

527 CMR: BOARD OF FIRE PREVENTION REGULATIONS

527 CMR 13.00: EXPLOSIVES

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13.01: Scope and Application

- (1) Effective as of March 1, 1996, 527 CMR 13.00 shall apply to the manufacture, mixing, transportation, storage, sale, and use of explosives and explosive material.
- (2) 527 CMR 13.00 shall not apply to:
 - (a) the interstate transportation of explosive materials when the transportation of such explosive materials is under the jurisdiction of the U.S. Department of Transportation (DOT). It shall, however, apply to intrastate transportation of explosive materials not subject to the jurisdiction of the U.S. Department of Transportation (DOT) and state and municipal supervision of compliance with the Hazardous Materials Regulations of DOT (Title 49, Code of Federal Regulations, Parts 100-199).
 - (b) the transportation and use of military explosive materials by federal or state military agencies, or the Coast Guard of the United States, nor shall it apply to the transportation and use of explosive materials by federal, state, or municipal agencies provided they are within their official capacity and while engaged in normal or emergency performance of duties.
 - (c) the manufacture of explosive materials under the jurisdiction of the U.S. Department of Defense. 527 CMR 13.00 shall also not apply to the distribution of explosive materials to or storage of explosive materials by military agencies of the United States or the Commonwealth of Massachusetts, nor shall it apply to arsenals, navy yards, or depots owned by or operated by or on behalf of the United States or the Commonwealth of Massachusetts.
 - (d) pyrotechnics such as flares, fuses, railway torpedoes.
 - (e) the use of explosive materials in medicines and medicine agents in the forms prescribed by the United States Pharmacopoeia or National Formulary.
 - (f) Fireworks regulated by 527 CMR 2.00.
 - (g) Model rockets regulated by 527 CMR 16.00.
- (3) Equivalency. The State Fire Marshal may authorize alternate provisions to those in 527 CMR 13.00 to meet unusual conditions, if such alternate provisions provide equivalent degrees of safety and security.
- (4) 527 CMR 13.00 is intended to provide reasonable safety in the manufacture, mixing, keeping, storage, transportation, sale, and use of explosive materials.
- (5) The hazards of explosives require all enforcing authorities to strictly adhere to the provisions of 527 CMR 13.00.

13.02: Appeals and Penalties

- (1) Massachusetts General Laws (M.G.L.) c. 148, §§ 15, 16, 31 and 35:
 - (a) § 15. Whoever knowingly violates or knowingly causes or permits the violation of any regulation adopted and prescribed for the transportation of gunpowder and other explosives or explosive or inflammable fluids or compounds shall be punished by a fine of not more than \$1,000 or by imprisonment for not more than one year, or both.

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(b) § 16. Whoever keeps, stores, uses, manufactures, sells, handles or otherwise disposes of any of the articles mentioned in M.G.L. c. 148, § 9, in violation of M.G.L. c. 148, § 12 or 13 or of any regulation, ordinance or by-law made under M.G.L. c. 148, § 9, or whoever violates any regulation made under M.G.L. c. 148, § 13, or whoever, not being exempt from the provisions of M.G.L. c. 148, § 13 relating to the filing of a certificate of registration, fails to file said certificate and to pay such fee as may be established under M.G.L. c. 148, § 13, shall, except as provided in M.G.L. c. 148, § 15 and 35 and in M.G.L. c. 266, § 102A, be punished by a fine of not more than \$100 or by imprisonment for not more than one month, or both.

(c) § 31. Any person aggrieved by any act, rule, order or decision of the head of a fire department, or other person or persons acting or purporting to act under authority derived from M.G.L. c. 148, except § 5, or any rule or regulation thereunder, may appeal to the Marshal, who shall make all necessary and proper orders thereon, but only in so far as the appeal presents a direct question of fire or explosion hazard. Such appeal shall be filed with the Marshal not later than ten days following the act, rule, order or decision appealed from.

(d) § 35. No person shall have in his possession or under his control any bomb or other high explosive, as defined by the rules and regulations made under M.G.L. c. 148, § 9, contrary to the provisions of M.G.L. c. 148, § 9 or of any rule or regulation made thereunder. Whoever violates M.G.L. c. 148, § 9 shall be punished by a fine of not more than \$1,000, or by imprisonment for not more than 2½ years, or both, and any bomb or explosive found in his possession or under his control on such violation shall be forfeited to the Commonwealth. Any officer qualified to serve criminal process may arrest without a warrant any person violating M.G.L. c. 148, § 9.

13.03: Definitions

For the purpose of 527 CMR 13.00, the following terms shall have the meanings respectively assigned to them:

Acceptor, a charge of explosives or blasting agent receiving an impulse from an exploding donor charge.

Air blast, the airborne shock wave or acoustic transient generated by an explosion measured in units of pressure or decibels.

Ammunition, small-arms, any cartridge or shell for use in a pistol, rifle or shotgun, and shall include ball, shot or blank cartridges or shells.

Approved, approved by the State Fire Marshal.

Authority having jurisdiction, the Marshal or his designee.

Barricaded, the effective screening of a magazine containing explosive materials from another magazine, a building, a railway, or a highway, either by a natural barricade or by an artificial barricade. To be properly barricaded, a straight line from the top of any sidewall of the magazine containing explosive materials to the eave line of any other magazine or building, or to a point 12 feet above the center of a railway or highway, will pass through the natural or artificial barricade.

Artificial barricade, an artificial mound or revetted wall of earth of a minimum thickness of three feet, or any other approved barricade that offers equivalent protection.

Natural barricade, natural features of the ground, such as hills, or timber of sufficient density that the surrounding exposures which require protection cannot be seen from the magazine when the trees are bare of leaves.

Barrier, a material object or objects that separates, keeps apart, or demarcates in a conspicuous manner such as cones, a warning sign or tape.

Batch, the quantity of material produced as a single mixture at manufacture.

Bench, a horizontal ledge from which holes are drilled vertically down into the material to be blasted; benching is a process of excavating where a highwall is worked in steps or lifts.

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Binary explosive, see Phosphoric materials.

Black powder, a deflagrating or low explosive compound of an intimate mixture of sulfur, charcoal, and alkali nitrate, usually potassium or sodium nitrate.

Blast area, the area including the blast site and the immediate adjacent area that is owned, leased, or controlled by the blast operation.

Blaster, a person who holds a valid Certificate of Competency issued by the State Fire Marshal and qualified to be in charge of and responsible for the design, loading and firing of a blast. A blaster is recognized in his field as an explosives craftsman.

Blasting license, see Certificate of Competency.

Blasting agent, any material or mixture, consisting of fuel and oxidizer, that is intended for blasting and not otherwise defined as an explosive if the finished product as mixed for use or shipment cannot be detonated by means of a number 8 blasting cap when unconfined.

Note: A No. 8 blasting cap is one containing 2 grams of a mixture of 80% mercury fulminate and 20% potassium chlorate, or a blasting cap of equivalent strength.

Blasting cap, thin metal shells containing dry fulminate of mercury or other similar substance either alone or in combination with fulminate of mercury and fired by a slow-burning safety fuse, or arranged to be fired by an electric current.

Blasting log, a written record of information about a specific blast that is maintained by the blaster.

Blasting mat, a mat of woven steel wire, rope, scrap tires, or other suitable material, earth fill or construction to cover blast holes, for the purpose of preventing flyrock.

Blasting operation, any person engaged in the conduct of blasting under the terms of a contract or otherwise.

Blast site, the area in which explosive materials are being or have been loaded and which includes all holes loaded or to be loaded for the same blast and for a distance of 50 feet in all directions.

Blending, see mixing.

Board, the Board of Fire Prevention Regulations established under M.G.L. c. 22, § 14.

Boosters, an explosive charge, usually of high detonation velocity and detonation pressure, designed to be used in the explosive initiation sequence between an initiator and primer and the main charge.

