be fatal. Take no chances.

Responsibility for complying with these regulations shall rest with the foreman or other person designated for that purpose by the management of the plant.

Failure to comply with these regulations may subject the offender to a penalty of a fine or imprisonment.

(c) Water shall always be available for use in case of evolution of nitrous fumes caused by breakage or other accident, and all workers handling such acid shall be warned against sprinkling sawdust, earth, or anything of an organic nature on spilled acid. Only water or alkalies shall be used upon spilled nitric acid.

#### **GENERAL PRECAUTIONS: FUMES, VAPORS, GASES AND CHEMICALS**

##### **§ 5.101. Scope.**

The provisions of this section and §§ 5.102—5.104 apply to all buildings in which fumes, vapors, or gases of an asphyxiating or poisonous nature are manufactured, used, handled, or stored, and in buildings in which chemicals which give off such fumes, vapors, or gases are produced, used, handled, or stored.

##### **§ 5.102. Resuscitation and physical examination.**

(a) For every 50 persons or less employed and exposed to risk, there shall be present at all times at least two persons who are trained or competent to apply resuscitation by the prone pressure or Schaeffer method or by effective mechanical devices.

(b) A sufficient number of helmets, gas masks or hose masks suitable for the kind of gas and the concentration encountered, shall be kept at each plant where there may be asphyxiating gases, fumes or vapors.

(c) Employes who are required by the employer to wear helmets, gas masks or hose masks in making repairs or in maintenance work, shall be thoroughly instructed in the use of such apparatus and be physically examined by a licensed physician at least once every 90 days, or after absence from work due to either sickness or accident. The physician shall certify to the proper physical condition of those so employed and no employe shall be permitted to do such work unless examined and certified.

##### **Cross References**

This section cited in 34 Pa. Code § 5.101 (relating to scope).

##### **§ 5.103. Cleaning tanks.**

(a) When it is necessary for an employe to enter any vats, tanks or other containers in which there have been used, stored or manufactured, gases, fumes or vapors of an asphyxiating or poisonous nature, or materials which give off gases, fumes or vapors of such a nature, the following procedure shall be pursued:

- (1) Containers shall be emptied and all connections shall be disconnected and blanked off.
  - (2) Containers shall be thoroughly cleaned by repeated washings with water, soda water, steam, compressed air or other suitable means.
  - (3) When the person in charge considers conditions satisfactory, employes may enter such containers. They shall use a helmet, gas mask or hose mask, and have attached to their bodies a lifeline or rope, if the person in charge considers it necessary.
  - (4) The lifeline or rope shall be under the control of one or more fellow workmen, who shall remain outside the container ready to render assistance if necessary.
  - (5) After the work is finished, the men should at once take a bath and change their clothing, including shoes, if the foreman or other person in charge deems it necessary. Facilities for such baths shall be provided.
- (b) The superintendent of the plant will be held responsible for the enforcement of the provisions of this section.

#### **Cross References**

This section cited in 34 Pa. Code § 5.101 (relating to scope).

### **§ 5.104. Other chemicals.**

The handling and storage of all chemicals necessary for the operation of explosives plants, not specifically provided for, shall be in accordance with recognized safe practices.

#### **Cross References**

This section cited in 34 Pa. Code § 5.101 (relating to scope).

## **GENERAL PRECAUTIONS: EXPLOSIVES**

### **§ 5.111. Storage of explosive material.**

- (a) Buildings in which explosives are manufactured, handled, used, or temporarily stored, are classed as "explosives buildings." Those buildings in which finished explosives not being used in the process of manufacture are kept for periods exceeding 48 hours will be classed as "magazines."
- (b) Explosive material not in the process of manufacture or being used in loading detonators, timing, or priming caps, or in like processes, shall not be stored in workrooms where people are employed, except under the following conditions:
  - (1) When the quantity used daily does not exceed 100 pounds, it is permissible to keep the quantity necessary daily in closely covered receptacles.

(2) When the quantity used daily exceeds 100 pounds, only 100 pounds may be stored in the workroom at one time, and then only if it is suitably protected from careless handling. Additional supplies shall be brought from the magazine as needed.

(3) Explosive materials being used may be stored in any quantity in storage buildings erected for that purpose, if such buildings are not used for other purposes and are located at distances in accordance with § 5.122 (relating to tables of quantity and distance).

(4) Fulminates or materials of like sensibility shall be brought into workrooms in quantities sufficient for current use only.

(c) Explosive materials not in process of manufacture or not being used in processes of manufacturing shall be stored in magazines.

#### **§ 5.112. Plans of plants.**

(a) Each existing concern manufacturing, using, handling, or storing explosives shall keep in the office of the superintendent of each plant a plan of the plant, showing the location of all explosives buildings and the distance they are located from other explosives buildings or buildings where persons are employed, and from magazines. Such plans shall at all times be open to inspection by authorized inspectors of the Department. The superintendent shall, upon demand by the inspector, furnish the following information:

(1) The number of persons ordinarily engaged at work in or at each building or the proposed number to be allowed there.

(2) The maximum amount and kind of explosive material which is or will be present in each building at one time.

(3) The nature and kind of work carried on in each building, whether such buildings are surrounded by natural or artificial barricades, and the dimensions of such barricades, if any.

(b) The plans of buildings proposed to be used for manufacturing or loading explosives shall be submitted to the Department for approval before the buildings are used for such purposes.

(c) Any concern engaging in the manufacture, use or handling of explosives shall comply with subsection (a), prior to, or at the time of, commencing operations.

#### **§ 5.113. Admission to plants.**

(a) The entrance to plants manufacturing explosives exclusively, and to all portions of plants where explosives buildings are maintained, shall be fenced off in a manner which will prevent the entrance of persons other than employes, unless permission is first obtained from the owner or his authorized representative. At no point shall the fence be located at a distance less than 100 feet from an explosives building.

(b) No person, other than authorized employes or properly identified State inspectors, shall be allowed in a plant manufacturing explosives or handling or using explosives in the process of manufacture unless they receive permission from the owner or his authorized representative and are accompanied by such person. A record of such permissions granted shall be kept on file in the office.

(c) No person suspected of being intoxicated shall be allowed upon the premises of a plant manufacturing or using explosives, or in any explosives building.

(d) No employe, other than those authorized to do work in or around such buildings, shall be allowed to remain in or near explosives buildings.

**§ 5.114. Material allowed in explosives buildings.**

All explosives buildings shall be kept clear of unnecessary tools, refuse, and debris of any kind at all times, and shall not be used as temporary storehouses for material not necessary at that time in manufacture. No explosives building, while containing explosives, shall be used as a storehouse of any sort.

**§ 5.115. Repairs.**

Necessary repairs in an explosives building shall be attended to by a repairs engineer or other authorized person. The foreman or person in charge of the building shall be responsible for seeing that only authorized persons perform such repairs, and that in the case of major repairs all explosive material is removed before repairs are undertaken. After repairs are made, all articles, other than those allowed, shall be removed from the building, and the workroom placed in its original working condition, before work may be resumed.

**§ 5.116. Matches prohibited.**

No employe shall have in his possession at any time in any explosives plant, any match or other flame-producing device unless he has the written authorization of the superintendent to do so, in which case only safety matches may be used. A search for matches shall be made at irregular intervals.

**§ 5.117. Attire of employes.**

(a) All employes handling loose explosives or working in or around explosives manufacturing buildings where there is a possibility of explosion by the attrition of metals shall wear powder shoes or rubber soled shoes without iron or steel nails. No pockets shall be allowed in the clothing worn in such work except skeleton pockets. Neither iron nor steel buttons, nor other metal attachments, shall be allowed on such clothes, nor shall metal objects such as knives, keys, and the like, be allowed to be carried in the pockets.

(b) All persons before entering such buildings shall wipe or clean their shoes. All explosives buildings shall be provided at each entrance with devices whereby the shoes of all persons entering may be cleaned.



(c) Suitable change or locker houses shall be provided where employes may change their clothes and wash. No lockers are allowed in explosives buildings.

**§ 5.118. Transportation, machinery and platforms.**

(a) Trucks or conveyors used for the transportation of loose explosive material, except smokeless powder not in the dry state or wet nitro compounds, shall be provided with either side or end rails or guards, to prevent any concentration of explosives from slipping off the truck or conveyors.

(b) Careful inspection shall be made daily by the foreman to ascertain that all machinery and equipment used in the manufacture or handling of explosives is in perfect order. If not found in such condition, it shall not be used until placed in perfect condition.

(c) All dangerous machinery and moving parts of machinery shall be guarded in accordance with Chapter 29, Subchapter C (relating to mechanical power transmission apparatus).

(d) Platforms, stairways, tanks, vats, runways, and other dangerous places shall be guarded by standard railings and toeboards as required by Chapter 47, Subchapter G (relating to railings, toeboards, open-sided floors, platforms and runways), except where there is danger of dust collecting, when toeboards shall not be used; in all such instances special permission shall be obtained from the Department. Metal shall not be used for railings and toeboards where its presence increases the danger of an explosion. No railings or toeboards shall be so installed as to interfere with safety exits.