Boot leg, the part of a drilled blast hole that remains when the force of the explosion does not break the rock completely to the bottom of the hole.

Borehole, a hole drilled in the material to be blasted, for the purpose of containing an explosive charge, also called blasthole or drill hole.

Building, Inhabited, means a building regularly occupied in whole or in part as a habitation for human beings, or any church, schoolhouse, railway station, store, or other structure where people are accustomed to assemble, except any building or structure occupied in connection with the manufacture, transportation, storage or use of explosives.

Bulk mix, a mass of explosive material prepared for use in bulk form without packaging.

Bulk mix delivery equipment, equipment (usually a motor vehicle with or without a mechanical delivery device) that transports explosive materials in bulk form for mixing or loading directly into bore holes, or both.

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Bullet-resistant Construction, with reference to magazine walls or doors, constructed so as to resist penetration of a bullet of 150 grain M2 ball ammunition having a nominal muzzle velocity of 2,700 fps when fired from a 0.30 caliber rifle from a distance of 100 feet perpendicular to the wall or door.

Bullet-sensitive Explosive Material, explosive material that can be detonated by 150 grain M2 ball ammunition having a nominal muzzle velocity of 2,700 fps when fired from a 0.30 caliber rifle at a distance of 100 feet, measured perpendicular. The test material is at a temperature of 70° to 75°F and is placed against a ½ inch steel plate.

Burden, the distance from the borehole and the nearest free face or the distance between boreholes measured perpendicular to the spacing.

Certificate of Competency [Blaster's License], is a license granted by the Marshal to a blaster which allows this person to be in charge of and responsible for the loading and firing of a blast.

CFR, Code of Federal Regulations.

Charge Activated Device, a device that utilizes an explosive charge to promote the breaking of rock or concrete by hydraulic or gas means.

Detonating Cord, a flexible cord containing a center core of high explosive which can be used to initiate other explosives.

Detonator, any device containing an initiating or primary explosive that is used for initiating detonation. A detonator may not contain more than 10 g of total explosive material per unit, excluding ignition or delay charges. The term includes, but is not limited to, electric detonators of instantaneous and delay types, detonators for use with safety fuses, detonating cord delay connectors, and non electric detonating cord, shock tube, or any other replacement for electric leg wires.

Donor, an exploding charge producing an impulse that impinges upon an explosive acceptor charge.

DOT, means the United States Department of Transportation.

Electric Squibs, small tubes or blocks containing a small quantity of ignition compound in contact with a wire bridge.

Emulsion, an explosive material containing substantial amounts of oxidizer [ammonium nitrates] dissolved in water droplets, surrounded by an immiscible fuel [oil-like material], or droplets of an immiscible fuel surrounded by water containing amounts of oxidizer.

Explosive, any chemical compound, mixture or device, the primary or common purpose of which is to function by explosion; *i.e.*, with substantially instantaneous release of gas and heat. In 527 CMR 13.00, explosives shall be a Class 1 Explosive Materials. Class 1 Explosives Materials shall be divided into six divisions, the divisions being characteristic of the properties and hazards of the particular explosive materials. The Divisions of Class 1 Explosives Materials shall be:

Division 1.1: explosives that have a mass explosion hazard. A high explosive. (Formerly class A explosives)

Division 1.2: explosives that have a projection hazard but not a mass explosion hazard. A high explosive. (Formerly class A or class B explosives)

Division 1.3: explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard, or both, but not a mass explosion hazard. A low explosive. (Formerly class B explosives)

Division 1.4: explosives that present a minor explosion hazard. An external fire must not cause virtual instantaneous explosion of almost the entire contents of the package. No device may contain more than 25 g (0.9 oz) of a detonating material. A low explosive. (Formerly a class C explosive)

Division 1.5: very insensitive explosive materials that have a mass explosion hazard but are so insensitive that there is little or no probability of initiation or of transition from burning to detonation under normal conditions of transport. (Formerly a blasting agent)

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Division 1.6: extremely insensitive articles that do not have a mass explosion hazard, and articles that demonstrate a negligible probability of accidental initiation or propagation. (No applicable hazard class)

Explosive bombs or Bomb, any explosive material or other chemical compound or mixture kept, used or possessed as a destructive device for the purpose of causing injury or damage to persons or property or both on ignition or detonation.

Explosive material, any explosive, blasting agent or detonator. The term includes, but is not limited to, dynamite and other explosives; slurries, emulsions and water gels; black powder; pellet powder; initiating explosives; detonators (blasting caps); safety fuse; squibs; detonating cord; smokeless propellants; small arms ammunition; small arms percussion caps; smokeless primers; igniter cord; and igniters.

Note: The term also includes any material determined to be contained in the list of explosive materials provided for in 27 CFR 55.23.

Explosives Users Certificate [Own and Possess Certificate], a certificate granted by the State Fire Marshal to a firm or company, indicating the rebuttable presumption of statutory and regulatory compliance with responsible levels of liability insurance and bonds required by M.G.L. c. 148, §§ 19, 20 and 20A, explosive storage magazines, and a general knowledge of the requirements of explosive regulations.

Fire resistant construction, construction designed to offer reasonable protection against fire. For exterior walls of magazines constructed of wood, this may mean fire resistance equivalency provided by sheet metal of not less than 26 gauge.

Flyrock, rock(s) propelled by the force of an explosive blast which travel beyond the blast area.

Free face, a rock surface exposed to air or water which provides room for expansion upon fragmentation; sometimes called open face.

Fuel, any substance that will react with the oxygen in the air or with the oxygen yielded by an oxidizer to produce combustion.

Fuse, Primer, a length of safety fuse to one end of which is crimped a blasting cap.

Fuse, Safety, a flexible cord containing an internal burning medium by which fire is conveyed at a continuous and uniform rate for the purpose of firing blasting caps or explosive charge.

Fuse, Tracer, devices attached to projectiles and containing a slow-burning composition.

Harbor Masters, as provided for by M.G.L. c. 102, § 19.

Head of the local fire department, the chief executive officer of the fire department in a city, town or fire district having such an officer, otherwise the fire commissioner, board of fire commissioners or fire engineers, or local commissioner of public safety; and in towns not having a fire department, the chief engineer, if any, otherwise the chairman of the board of selectmen or their designees.

Highway, any public street, public alley, or public road.

Igniters, Delay Electric, small metal tubes containing a wire bridge in contact with a small quantity of ignition compound.

IME, the Institute of Makers of Explosives.

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Inhabited building, means a building regularly occupied in whole or part as habitation for human beings, or any church, schoolhouse, railroad station, store, or other structure where people are accustomed to assemble, except any building or structure occupied in connection with the manufacture, transportation, storage or use of explosive materials.

Initiator, a detonator, detonating cord or similar device used to start detonation or deflagration in an explosive material.

Intrastate, commerce within the state, as opposed to commerce between the states (*i.e.* interstate).

Listed, equipment or materials included in a list published by an organization acceptable to the Marshal and concerned with product evaluation, that maintains periodic inspection of production of listed equipment or materials and whose listing states either that the equipment or material meets appropriate standards or has been tested and found suitable for use in a specified manner.

Note: The means for identifying listed equipment may vary for each organization concerned with product evaluation, some of which do not recognize equipment as listed unless it is also labeled. The "authority having jurisdiction" should utilize the system employed by the listing organization to identify a listed product.

Magazine, means any building or structure, other than an "explosive manufacturing building," used for the storage of explosives as described in 527 CMR 13.05.

Manufacturer of explosives, any person licensed in accordance with 27 CFR Part 55, and engaged in the business of manufacturing explosives for the purpose of sale or distribution.

Manufacturing building, means any building or other structure (except magazines) in which the manufacture of explosive materials or any processing involving the manufacture of explosive material is carried on, and any building where explosive materials are used as a component part or ingredient in the manufacture of any explosive article or device.

Marshal, the State Fire Marshal or his designee.

Misfire, a charge of explosive material that fails to detonate completely after initiation.

Mixing, bulk mixed material blended by a person trained by the explosive material manufacturer to handle and mix material used to enhance blasting operations. This mixed material shall not be classified as an explosive and shall include non cap sensitive blasting Agents, slurry, emulsion or water gel, mixtures.

Own and Possess Certificate, see Explosives Users Certificate.

Oxidizing material, a substance such as nitrate that readily yields oxygen or other oxidizing substances to stimulate the combustion of organic matter or other fuel.

Person, means any natural person, partnership, firm, association, or corporation.

Permit to blast, see Use and Handling permit.

Phosphoric materials [Binary explosives], two of more unmixed, commercial manufactured, prepackaged chemical ingredients including oxidizers, flammable liquids or solids, or similar substances that are not independently classified as explosives but which when mixed or combined form a mixture that is classified as an explosive and that is intended for blasting. It may be classified by the Hazardous Materials Regulations of the U.S. Department of Transportation as an explosive depending on its susceptibility to detonation.

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Primer, a unit, package or cartridge of explosives used to initiate other explosives or blasting agents, and which contains:

- (a) a detonator; or
- (b) detonating cord to which is attached a detonator designed to initiate the detonating cord.

Propellant, see Smokeless propellant.

Quarry, any property which may primarily be used as a source of mined products from the earth when the removal of such products requires the use of explosives to facilitate such removal.

Temporary quarry [Borrow pit], any quarry associated with a road building or other construction project.

Railway, means any public steam, electric, or other public railroad or public railway which carries passengers for hire.

Scaled distance, a factor relating similar blast effects from various weight charges of explosive material at various distances. Scaled distance referring to blasting effects is obtained by dividing the distance of concern by a fractional power of the weight of the explosive materials.

Sensitivity, a characteristic of an explosive material classifying its ability to detonate upon receiving an external impulse such as impact shock, flame, or other influence that can cause explosive decomposition.

Cap-sensitive explosive material, any explosive material that can be detonated by means of a No. 8 blasting cap or its equivalent. Cap-sensitive material SHALL be classified as an explosive.

Non cap-sensitive explosive material, any explosive material that can NOT be detonated by means of a No. 8 blasting cap or its equivalent. Non cap-sensitive material SHALL NOT be classified as an explosive.

Shock tube, a small diameter plastic tube used for initiating detonators. it contains only a limited amount of reactive material so that the energy that is transmitted through the tube by means of a detonation wave is guided through and confined within the walls of the tube.

Slurry, see Water Gel.

Small arms ammunition, any shotgun, rifle, or pistol cartridge and any cartridge or propellant-actuated devices. This definition does not include military ammunition containing bursting charges or incendiary, tracer, spotting, or pyrotechnic projectiles.

Small arms ammunition primers, small percussion sensitive explosive charges, encased in a cap, used to ignite propellant powder.

Smokeless propellants, solid propellants, commonly referred to as smokeless powders, used in small arms ammunition, cannons, rockets, propellant-actuated devices, *etc.*

Spacing, the distance between boreholes in bench blasting. The distance is measured parallel to the free face and perpendicular to the burden.

Stemming, a suitable inert non combustible material or device used to confine or separate explosives in a drill hole.

Structure, a combination of materials assembled at a fixed location to give support or shelter, such as a building.

Theft resistant, construction designed to deter illegal entry into facilities used for the storage of explosive material.

13.03: continued

Use and Handling permit [Permit to Blast], a permit granted by the head of the local fire department to a person requesting to detonate explosives. This permit establishes the terms and conditions of fire and explosion safety specific to the blast area.

Velocity, the measurement of speed

Velocity, particle, the velocity at which the earth vibrates, measured in inches per second.

Velocity, peak particle, the highest recorded particle velocity.

Velocity, seismic, the velocity at which a vibration or seismic wave travels outward from the source. It is measured in thousands of feet per second.

Vibration, blasting, the energy from a blast that manifests itself in vibrations which are transmitted through the earth away from the immediate blast area .

Vibration, ground, shaking the ground, by elastic waves emanating from a blast; usually measured in inches per second of particle velocity.

Vibration, frequency, the number of cycles of vibration per unit of time. The units of frequency are in cycles per second or Hertz (Hz).

Water gel or slurry, a wide variety of materials used for blasting manufactured with varying degrees of sensitivity to initiation and may be classified as explosives or non explosive blasting agents. Water gels may be premixed at an explosive manufacturing building or mixed at the site immediately before delivery into the borehole.

Weather resistant construction, construction designed to offer reasonable protection against weather.

Note: Words used in the singular number shall include the plural, and the plural the singular.

13.04: Licenses, Registrations, Permits and Certificates

(1) Exemption: License, Registration, or Permit: In accordance with the provisions of M.G.L. c. 148 § 13, the Board hereby prescribes the following quantities of explosive materials that shall be exempt from License, Registration, and Permit and may be kept, or stored in a building or other structure:

(a) Small Arms Ammunition

1. Not more than 10,000 rounds of rim fire ammunition.
2. Not more than 10,000 rounds of center fire ammunition.
3. Not more than 5,000 rounds of shotgun ammunition.

(b) Small Arms Ammunition Primers

1. Not more than 1,000 caps or other small arms primers.

(c) Smokeless Propellants

1. Not more than 16 pounds.
2. Persons under 18 years of age may not keep or store Smokeless Propellants.
3. Not more than two pounds of such propellant shall be stored in a multiple family dwelling or a building of public access.

(d) Black Powder

1. Not more than two pounds.
2. Persons under 18 years of age may not keep or store black powder.

(e) Exempt quantities of small arms ammunition, primers, smokeless propellants and black powder shall be stored in original containers and such containers shall be stored in a locked cabinet, closet or box when not in use.

(f) Special industrial explosive devices when in quantities of less than 50 pounds net weight of explosives.

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(2) Storage By Permit: In accordance with the provisions of M.G.L. c. 148 § 13, the Board hereby prescribes the following quantities of explosive materials that shall be exempt from License, and Registration, and may be kept, or stored in a building or other structure provided a permit has been obtained from the head of the local fire department;

- (a) Small Arms Ammunition: Private Use. Small arms ammunition in amounts over that specified in 527 CMR 13.04(1), that do not exceed 100,000 total rounds at any one time, may be kept for private use provided none of the individual limitations listed below are exceeded.
 - 1. 10,001 to 30,000 rounds of rim fire ammunition.
 - 2. 10,001 to 50,000 rounds of center fire ammunition not to include shotgun ammunition.
 - 3. 10,001 to 50,000 rounds of shotgun ammunition not to include center fire ammunition.
- (b) Small Arms Ammunition: Commercial Use. Not to exceed 200,000 rounds in any combination.
- (c) Small Arms Ammunition Primers: Private Use
Not to exceed 10,000 Small Arms Ammunition Primers.
- (d) Small Arms Ammunition Primers: Commercial Use
Not to exceed 100,000 Small Arms Ammunition Primers.
- (e) Smokeless Propellants: Private Use
 - 1. Not to exceed 48 pounds Smokeless Propellants.
 - 2. Persons under 18 years of age may not keep or store Smokeless Propellants.
 - 3. The head of the local fire department may limit the quantity of smokeless propellants stored by permit to as low as two pounds if such propellant shall be stored in a multiple family dwelling or a building of public access.
- (f) Smokeless Propellants: Commercial Use
Not to exceed 100 pounds smokeless propellant.
- (g) Black Powder: Private Use
 - 1. Not to exceed five pounds of black powder.
 - 2. Persons under 18 years of age may not keep or store black powder.
 - 3. The head of the local fire department may limit the quantity of black powder stored by permit to as low as two pounds if such black powder shall be stored in a multiple family dwelling or a building of public access.
- (h) Black Powder: Commercial Use
Not to exceed 50 pounds of black powder.