(e) The tread of all wheels on trucks or conveyors and the rails used inside of explosives buildings shall be composed of nonsparking material.

**§ 5.119. Carrying of explosives.**

When explosives are carried from one building to another, employes carrying such explosives shall not follow each other closely, but shall allow an interval of at least one minute in time or 100 feet in distance. This does not apply to such explosives as trinitrotoluol or smokeless powder.

**§ 5.120. Cleanliness.**

(a) Any spilled explosive material or ingredients shall be cleaned up immediately.

(b) The floors of explosives buildings shall be as free as possible from cracks, openings, or irregularities, and no projecting or visible iron or steel nails are permitted in such floors.

**§ 5.121. Electric wiring.**

(a) Temporary or loose electric wiring, such as extension lights and the like, is prohibited in explosives buildings, except while making necessary repairs in case of emergency.

(b) All inside electric wiring shall be of a permanent character, installed in metal conduit or lead-encased cable with vapor-proof keyless lamps.

**§ 5.122. Tables of quantity and distance.**

(a) Buildings and magazines in which explosives are kept in explosives plants shall be located at distances from buildings which are regularly occupied in whole or in part as a habitation for human beings, or any church, schoolhouse, railroad station, store, or other building where people assemble, or railroads which carry passengers for hire, or from public highways, in conformity with the following table:

*Quantity and Distance Table*

<i>Quantity Which May be kept or Stored</i>		<i>Distance From Nearest Building (in feet)</i>	<i>Distance From Nearest Railway (in feet)</i>	<i>Distance From Nearest Highway (in feet)</i>
<i>Blasting &amp; Electric Blasting Caps (in pounds)</i>	<i>Other Explosives (in pounds)</i>			
1,000—5,000		30	20	10
5,000—10,000		60	40	20
10,000—20,000		120	70	35
20,000—25,000	0—50	145	90	45
25,000—50,000	50—100	240	140	70
50,000—100,000	100—200	360	220	110
100,000—150,000	200—300	520	310	150
150,000—200,000	300—400	640	380	190
200,000—250,000	400—500	720	430	220
250,000—300,000	500—600	800	480	240
300,000—350,000	600—700	860	520	310
350,000—400,000	700—800	920	550	280
400,000—450,000	800—900	980	590	300
450,000—500,000	900—1,000	1,020	610	310
500,000—750,000	1,000—1,500	1,060	640	320
750,000—1,000,000	1,500—2,000	1,200	720	360
1,000,000—1,500,000	2,000—3,000	1,300	780	390
1,500,000—2,000,000	3,000—4,000	1,420	850	420
2,000,000—2,500,000	4,000—5,000	1,500	900	450
2,500,000—3,000,000	5,000—6,000	1,560	940	470
3,000,000—3,500,000	6,000—7,000	1,610	970	490
3,500,000—4,000,000	7,000—8,000	1,660	1,000	500
4,000,000—4,500,000	8,000—9,000	1,700	1,020	510
4,500,000—5,000,000	9,000—10,000	1,740	1,040	520
5,000,000—7,500,000	10,000—15,000	1,780	1,070	530
7,500,000—10,000,000	15,000—20,000	1,950	1,170	580
10,000,000—12,500,000	20,000—25,000	2,110	1,270	630
12,500,000—15,000,000	25,000—30,000	2,260	1,360	680
15,000,000—17,500,000	30,000—35,000	2,410	1,450	720
17,500,000—20,000,000	35,000—40,000	2,550	1,530	760
	40,000—45,000	2,680	1,610	800
	45,000—50,000	2,800	1,680	840

50,000—55,000	2,920	1,750	880
55,000—60,000	3,030	1,820	910
60,000—65,000	3,130	1,880	940
65,000—70,000	3,220	1,940	970
70,000—75,000	3,310	1,990	1,000
75,000—80,000	3,390	2,040	1,020
80,000—85,000	3,460	2,080	1,040
85,000—90,000	3,520	2,120	1,060
90,000—95,000	3,580	2,150	1,080
95,000—100,000	3,630	2,180	1,090
100,000—125,000	3,670	2,200	1,100
125,000—150,000	3,800	2,280	1,140
150,000—175,000	3,930	2,360	1,180
175,000—200,000	4,060	2,440	1,220
200,000—225,000	4,190	2,520	1,260
225,000—250,000	4,310	2,590	1,300
250,000—275,000	4,430	2,660	1,340
275,000—300,000	4,550	2,730	1,380

(b) Factory buildings in which explosives are kept shall be separated from each other, and from other buildings in explosives plants in which persons are regularly employed, and all magazines shall be located from factory buildings and buildings on explosives plants in which persons are regularly employed, in conformity with the Intraplant Quantity and Distance Table set forth in § 5.62 (relating to location).