(3) Local and State Requirements for Buildings or Structures Used To Keep, Store or Manufacture Explosive Materials:

- (a) In accordance with the provisions of M.G.L. c. 148, §13, all quantities of explosive materials not exempted or allowed by permit shall require a license, granted by the local licensing authority, and a registration, to be kept, or stored in a building or other structure.
- (b) In addition to the local requirements required by 527 CMR 13.04(3)(a), as of January 1, 2003, no magazine, building or structure shall be used for the manufacturing or storage of explosive materials without a permit issued by the Marshal in accordance with the provisions of M.G.L. c. 148, § 12. For the purposes of 527 CMR 13.04(3)(b) the term "explosive materials" shall be defined as "Explosive" as defined in 527 CMR 13.03.
 - 1. Permits for the manufacture of explosive materials shall be obtained from the Marshal in accordance with 527 CMR 13.04(5) and 527 CMR 13.10
 - 2. Permits for the storage of explosive materials in any magazine, building or structure shall be obtained from the marshal by the owner of said magazine, building or structure. The application for said permit shall contain the location of the subject magazine building or structure, the nature and quantity of explosives materials to be stored, and the capacity and specifications of the storage and any other information as prescribed by the Marshal in said application.
 - 3. No permit or renewal thereof shall be issued by the Marshal under 527 CMR 13.04(3)(b) until the owner of said magazine, building or structure provides proof that the owner has met all requirements required by State and Federal law or regulation.
 - 4. The Marshal may suspend or revoke a permit issued under 527 CMR 13.04(3)(b) if the marshal has reason to believe that the permit holder has violated the provisions of 527 CMR 13.00, or any law or other regulation related thereto.

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5. Any person who has applied for or has been issued such a permit or a renewal thereof by the marshal, under 527 CMR 13.04(3)(b), shall be deemed to have consented to periodic administrative inspections by the Marshal or his designees of any building, structure, magazine or facility used to store or manufacture such explosive materials and all records relating thereto.
6. Any owner who has been issued a permit under 527 CMR 13.04(3)(b) shall notify the Marshal immediately of the sale or transfer of a magazine, building or structure. The owner shall remove the permit number from the magazine, building or structure upon sale or transfer. The transferee shall immediately apply for a new permit for the magazine, building or structure in accordance with 527 CMR 13.04(3)(b).
- (4) Additional Requirements Permitted and Exempt Explosive Material: Storage and transportation of explosive material shall be subject to all additional applicable transportation and storage requirements of 527 CMR 13.00.
- (5) Manufacture of explosives: A permit for the Manufacture of Explosive Material shall be obtained from the Marshal. Applicants for a permit to Manufacture Explosives shall submit proof of license to manufacture explosives issued in accordance with 27 CFR Part 55, and a license and registration to keep, store, manufacture or sell explosive material issued in accordance with M.G.L. c. 148, § 13.
- (6) Transportation of Explosive Material: Interstate transportation of explosive material not exempted by 527 CMR 13.01, shall require a permit to be issued by the State Fire Marshal subject to 527 CMR 13.06.
- (7) Storage of Explosive Materials: No person shall keep, store, mix, manufacture, use, handle, or sell explosive material except in accordance with 527 CMR 13.00.
- (a) explosives materials kept or stored for use on a job site shall be in magazines approved in accordance with the provisions of 527 CMR 13.05.
- (b) a permit from the head of the local fire department or the Marshal shall be required for the storage of explosives not specifically covered by 527 CMR 13.00.
- (c) all such permits for the storage of explosives referred to in 527 CMR 13.00 shall remain in effect for a minimum period of one year and may be renewed annually, thereafter, unless suspended or revoked for cause by the head of the local fire department or the Marshal. Such permits shall be obtained from the head of the fire department having jurisdiction in the city or town where the material is to be stored, or the Marshal in all other jurisdictions.
- (8) Exemption: From Aggregate Capacity of a License. Explosive material classified Division 1.5 and 1.6 shall not be regulated as an explosive in determining capacities subject to license requirements of M.G.L. c. 148, § 13 or 527 CMR 13.00.
- (9) Certificate of Competency [Blaster's License]: No person shall conduct blasting operations unless they possess a Certificate of Competency [Blaster's License] granted by the State Fire Marshal.
- Any person desiring a Certificate of Competency shall make application in writing to the Marshal, be 21 years of age or older, and shall submit to such examination and test as the Marshal may prescribe. The certificate, when issued, shall remain in effect for a period of two years unless suspended or revoked by the Marshal.
- (10) Explosives Users Certificate [Own and Possess Certificate]: No person or firm shall use explosives unless they possess an Explosives Users Certificate [Own and Possess Certificate] granted by the Marshal.
- (a) Application for an Explosives Users Certificate shall be made to the Marshal and shall include the following:
1. Evidence of valid liability insurance coverage in the form of a certificate issued by the insurance agency to the Marshal's Office listing the name and claims representative, providing general liability in the amount of \$1,000,000 per occurrence and \$1,000,000 aggregate coverage. A 30 day cancellation notice to the Marshal shall be a condition of the policy.

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Any insurance company providing coverage under 527 CMR 13.00 shall be licensed in the Commonwealth of Massachusetts by the Commissioner of Insurance.

2. Evidence of a valid blasting bond.
 3. A notarized statement indicating that explosive materials shall be kept in magazines which meet the requirements of 527 CMR 13.05 or a valid magazine license issued in accordance with 27 CFR Part 55.
 4. A notarized statement attesting the person or firm understands the contents of 527 CMR 13.00 and M.G.L. c. 148. The statement shall be made a part of the application.
- (b) The Explosives Users Certificate shall expire upon the expiration of the bond, or the liability insurance, whichever ever occurs first. The Explosives Users Certificate may be revoked by the Marshal for a failure to comply with 527 CMR 13.00, or M.G.L. c. 148.
- (c) The Explosives Users Certificate shall be presented along with a Certificate of Competency when applying for a "Use and Handling" permit [Permit to Blast].
- (d) Any person who has applied for or has been issued or has renewed an Explosives Users Certificate by the Marshal under 527 CMR 13.04(10), shall be deemed to have consented to periodic administrative inspections by the Marshal or his designee of any building, structure, magazine or facility used by said certificate holder to keep or store such explosive materials and all records relating thereto.

(11) Use and Handling Permit [Permit to Blast]: No person shall detonate explosives unless they possess a Use and Handling permit [Permit to Blast] issued to the blaster by the head of the local fire department, or the Marshal in a jurisdiction other than a city or town.

- (a) Said Use and Handling permit shall not be issued until the person exhibits:
1. A valid "Certificate of Competency";
 2. A valid Explosives Users Certificate; and
 3. A Dig-Safe number has been obtained in accordance with M.G.L. c. 82, § 40.
- (b) A valid "Use and Handling" permit shall be in possession of the blaster at the blast site and shall be produced for inspection, in hand, when requested by the head of the local fire department, the Marshal, or their designees.
- (c) The head of the local fire department may verify, through the Marshal, that an Explosives Users Certificate and a "Certificate of Competency" is valid.
- (d) The head of the local fire department or the Marshal may restrict the terms and conditions of a "Use and Handling" permit if hazards to the safety of the public, not covered by 527 CMR 13.00, are documented in writing and made a part of the restricted permit.

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13.04: continued

(e) When issued, a "Use and Handling" permit shall remain in effect for a minimum of 30 days unless suspended or revoked by the head of the local fire department, the Marshal or their designees. If requested by the head of the local fire department upon granting of the permit, the local fire department shall be notified each day any blasting operations are to be performed at least two hours prior to such operations. Failure to notify will be cause for revocation of the "Use and Handling" permit. A "Use and Handling" permit may be suspended or revoked by the head of the local fire department or the Marshal or their designees for any violation of 527 CMR 13.00, or M.G.L. c. 148.

1. The head of the local fire department may extend the length of time the permit shall be in effect before renewal is required.
2. The Marshal or the head of the local fire department may, at his discretion at any time he deems it necessary, order a suitable fire watch on the explosive materials from the time the explosive materials are delivered to the blast area until the termination of blasting operations and the removal of all explosive material from the site.

(12) Sale of Explosive Material. No person shall sell or possess for purpose of sale any explosive material without a license to sell explosives granted by the State Fire Marshal. Application for a license to sell explosive material shall be made on a form approved by the Marshal.

Exception: 527 CMR 13.04(12) shall not apply to the sale of small arms ammunitions as defined in 527 CMR 13.03

13.05: Storage

(1) Types of Magazines: For the purpose of 527 CMR 13.00, there are five types of magazines. These types, together with the classes of explosive materials which shall be stored in them are as follows;

- (a) Type 1 magazines: Permanent magazines for the storage of high explosives. Other classes of explosive material may be stored in Type 1 magazines.
- (b) Type 2 magazines: Mobile and portable indoor and outdoor magazines for the storage of high explosives. Other classes of explosive materials may also be stored in type 2 magazines.
- (c) Type 3 magazines: Portable outdoor magazines for the temporary storage of high explosives while attended (for example, a "day-box". Other classes of explosive material may also be stored in type 3 magazine.
- (d) Type 4 magazines: Magazines for the storage of low explosives. Blasting agents may be stored in type 4 magazines. Detonators that will not mass detonate may also be stored in type 4 magazines.
- (e) Type 5 magazines: Magazines for the storage of blasting agents.

Explosive materials classified as Class 1 materials. Class 1 materials are divided into Divisions, numbered 1 through 6 to indicate their relative hazard. Additionally, all explosive materials are further assigned a Compatibility Letter to show which explosive materials, when grouped together, will not significantly increase the probability of an accident, or for a given quantity, increase the magnitude of the effects from such an accident.

COMPATIBILITY GROUPS WHICH MAY BE STORED TOGETHER

Compatibility Group	A	B ¹	C ²	D ²	E ²	S ¹
A	YES	NO	NO	NO	NO	NO
B	NO	YES	NO	NO	NO	YES
C	NO	NO	YES	YES	YES	YES
D	NO	NO	YES	YES	YES	YES
E	NO	NO	YES	YES	YES	YES
S	NO	YES	YES	YES	YES	YES

13.05: continued

Note 1: No detonators shall be stored in the same magazine with other explosive materials.

EXCEPTION: Detonators which are not mass detonating may be stored with safety fuse, electric squibs, igniters, or igniter cord in Type 1, 2, 3 or 4 magazines.

Note 2: When compatibility Groups C, D, and E are stored in the same magazine the entire quantity must be considered as Compatibility Group E.

(2) **Magazine Construction:** Magazines in which explosives are kept and stored shall be of five types, as follows:

(a) **Type 1 magazines:** A type 1 magazine is a permanent structure: a building, an igloo or "Army-type structure", a tunnel, or a dugout. It shall be bullet-resistant, fire-resistant, weather-resistant, theft-resistant, and ventilated.

Buildings. All building type magazines shall be constructed of masonry, wood, metal, or a combination of these materials, and have no openings except for entrances and ventilation. The ground around building magazines shall slope away for drainage or other adequate drainage shall be provided.

1. **Masonry wall construction.** Masonry wall construction shall consist of brick, concrete, tile, cement block, or cinder block and be not less than six inches in thickness. Hollow masonry units used in construction shall have all hollow spaces filled with well-tamped, coarse, dry sand or weak concrete (at least a mixture of one part cement and eight parts of sand with enough water to dampen the mixture while tamping in place). Interior walls shall be constructed of, or covered with, a non sparking material.

2. **Fabricated metal wall construction.** Metal wall construction shall consist of sectional sheets of steel or aluminum not less than number 14-gauge, securely fastened to a metal framework. Metal wall construction shall be either lined inside with brick or solid cement blocks, or shall have at least a six inch sand fill between interior and exterior walls. Interior walls shall be constructed of, or covered with, a non sparking material.

3. **Wood frame wall construction.** The exterior of outer wood walls shall be covered with iron or aluminum not less than number 26-gauge. An inner wall of, or covered with non sparking material shall be constructed so as to provide a space of not less than six inches between the outer and inner walls. The space shall be filled with coarse, dry sand or weak concrete.

4. **Floors.** Floors shall be constructed of, or covered with, a non sparking material and shall be strong enough to bear the weight of the maximum quantity to be stored. Use of pallets covered with a non sparking material is considered equivalent to a floor constructed of or covered with a non sparking material.

5. **Foundations.** Foundations shall be constructed of brick, concrete, cement block, stone, or wood posts. If piers or posts are used in lieu of a continuous foundation, the space under the buildings shall be enclosed with metal.

6. **Roof.** Except for buildings with fabricated metal roofs, the outer roof shall be covered with no less than number 26-gauge iron or aluminum, fastened to at least one inch nominal sheathing, $\frac{3}{4}$ inch plywood, or $\frac{3}{4}$ inch particle board.

7. **Bullet-resistant ceilings or roofs.** Where it is possible for a bullet to be fired directly through the roof and into the magazine at such an angle that the bullet would strike the explosives within, the magazine shall be protected by one of the following methods:

a. A sand tray lined with a layer of building paper, plastic, or other nonporous material, and filled with not less than four inches of coarse, dry sand, and located at the tops of inner walls covering the entire ceiling area, except that portion necessary for ventilation.

b. A fabricated metal roof constructed of $\frac{3}{16}$ inch plate steel lined with four inches of hardwood. (For each additional $\frac{1}{16}$ inch of plate steel, the hardwood lining may be decreased one inch.

8. **Doors.** All doors shall be constructed of not less than $\frac{1}{4}$ inch plate steel and lined with at least two inches of hardwood. Hinges and hasps shall be attached to the doors by welding, riveting or bolting (nuts on inside of door). They shall be installed in such a manner that the hinges and hasps cannot be removed when the doors are closed and locked.

13.05: continued

9. Locks. Each door shall be equipped with:
- Two mortise locks;
 - Two padlocks fastened in separate hasps and staples;
 - A combination of a mortise lock and a padlock;
 - A mortise lock that requires two keys to open; or,
 - A three-point lock.

Note: A five-blade lock also meets requirements. Padlocks shall have at least five tumblers and a case-hardened shackle of at least $\frac{1}{4}$ inch diameter. Padlocks shall be protected with not less than $\frac{1}{4}$ inch steel hoods constructed so as to prevent sawing or lever action on the locks, hasps, and staples. These requirements do not apply to magazine doors that are adequately secured on the inside by means of a bolt, lock, or bar that cannot be actuated from the outside.

10. Ventilation. Ventilation shall be provided to prevent dampness and heating of stored explosive materials. Ventilation openings shall be screened to prevent the entrance of sparks. Ventilation openings in side walls and foundations shall be offset or shielded for bullet-resistant purposes. Magazines having foundation and roof ventilators with the air circulating between the side walls and the floors and between the side walls and the ceiling shall have a wooden lattice lining or equivalent to prevent the packages of explosive materials from being stacked against the side walls and blocking the air circulation.

11. Exposed metal. No sparking material shall be exposed to contact with the stored explosive materials. All ferrous metal nails in the floor and side walls, which might be exposed to contact with explosive materials, shall be blind nailed, countersunk, or covered.

Igloos, "Army-type structures", tunnels, and dugouts: Igloo: "Army-type structure", tunnel, and dugout magazines shall be constructed of reinforced concrete, masonry, metal, or a combination of these materials. They shall have an earth mound covering of not less than 24 inches on the top, sides and rear unless the magazine meets the requirements of 527 CMR 13.05(2)(a)7.. Interior walls and floors shall be constructed of, or covered with, a non sparking material. Magazines of this type shall also be constructed in conformity with the requirements of 527 CMR 13.05(2)(a)4. and 527 CMR 13.05(2)(a)8. through 11..