(c) Magazines in which more than 50 pounds of explosives are kept shall be detached from other structures. Magazines where more than 5,000 pounds of explosives are kept shall be located at least 200 feet from any other magazine, except cap magazines. Magazines where quantities of explosives over 25,000 pounds are kept shall have an increase over 200 feet of  $2 \frac{2}{3}$  feet for each 1,000 pounds of explosives in excess of 25,000 pounds stored therein; these distances between magazines may be disregarded where the total quantity stored in the magazines complies with the Quantity and Distance Table set forth in subsection (a). In all cases, the quantity of explosives contained in cap magazines shall govern in regard to spacing such magazines from magazines containing other explosives, but under no circumstances shall a magazine containing blasting caps be within less than 100 feet, unbarricaded, or 50 feet, barricaded, from any magazine other than a cap magazine.

(d) Whenever a factory building or magazine is effectively screened from another explosives plant building or magazine, building, railroad or highway, by natural features of the ground or by efficient artificial barricade of such height that any straight line drawn from the top of any sidewall of the factory building or magazine to any part of the explosives plant building, magazine or building to be protected will pass through such intervening natural or efficient artificial barricade, and any straight line drawn from the top of any sidewall of the factory building or magazine to any point 12 feet above the center of the railroad or

highway to be protected will pass through such intervening natural or artificial barricade, 1/2 the distances prescribed by the Quantity and Distance Table in this section, the Intraplant Quantity and Distance Table set forth in § 5.62 (relating to location), and the distances separating magazines, may be deemed applicable.

(e) The tables described in subsections (a) and (b) also apply to new construction or replacement.

#### Cross References

This section cited in 34 Pa. Code § 5.111 (relating to storage of explosive material); 34 Pa. Code § 5.191 (relating to distance limitations); and 34 Pa. Code § 11.43 (relating to employment near explosives).

#### § 5.123. Protection against lightning.

Lightning protection shall be provided for all electric conduits and circuits entering explosives buildings by means of suitable lightning arresters installed outside, and not upon, such buildings.

#### § 5.124. Heating.

When heat is desirable, workrooms shall be heated by a system of steam, indirect hot air radiation, or hot water. The temperature of steam shall not exceed 120 C. Radiators shall be at least 1 inch from all wooden walls or other inflammable material and shall be attached in a manner which facilitates easy inspection and cleaning.

#### § 5.125. Fire-extinguishing apparatus.

Outside water mains shall be underground below the frost line. Chemical fire extinguishers are recommended under certain conditions, but not in high explosives and black powder manufacturing buildings. In workrooms where alcohol or other easily inflammable liquids in quantities over one barrel are being used, steam pipes or sprinkler systems for the extinguishing of fires shall be provided.

### SPECIAL PRECAUTIONS: NITROGLYCERIN, ITS COMPOUNDS AND MIXTURES

#### § 5.141. Nitrator house.

(a) *Floors.* The floor of a nitrator house shall be covered with sheet lead or the nitrator shall stand in a suitable lead pan draining to the drowning tank. All seams and joints shall be lead-burned in a careful manner, so that there are no crevices in which nitroglycerin may lodge. The floor shall be so constructed as to be readily washed and drained.

(b) *Thermometers.* At least one reserve thermometer shall be kept in each nitrator house for use in case of emergency.

(c) *Drowning tanks.* Each nitrator house shall be provided with a drowning tank with a water capacity at least five times the amount of the acid charge, and with an air agitator and water supply. Valves shall be located conveniently for the operators in case of emergency.

(d) *Operation.* The operation of each nitrator house shall conform with the following:

(1) When, in the judgment of the Department or its authorized representative, fumes are being given off, adequate vent pipes shall be provided to carry all such fumes from the nitrator to the outside of the building.

(2) There shall be daily inspection of the nitrator as well as a test of its coils.

(3) No iron valves are permitted on any nitroglycerin pipelines, except quick-opening nitrator plug cocks which shall be frequently lubricated. All other valves or stop cocks on nitroglycerin pipelines or containers shall be of stoneware, earthenware, hard rubber or wood, and shall be kept clean and greased at all times.

(4) No repairs shall be made during nitration, except in emergencies.

(5) Nitrators shall be provided with coils for cooling by cold water, brine or other suitable means, and also with means for mechanical and compressed air agitation.

(6) No more than two nitrators shall be installed and not more than three employees shall be regularly employed in one building.

(7) During nitration, the attention of one employe shall be devoted solely to observing the thermometer and running in the glycerin.

(8) No removal of supplies, acids or glycerin drums shall occur in the nitrator house while nitration is going on.

(9) The nitrator house shall be located not less than the proper distance from the nearest operating building containing other employes. The glycerin heating house and acid tanks are excepted.

(10) No charge of nitroglycerin shall be sent to the separator house in a hose line while nitrating operations are in progress.

(11) Catch boxes shall be provided on all outlets for wash water and shall be kept clean.

(12) Floors shall be washed daily, at the conclusion of operations.

#### **§ 5.142. Separator house.**

(a) *Floors.* The floor of a separator house shall be covered with sheet lead, with all seams and joints and burned in a careful manner, so that there are no crevices in which nitroglycerin may lodge. The floor shall be so constructed as to be readily washed and drained. The lead floor covering on new buildings shall be extended at least three inches up each side wall with rounded corners. A lead pan under the receptacle for holding nitroglycerin is acceptable in old construction in lieu of a complete lead floor covering.

(b) *Thermometers.* At least one reserve thermometer shall be kept in each separator house for use in case of emergency.

(c) *Drowning tanks.* An air agitator shall be provided for each separating tank and the outlet of each tank shall be suitably arranged so that the entire charge may be drowned in a drowning tank with a water capacity of at least five times that of the acid charge. Such tank shall be provided with an air agitator and water supply.

(d) *Operation.* The operation of each separator house shall conform with the following:

- (1) No more than two charges are allowed in a separator house at one time.
- (2) The maximum number of regular employes in each separator house shall be three.
- (3) Stopcocks or valves on nitroglycerin pipelines or containers shall be of stoneware, earthenware, hard rubber or wood.
- (4) Catch boxes shall be provided on all outlets for wash water and shall be kept clean.
- (5) No charge shall be sent from the separator house at a time when a charge is being received.
- (6) Each separating tank shall be cleaned and the floors washed at the conclusion of work each day.
- (7) It is permitted to carry on nitration, separation and neutralization in one building, if not more than four persons are employed, and the regulations prescribed for each individual operation are complied with.

### § 5.143. Neutralizing storage and freezing houses.

(a) *Floors.* The floors of a neutralizing storage and freezing house shall be covered with sheet lead, with all seams and joints lead-burned in a careful manner so that there are no crevices in which nitroglycerin may lodge. It shall also be so constructed as to be readily washed and drained. The lead floor covering on new buildings shall be extended at least three inches up each sidewall with rounded corners. A lead pan under the receptacle for holding nitroglycerin is acceptable in old construction in lieu of a complete lead floor covering.

(b) *Operation.* The operation of each neutralizing storage and freezing house shall conform with the following:

- (1) The maximum number of regular employes in each house shall be three.
- (2) Catch boxes shall be provided on the outlets for wash water.
- (3) No charge of nitroglycerin shall be sent out of a house into a pipeline or gutter during the period in which a charge is being received.
- (4) Floors shall be washed at the conclusion of work each day.

**§ 5.144. Hand mixing house.**

(a) *Floors.* The floor of a hand mixing house shall be covered with linoleum, rubberoid or other suitable covering, laid either by lapping joints or by cementing their edges.

(b) *Operation.* The operation of every hand mixing house shall conform with the following:

- (1) The maximum number of employes allowed in a mixing house is three, except when supplies are being received or finished material is being removed, when the number may be increased to five.
- (2) Proper precautions shall be taken to prevent the freezing of nitroglycerin.
- (3) The amount of nitroglycerin stored in a mixing house may not exceed that necessary for the next two mixes.
- (4) The mixing bowl shall be made of wood (wood-lead lined) or some other suitable material.
- (5) Shovels and rakes shall be made of wood.
- (6) No iron or steel tools of any kind are allowed in or about a mixing house or at platforms or entrances, except in case of repairs when operations cease and explosives are removed. No iron drums shall be rolled or dragged over the floor or platform.
- (7) The maximum amount of nitroglycerin in a mixing house at one time shall be 2,000 pounds.
- (8) No mixed powder shall regularly remain in a mixing house overnight.