(b) Type 2 magazines: A type 2 magazine is a box, trailer, semi-trailer, or other mobile facility.

- Outdoor magazines.
 - General. Outdoor magazines shall be bullet-resistant, fire-resistant, weather-resistant, theft-resistant, and ventilated. They shall be supported to prevent direct contact with the ground and, if less than one cubic yard in size, shall be securely fastened to a fixed object. The ground around outdoor magazines shall slope away for drainage or other adequate drainage shall be provided. When unattended, vehicular magazines shall have wheels removed or otherwise effectively immobilized by kingpin locking devices or other methods approved by the Marshal.
 - Exterior construction. The exterior and doors shall be constructed of not less than $\frac{1}{4}$ inch steel and lined with at least two inches of hardwood. Magazines with top openings shall have lids with water-resistant seals or which overlap the sides by at least one inch when in a closed position.
 - Hinges and hasps. Hinges and hasps shall be attached to doors by welding, riveting, or bolting (nuts on inside of door). Hinges and hasps shall be installed so that they cannot be removed when the doors are closed and locked.
 - Locks. Each door shall be equipped with:
 - Two mortise locks;
 - Two padlocks fastened in separate hasps and staples;
 - A combination of a mortise lock and a padlock;
 - A mortise lock that requires two keys to open; or,
 - A three-point lock.

13.05: continued

Note: A five-blade lock also meets requirements. Mobile outdoor magazines need have only one lock, and no hood is required. Padlocks shall have at least five tumblers and a case-hardened shackle of at least $\frac{1}{4}$ inch diameter. Padlocks shall be protected with not less than $\frac{1}{4}$ inch steel hoods constructed so as to prevent sawing or lever action on the locks, hasps, and staples. These requirements do not apply to magazine doors that are adequately secured on the inside by means of a bolt, lock, or bar that cannot be actuated from the outside.

2. Indoor magazines.

a. General. Indoor magazines shall be fire-resistant and theft-resistant. They need not be bullet-resistant and weather-resistant if the buildings in which they are stored provide protection from the weather and from bullet penetration. No indoor magazine shall be located in a residence or dwelling. The indoor storage of high explosives shall not exceed a quantity of 50 pounds. More than one indoor magazine may be located in the same building if the total quantity of explosive materials stored does not exceed 50 pounds. Detonators shall be stored in a separate magazine (except as provided in 527 CMR 13.05(5)(b)2. and the total quantity of detonators shall not exceed 5,000.

b. Exterior construction. Indoor magazines shall be constructed of wood or metal according to one of the following specifications:

i. Wooden indoor magazines shall have sides, bottoms and doors constructed of at least two inches of hardwood and shall be well braced at the corners. They shall be covered with sheet metal of not less than number 26-gauge (.0179 inches). Nails exposed to the interior of magazines shall be countersunk.

ii. Metal indoor magazines shall have sides, bottoms and doors constructed of not less than number 12-gauge (.1046 inches) metal and shall be lined inside with a non sparking material. Edges of metal covers shall overlap sides at least one inch.

c. Hinges and hasps. Hinges and hasps shall be attached to doors by welding, riveting, or bolting (nuts on inside of door). Hinges and hasps shall be installed so that they cannot be removed when the doors are closed and locked.

d. Locks. Each door shall be equipped with:

i. Two mortise locks;

ii. Two padlocks fastened in separate hasps and staples;

iii. A combination of a mortise lock and a padlock;

iv. A mortise lock that requires two keys to open; or,

v. A three-point lock.

Note: A five-blade lock also meets requirements. Padlocks shall have at least five tumblers and a case-hardened shackle of at least $\frac{1}{4}$ inch diameter. Padlocks shall be protected with not less than $\frac{1}{4}$ inch steel hoods constructed so as to prevent sawing or lever action on the locks, hasps, and staples.

Indoor magazines located in secure rooms that are locked as provided in this subparagraph may have each door locked with one steel padlock (which need not be protected by a steel hood) having at least five tumblers and a case-hardened shackle of at least $\frac{1}{4}$ inch diameter, if the door hinges and lock hasps are securely fastened to the magazine. These requirements do not apply to magazine doors that are adequately secured on the inside by means of a bolt, lock, or bar that cannot be actuated from the outside.

3. Detonator boxes. Magazines for detonators in quantities of 100 or less shall have sides, bottoms and doors constructed of not less than number 12-gauge (.1046 inches) metal and lined with a non sparking material. Hinges and hasps shall be attached so they cannot be removed from the outside. One steel padlock (which need not be protected by a steel hood) having at least five tumblers and a case-hardened shackle of at least $\frac{1}{4}$ inch diameter is sufficient for locking purposes.

(c) Type 3 magazines: A type 3 magazine is a "day-box" or other portable magazine. It shall be fire-resistant, weather-resistant, and theft-resistant. A type 3 magazine shall be constructed of not less than number 12 gauge (.1046) steel, lined with at least either $\frac{1}{2}$ inch plywood or $\frac{1}{2}$ inch Masonite-type hardboard.

1. Doors shall overlap door openings by at least one inch. Hinges and hasps shall be attached by welding, riveting or bolting (nuts on inside).

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2. One steel padlock (which need not be protected by a steel hood) having at least five tumblers and a case-hardened shackle of at least $\frac{1}{4}$ inch diameter is sufficient for locking purposes. Explosive materials shall not be left unattended in type 3 magazines and shall be removed to type 1 or 2 magazines for unattended storage.

(d) Type 4 magazines: A type 4 magazine is a building, igloo, or "Army type structure," tunnel, dugout, box, bin, trailer, or a semi-trailer or other mobile magazine.

1. Outdoor magazines.

a. General. Outdoor magazines shall be fire-resistant, weather-resistant, and theft-resistant. The ground around outdoor magazines shall slope away for drainage or other adequate drainage be provided. When unattended, vehicular magazines shall have wheels removed or otherwise be effectively immobilized by kingpin locking devices or other methods approved by the Marshal.

b. Construction. Outdoor magazines shall be constructed of masonry, metal-covered wood, fabricated metal, or a combination of these materials. Foundations shall be constructed of brick, concrete, cement block, stone, or metal or wood posts. If piers or posts are used, in lieu of a continuous foundation, the space under the building shall be enclosed with fire-resistant material. The walls and floors shall be constructed of, or covered with, a non sparking material or lattice work. The doors shall be metal or solid wood covered with metal.

c. Hinges and hasps. Hinges and hasps shall be attached to doors by welding, riveting, or bolting (nuts on inside of door). Hinges and hasps shall be installed so that they cannot be removed when the doors are closed and locked.

d. Locks. Each door shall be equipped with:

- i. Two mortise locks;
- ii. Two padlocks fastened in separate hasps and staples;
- iii. A combination of a mortise lock and a padlock;
- iv. A mortise lock that requires two keys to open; or,
- v. A three-point lock.

Note: A five-blade lock also meets requirements. Mobile outdoor magazines need have only one lock, and no hood is required. Padlocks shall have at least five tumblers and a case-hardened shackle of at least $\frac{1}{4}$ inch diameter. Padlocks shall be protected with not less than $\frac{1}{4}$ inch steel hoods constructed so as to prevent sawing or lever action on the locks, hasps, and staples. These requirements do not apply to magazine doors that are adequately secured on the inside by means of a bolt, lock, or bar that cannot be actuated from the outside.

2. Indoor magazines.

a. General. Indoor magazines shall be fire-resistant and theft-resistant. They need not be weather-resistant if the buildings in which they are stored provide protection from the weather. No indoor magazine shall be located in a residence or dwelling. The indoor storage of low explosives shall not exceed a quantity of 50 pounds. More than one indoor magazine may be located in the same building if the total quantity of explosive materials stored does not exceed 50 pounds. Detonators that will not mass detonate shall be stored in a separate magazine and the total number of electric detonators shall not exceed 5,000.

b. Construction. Indoor magazines shall be constructed of masonry, metal-covered wood, fabricated metal, or a combination of these materials. The walls and floors shall be constructed of, or covered with, a non sparking material. The doors shall be metal or solid wood covered with metal.

c. Hinges and hasps. Hinges and hasps shall be attached to doors by welding, riveting, or bolting (nuts on inside of door). Hinges and hasps shall be installed so that they cannot be removed when the doors are closed and locked.

d. Locks. Each door shall be equipped with:

- i. Two mortise locks;
- ii. Two padlocks fastened in separate hasps and staples;
- iii. A combination of a mortise lock and a padlock;
- iv. A mortise lock that requires two keys to open; or,
- v. A three-point lock.

13.05: continued

Note: A five-blade lock also meets requirements. Padlocks shall have at least five tumblers and a case-hardened shackle of at least $\frac{1}{4}$ inch diameter. Padlocks shall be protected with not less than $\frac{1}{4}$ inch steel hoods constructed so as to prevent sawing or lever action on the locks, hasps, and staples.

Indoor magazines located in secure rooms that are locked as provided in this subparagraph may have each door locked with one steel padlock (which need not be protected by a steel hood) having at least five tumblers and a case-hardened shackle of at least $\frac{1}{4}$ inch diameter, if the door hinges and lock hasps are securely fastened to the magazine. These requirements do not apply to magazine doors that are adequately secured on the inside by means of a bolt, lock, or bar that cannot be actuated from the outside.

(e) Type 5 magazines: A type 5 magazine is a building, igloo, or "Army type structure," tunnel, dugout, box, bin, trailer, or a semi-trailer or other mobile facility.

1. Outdoor magazines.

a. General. Outdoor magazines shall be weather-resistant, and theft-resistant. The ground around magazines shall slope away for drainage or other adequate drainage be provided. When unattended, vehicular magazines shall have wheels removed or otherwise be effectively immobilized by kingpin locking devices or other methods approved by the Marshal.

b. Construction. The doors are shall be constructed of solid wood or metal.

c. Hinges and hasps. Hinges and hasps shall be attached to doors by welding, riveting, or bolting (nuts on inside of door). Hinges and hasps shall be installed so that they cannot be removed when the doors are closed and locked.

d. Locks. Each door shall be equipped with:

- i. Two mortise locks;
- ii. Two padlocks fastened in separate hasps and staples;
- iii. A combination of a mortise lock and a padlock;
- iv. A mortise lock that requires two keys to open; or,
- v. A three-point lock.

Note: A five-blade lock also meets requirements. Padlocks shall have at least five tumblers and a case-hardened shackle of at least $\frac{1}{4}$ inch diameter. Padlocks shall be protected with not less than $\frac{1}{4}$ inch steel hoods constructed so as to prevent sawing or lever action on the locks, hasps, and staples. Trailers, semi-trailers, and similar vehicular magazines may, for each door, be locked with one steel padlock (which need not be protected by a steel hood) having at least five tumblers and a casehardened shackle of at least $\frac{1}{4}$ inch diameter, if the door hinges and lock hasps are securely fastened to the magazine and to the door frame. These requirements do not apply to magazine doors that are adequately secured on the inside by means of a bolt, lock, or bar that cannot be actuated from the outside.

e. Placards. The placards required by Department of Transportation regulations at 49 CFR Part 172, Subpart F, for the transportation of blasting agents shall be displayed on all magazines.

2. Indoor magazines.

a. General. Indoor magazines shall be theft resistant. They need not be weather-resistant if the buildings in which they are stored provide protection from the weather. No indoor magazine shall be located in a residence or dwelling. Indoor magazines containing quantities of blasting agents in excess of 50 pounds are subject to Table of Distance requirements of 527 CMR 13.00.

b. Construction. The doors shall be constructed of wood or metal.

c. Hinges and hasps. Hinges and hasps shall be attached to doors by welding, riveting, or bolting (nuts on inside). Hinges and hasps shall be installed so that they cannot be removed when the doors are closed and locked.

d. Locks. Each door shall be equipped with:

- i. Two mortise locks;
- ii. Two padlocks fastened in separate hasps and staples;
- iii. A combination of a mortise lock and a padlock;
- iv. A mortise lock that requires two keys to open; or,
- v. A three-point lock.

13.05: continued

Note: A five-blade lock also meets requirements. Padlocks shall have at least five tumblers and a case-hardened shackle of at least inch diameter. Padlocks shall be protected with not less than $\frac{1}{4}$ inch steel hoods constructed so as to prevent sawing or lever action on the locks, hasps, and staples. Indoor magazines located in secure rooms that are locked as provided in this subparagraph may have each door locked with one steel padlock (which need not be protected by a steel hood) having at least five tumblers and a case-hardened shackle of at least $\frac{1}{4}$ inch diameter, if the door hinges and lock hasps are securely fastened to the magazine and to the door frame. These requirements do not apply to magazine doors that are adequately secured on the inside by means of a bolt, lock, or bar that cannot be actuated from the outside.

13.05: continued

USE OF MAGAZINES

Product Stored	TYPE OF MAGAZINE				
	1	2	3	4	5
High Explosives (1.1D) (Class A Exp.) Incl. dynamites, cap sensitive emulsions slurries, gels and cast booster	X	X	X		
Black Powder (1.1D) (Class A Exp.) Defined as Low Explosive by BATF for storage	X	X	X	X	
Detonators (1.1B) (Class A Exp.)	X	X	X		
Detonating Cords (1.1D, 1.2D, 1.4G) (Class A or C Exp.)	X	X	X		
Detonators (1.4B, 1.4S) (Class C Exp.)	X	X	X	X	
Safety fuse, elect squibs, igniters and ignitor cord (1.4G, 1.4S)	X	X	X	X	
Blasting Agents (1.5D) (Blasting Agents)	X	X	X	X	X
Propellants (1.3C) (Class B Exp.) Defined as Low Explosive by BATF for storage	X	X	X	X	

Note: Detonators shall not be stored in the same magazine with other explosives

EXCEPTION: Detonators which are not mass detonating may be stored with safety fuse, electric squibs, igniters or ignitor cord in Type 1, 2, 3, or 4 magazines.

13.05: continued

CLASSIFICATION OF MAGAZINES

Construction Features	Magazine Types				
	1	2	3	4	5
Permanent	X			X	X
Portable/Mobile		X	X	X	X
Bullet-Resistant	X	X			
Fire-Resistant	X	X	X	X ²	X ²
Theft-Resistant	X	X	X	X	X ¹
Weather-Resistant	X	X	X	X	X
Ventilated	X	X	X	X ²	X ²

Note 1: Each door of a Mobile Type 5 magazine shall be equipped with at least one 5-tumbler padlock having a 1/4 inch case-hardened shackle. The lock need not be hooded.

Note 2: Over-the-road trucks or semi-trailers used for temporary storage as Type 4 or 5 magazines need not be fire-resistant or ventilated.

(3) Tables of Distances.

(a) All explosives, except as herein otherwise provided, shall be stored in a permanent magazine which shall be located as required by the *American Table of Distances for the Storage of Explosives*, as revised and approved by the Institute of Makers of Explosives (June 1991), Table 1, and the *Table of Separation Distance of Ammonium Nitrate and Blasting Agents from Explosives or Blasting Agents*, Table 2.

(b) The Table regulates the distance a permanent magazine shall be kept from other magazines and from the nearest inhabited building, passenger railway or highway (excepting a vehicular magazine while in transit).

(c) When two or more storage magazines are located on the same property, each magazine shall comply with the minimum distances, specified from inhabited buildings, railways, and highways, and in addition they shall be separated from each other by not less than the distances shown for "Separation of Magazines". If any two or more magazines are separated from each other by less than the specified "Separation of Magazines" distances, then such two or more magazines, as a group, shall be considered as one magazine, and the total quantity of explosives stored in such group shall be treated as if stored in a single magazine located on the site of any magazine of the group, and shall comply with the minimum distances specified from other magazines, inhabited buildings, railways, and highways.