**Cross References**

This section cited in 34 Pa. Code § 5.145 (relating to machine mixing house).

**§ 5.145. Machine mixing house.**

The operation of each machine mixing house shall conform to the regulations for a hand mixing house, as set forth in § 5.144 (relating to hand mixing house), with the following exceptions:

- (1) The maximum number of regular employes at one time shall be four, except at a time when supplies are being received or finished material is being taken away, at which time the number may be increased to six.
- (2) The maximum amount of explosive material allowed at one time in a building shall be in accordance with the Intraplant Quantity and Distance Table set forth in § 5.62 (relating to location) and recognized safe practices.

**§ 5.146. Handpacking or punching house.**

The operation of each handpacking or punching house shall conform with the following:

- (1) The maximum number of regular employes in each handpacking or punching house shall be seven.

(2) The floors of such houses shall be covered with linoleum, rubberoid or other suitable covering, laid either by lapping joints or by cementing their edges.

(3) No explosive material shall be stored during operations, except what is necessary for operations each day.

(4) A thorough cleaning shall be given at the conclusion of the work each day, and all refuse material shall be destroyed.

(5) Proper precautions shall be taken to prevent the freezing of explosives, and no explosives shall be packed in a frozen condition.

**§ 5.147. Box packing house.**

The maximum number of regular employees in any box packing house shall be ten.

**§ 5.148. Water outlet or shower bath.**

A water outlet or shower bath shall be provided inside of all houses where an employe may be burned with acid at any time.

**§ 5.149. Transportation.**

(a) *Hose lines.* The transmission of nitroglycerin through hose lines shall conform with the following:

(1) In cold weather, hot water shall be sent down through a hose line or in a gutter surrounding the hose line both before and after a charge of nitroglycerin is sent down the line.

(2) Nitroglycerin lines shall be carried on substantial scaffolding or runways protected by suitable covering.

(3) A thorough examination of the complete system shall be made each day.

(4) No nitroglycerin lines shall pass an explosives building at a distance near enough to cause serious injury if an explosion occurs in the hose line.

(5) Hose lines shall be composed of rubber of the highest quality.

(b) *Gutters.* When lead gutters are used instead of hose lines, they shall be formed of at least 6 pound lead, suitably lead-burned and located so that they will drain completely toward one end. Rubber gutters are permissible if they are of the highest quality rubber only.

(c) *Carriages.* Carriages for the transportation of nitroglycerin shall be properly designed and equipped with rubber tires. Smooth runways for such carriages shall be provided and kept in good repair at all times.

**§ 5.150. Paraffin dipping.**

Dipping of cartridges shall be done in a jacketed kettle, the heat being supplied by hot water or steam, with a maximum pressure of 20 pounds. A paraffin circulating system is also permissible.



**§ 5.151. Gelatin mixing and packing.**

(a) Gelatin mixing shall be done in a building provided for that purpose. The gelatin packer machine shall be located in a separate building.

(b) The maximum number of regular employes in a packing house shall be five; the maximum number in a mixing house shall be four. When the output is such that it requires an additional number of hand wrappers, they shall be housed in a separate building.

**SPECIAL PRECAUTIONS: BLACK POWDER MILLS****§ 5.161. Materials used.**

Materials used in the manufacture of black powder shall, prior to mixing or incorporating, be subjected to a magnetic separator or put through a screen.

**§ 5.162. Incorporating mills.**

(a) The mechanism for starting or stopping an incorporating mill shall be so arranged that after the material has been placed in the bowl the mill may be started only from a reasonably safe station, and then only after all employes have left the building.

(b) No loading or unloading of ingredients or finished mixed material shall occur while a mill is in operation.

(c) Bolts or parts of machinery which might break off and fall into the mill while it is operating shall be suitably protected so that, in the event of such breakage, these parts will not fall into the mixing bowl.

**§ 5.163. Cleaning.**

(a) Buildings shall be hosed down as necessity demands. At least 1 day each week, at a time designated by the superintendent, there shall be a thorough cleaning of each building with the removal of all accumulated dust from walls and ceilings.

(b) Buildings in which loose powder is handled shall be provided with suitable hose and water connections.

**§ 5.164. Examination of machinery.**

(a) When going on duty, workmen shall first examine each mill or building in their charge, oil up, and, if anything is out of order, report it to the superintendent or foreman at once. Under no circumstances shall a mill be started unless in proper condition.

(b) When any foreign substance is thought to be in the powder, work and machinery shall be stopped at once, and a report made to the superintendent or foreman to that effect.

(c) At the conclusion of each daily run, machinery and belts shall be examined. If not found to be in first class condition, a report shall be made to the superintendent or foreman.

**§ 5.165. Repairs.**

(a) When major repairs are necessary in any building, work shall cease shall be guarded with standard railings, as provided in Chapter 47, Subchapter G (relating to railings, toeboards, open-sided floors, platforms and runways) of by the removal of all loose powder and dust and thoroughly wetting down all parts of such machine and room. Repairs shall be made only by persons designated by the management. Caked powder may be removed by soaking with water and then loosening by means of a wooden shovel or wooden spud.

(b) The number of employes present shall be kept to a minimum by the millwright or mechanic, depending upon services needed.

(c) When repairs are complete, all tools taken to the mill shall be accounted for and removed before starting the mill.

**§ 5.166. Electric apparatus and lighting.**

(a) The lighting of all buildings shall conform to § 5.93 (relating to lighting).

(b) No electric devices which may give off sparks are permitted in rooms where powder dust may be present at any time.

**§ 5.167. Metal implements.**

No metal implements of any kind, except those made of nonsparking metal, shall be used in handling powder.

**SPECIAL PRECAUTIONS: GUNCOTTON, NITROSTARCH,  
SMOKELESS POWDER AND SIMILAR PRODUCTS**

**§ 5.181. General.**

(a) *Railings and toeboards.* Platforms, openings, and stairways shall be guarded with standard railings, as provided in Chapter 47, Subchapter G (relating to railings, toeboards, opensided floors, platforms, and runways), except where there is danger of explosive or inflammable dust collecting, in which case toeboards shall not be used. Metal shall not be used for railing and toeboards where its presence increases the danger of an explosion. No railings or toeboards shall be installed so as to interfere with safety exits.

(b) *Walks or runways.* Walks or runways shall not be built over the tops of tanks or vats but may be located at the sides of such containers if at least 3 feet, 6 inches below the top. When such conditions cannot be obtained, standard railings shall be installed, and toeboards where necessary.

(c) *Escape from buildings.* Explosives buildings two or more stories in height shall have at least one outside means of escape which shall be of the chute type or a sloping lateral runway. In no case will steps or ladders be considered a sufficient substitute.

(d) *Removal of acid fumes.* Provision shall be made for the removal of acid fumes at all stages of the nitrating process.

(e) *Protection of employes.* Employes shall be instructed to wear suitable protective clothing, such as rubber gloves, rubber aprons and rubber shoes or boots. Suitable respirators and goggles shall be provided by the employer.

(f) *Separation of wringers.* Each centrifugal wringing out waste acid shall be separated from other wringers by partitions or located at a safe distance from other centrifugals. The compartments created shall be so arranged that employes can quickly escape in case the cotton should ignite.

(g) *Water facilities.* Adequate water facilities shall be provided for firefighting apparatus, washing purposes and shower baths. The latter are necessary particularly in the event of acid burns.

#### § 5.182. Rooms containing ether vapor.

(a) *Floors.* Floors shall be of such construction that they may be easily kept clean.

(b) *Doors.* The number of doors shall be sufficient to insure a quick exit of all employes, if necessary.

(c) *Electric apparatus.* No electric apparatus capable of giving off a spark is permitted in any room containing ether vapor.

(d) *Operation.* Rooms which may at any time contain ether vapor shall conform to the requirements set forth in §§ 5.91—5.93 (relating to construction of buildings; number of employes; lighting).

#### § 5.183. Dry houses, dry dump houses and blending houses.

(a) *Powder bins.* Powder bins shall be suitably grounded to insure safety from static electricity. A monthly inspection and report shall be made of the condition of such apparatus by a competent person designated by the superintendent.

(b) *Number of employes allowed.* The number of employes allowed shall be as follows:

(1) No more than six employes shall be allowed inside of or around a dry house or dry dump house while a filling or emptying process is being carried on.

(2) No more than 12 employes shall be allowed inside of a cordite blending house.

(3) No more than ten employes shall be allowed inside of a gravity type of blending house (a house in which the entire charge of powder is deposited in a bin or funnel situated one or more floors above the packing floor).

(4) No more than eight employes shall be allowed inside of a bin type of blending house (a house in which all operations are carried on on one floor).

(5) Where more than eight men are necessary to carry on operations in a gravity or bin-type of blending house, a number not exceeding 12 men will be permitted, if a fire-resistive wall of a type approved by the Department or its authorized representative is erected. Such wall shall separate employes engaged in weighing, packing, and inspecting from the bins containing powder. A covered fire-resistive means of escape extending at least 75 feet from the building shall be erected. The plan and type of this means of escape shall also be approved by the Department or its authorized representative.

(6) Restrictions as to the number of employes are intended to include laborers and foremen, but not inspectors, superintendents or other members of the staff of the plant manager whose duties only occasionally require their presence to see that work is progressing properly.

#### SPECIAL PRECAUTIONS: AMMONIUM NITRATES

##### § 5.191. Distance limitations.

(a) Where both finished explosives and raw ammonium nitrate are handled or stored within the distance limitations for intermagazine storage, as prescribed in § 5.122(c) (relating to tables of quantity and distance), the weight of raw ammonium nitrate shall be included in the calculation of the weight of total explosives for determining the proper spacing from highways, public buildings, and railroads, in accordance with § 5.122(a).

(b) Plants used for mixing ammonium nitrate with fuel shall be located in accordance with the provisions of § 5.122. The mixing plant shall be separated from raw nitrate storage areas by at least the distance provided in § 5.122(c); and from the finished storage areas by at least the distance provided in § 5.62 (relating to location). Any raw ammonium nitrate stored closer to finished explosives than the distance provided by § 5.122(c) shall be considered as explosive in calculating the quantity of explosives involved.

(c) Stored ammonium nitrate shall be isolated from readily combustible fuels.

(d) The mixing plant shall provide physically separated areas for the storage of raw material and the finished product, as well as for mixing and packaging operations.

##### § 5.192. Operation.

(a) *Floors.* Floors in storage areas and in the processing plant shall be composed of concrete.

(b) *Storage areas.* Storage areas for processed or unprocessed ammonium nitrate shall be separated from fuel storage areas.

(c) *Draft vents.* A natural draft vent shall be provided.

(d) *Heating.* Heat shall be provided exclusively from a source located outside the building.

(e) *Washdown hose and drain.* A washdown hose and drain shall be provided.

(f) *Mixer design.* Mixer design shall avoid possibilities of frictional heating, compaction, and particularly, confinement. Only open mixers shall be used. Bearings and gears shall be protected against the accumulation of ammonium nitrate dust. All surfaces shall be easily accessible for cleaning.

(g) *Mixing and packaging equipment.* Mixing and packaging equipment shall be constructed of nonsparking materials compatible with the ammonium nitrate composition. Copper and its alloys are not preferred because of corrosion problems.

(h) *Personnel limits.* Personnel limits shall be established, posted, and enforced while operations involving explosives are underway in the mixing plant.

(i) *Daily washdowns.* There shall be daily washdowns of the floors and equipment of mixing and packaging rooms to prevent any accumulation of ammonium nitrate or fuel oil or other sensitizers.

(j) *Sensitizing of ammonium nitrate materials.* The sensitizing of ammonium nitrate in an established mine or quarry and at the site of an explosive blast for immediate use is permitted, subject to all the requirements of this section and such sensitizing shall:

- (1) Be done under the direct supervision of a licensed blaster.
- (2) In a location reasonably safe in light of the quantities involved.
- (3) Using equipment, materials, and methods approved by an authorized representative of the Department as adequate to provide for proper and safe admixture without frictional heating, compaction, or confinement.
- (4) In quantities and at locations appropriate to minimize the requirements for storage, handling, and transportation of sensitized ammonium nitrate materials.
- (5) Smoking and any open flame are prohibited where sensitizing is being conducted.

(k) *Use of liquid hydrocarbon fuels.* The use of liquid hydrocarbon fuels of a volatility no higher than No. 2 diesel fuel (minimum flashpoint of 145° F ASTM closed cup procedure) is prohibited.

(l) *Use of metal dust.* The use of metal dust, such as aluminum powder or chlorates and perchlorates, or explosive oil, such as nitroglycerine, will be permitted only where the strict standards of normal explosive plant operations are met.

(m) *Unusual compositions.* No unusual compositions shall be attempted, except under the supervision of competent personnel equipped to determine the sensitivity of the resulting compositions.

(n) *Distance.* A maximum production of one day or the limit determined by the Intraplant Quantity and Distance Table in § 5.62 (relating to location), whichever is less, is permitted within the immediate vicinity of the mixing or packaging plant.

**§ 5.193. Blasting prohibited.**

Under no circumstances shall caked ammonium nitrate in bags or in bulk be loosened by blasting with explosives. Otherwise permissible explosives shall not be regarded as safe for this purpose.

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