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13.05: continued

TABLE 1

American Table of Distances for the Storage of Explosives

The American Table of Distances is reprinted from IME Safety Library Publication No. 2 with permission of the Institute of Makers of Explosives. (revised in June 1991)

Distances in Feet

Quantity of Explosive Materials ^{(1,2), (4)}		Inhabited Buildings		Public Highways with Traffic Vol. of less than 3,000 Vehicles /Day		Passenger Railways- Public Highways with Traffic Vol. of more than 3,000 Vehicles/Day		Separation of Magazines (3)	
Pounds Over	Pound Not Over	Barri- caded	Unbarri- caded	Barri- caded	Unbarri- caded	Barri- caded	Unbarri- caded	Barri- caded	Unbarri- caded
0	5	70	140	30	60	51	102	6	12
5	10	90	180	35	70	64	128	8	16
10	20	110	220	45	90	81	162	10	20
20	30	125	250	50	100	93	186	11	22
30	40	140	280	55	110	103	206	12	24
40	50	150	300	60	120	110	220	14	28
50	75	170	340	70	140	127	254	15	30
75	100	190	380	75	150	139	278	16	32
100	125	200	400	80	160	150	300	18	36
125	150	215	430	85	170	159	318	19	38
150	200	235	470	95	190	175	350	21	42
200	250	255	510	105	210	189	378	23	46
250	300	270	540	110	220	201	402	24	48
300	400	295	590	120	240	221	442	27	54
400	500	320	640	130	260	238	476	29	58
500	600	340	680	135	270	253	506	31	62
600	700	355	710	145	290	266	532	32	64
700	800	375	750	150	300	278	556	33	66
800	900	390	780	155	310	289	578	35	70
900	1,000	400	800	160	320	300	600	36	72
1,000	1,200	425	850	165	330	318	636	39	78
1,200	1,400	450	900	170	340	336	672	41	82
1,400	1,600	470	940	175	350	351	702	43	86
1,600	1,800	490	980	180	360	366	732	44	88
1,800	2,000	505	1,010	185	370	378	756	45	90
2,000	2,500	545	1,090	190	380	408	816	49	98
2,500	3,000	580	1,160	195	390	432	864	52	104
3,000	4,000	635	1,270	210	420	474	948	58	116
4,000	5,000	685	1,370	225	450	513	1,026	61	122
5,000	6,000	730	1,460	235	470	546	1,092	65	130
6,000	7,000	770	1,540	245	490	573	1,146	68	136
7,000	8,000	800	1,600	250	500	600	1,200	72	144
8,000	9,000	835	1,670	255	510	624	1,248	75	150
9,000	10,000	865	1,730	260	520	645	1,290	78	156
10,000	12,000	875	1,750	270	540	687	1,374	82	164
12,000	14,000	885	1,770	275	550	723	1,446	87	174
14,000	16,000	900	1,800	280	560	756	1,512	90	180
16,000	18,000	940	1,880	285	570	786	1,572	94	188
18,000	20,000	975	1,950	290	580	813	1,626	98	196
20,000	25,000	1,055	2,000	315	630	876	1,752	105	210

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25,000	30,000	1,130	2,000	340	680	933	1,866	112	224
30,000	35,000	1,205	2,000	360	720	981	1,962	119	238
35,000	40,000	1,275	2,000	380	760	1,026	2,000	124	248
40,000	45,000	1,340	2,000	400	800	1,068	2,000	129	258
45,000	50,000	1,400	2,000	420	840	1,104	2,000	135	270
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50,000	55,000	1,460	2,000	440	880	1,140	2,000	140	280
55,000	60,000	1,515	2,000	455	910	1,173	2,000	145	290
60,000	65,000	1,565	2,000	470	940	1,206	2,000	150	300
65,000	70,000	1,610	2,000	485	970	1,236	2,000	155	310
70,000	75,000	1,655	2,000	500	1,000	1,263	2,000	160	320
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75,000	80,000	1,695	2,000	510	1,020	1,293	2,000	165	330
80,000	85,000	1,730	2,000	520	1,040	1,317	2,000	170	340
85,000	90,000	1,760	2,000	530	1,060	1,344	2,000	175	350
90,000	95,000	1,790	2,000	540	1,080	1,368	2,000	180	360
95,000	100,000	1,815	2,000	545	1,090	1,392	2,000	185	370

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Distances in Feet (continued)

Quantity of Explosive Materials ^{(1,2), (4)}		Inhabited Buildings				Public Highways with Traffic Vol. of less than 3,000 Vehicles /Day		Passenger Railways- Public Highways with Traffic Vol. of more than 3,000 Vehicles/Day		Separation of Magazines (3)
Pounds Over	Pound Not Over	Barri-caded	Unbarri-caded	Barri-caded	Unbarri-caded	Barri-caded	Unbarri-caded	Barri-caded	Unbarri-caded	
100,000	110,000	1,835	2,000	550	1,100	1,437	2,000	195	390	
110,000	120,000	1,855	2,000	555	1,110	1,479	2,000	205	410	
120,000	130,000	1,875	2,000	560	1,120	1,521	2,000	215	430	
130,000	140,000	1,890	2,000	565	1,130	1,557	2,000	225	450	
140,000	150,000	1,900	2,000	570	1,140	1,593	2,000	235	470	
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150,000	160,000	1,935	2,000	580	1,160	1,629	2,000	245	490	
160,000	170,000	1,965	2,000	590	1,180	1,662	2,000	255	510	
170,000	180,000	1,990	2,000	600	1,200	1,695	2,000	265	530	
180,000	190,000	2,010	2,010	605	1,210	1,725	2,000	275	550	
190,000	200,000	2,030	2,030	610	1,220	1,755	2,000	285	570	
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200,000	210,000	2,055	2,055	620	1,240	1,782	2,000	295	590	
210,000	230,000	2,100	2,100	635	1,270	1,836	2,000	315	630	
230,000	250,000	2,155	2,155	650	1,300	1,890	2,000	335	670	
250,000	275,000	2,215	2,215	670	1,340	1,950	2,000	360	720	
275,000	300,000	2,275	2,275	690	1,380	2,000	2,000	385	770	

Note 1: For quantity and distance purposes, detonating cord of 50 grains per foot shall be calculated as equivalent to eight lbs. of high explosive per 1,000 feet. Heavier or lighter core loads shall be rated proportionately.

Note 2: For quantity and distance purposes, detonators in strengths through No. 8 cap shall be rated at 1½ lbs. of explosives per 1,000 caps. For strengths higher than No. 8 cap, consult the manufacturer.

Note 3: When two or more magazines are located on the same property, each magazine shall comply with the minimum distances specified from inhabited buildings, railways and highways, and, in addition, they shall be separated from each other by not less than the distances shown for "Separation of Magazines," except that the quantity of explosive materials contained in the detonator magazine shall govern in regard to the spacing of said detonator magazines from magazines containing other explosive materials. If two or more magazines are separated from each other by less than the specified "Separation of Magazines" distances, then such two or more magazines, as a group, shall be considered as one magazine, and the total quantity of explosive materials stored in such group shall be treated as if stored in a single magazine located on the site of any magazine of the group, and shall comply with the minimum of distances specified from other magazines, inhabited buildings, railways and highways.

Note 4: This Table applies only to the manufacturer and permanent storage of commercial explosive materials. It is not applicable to transportation of explosives or any handling or temporary storage necessary or incident thereto. It is not intended to apply to bombs, projectiles, or other heavily encased explosives.

Note 5: When a manufacturing building on an explosive materials plant site is designed to contain explosive materials, such building shall be located from inhabited buildings, public highways and passenger railways in accordance with the American Table of Distances based on the maximum quantity of explosive materials permitted to be in the building at one time.

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TABLE 2

American Table of Recommended Separation Distances of Ammonium Nitrate and Blasting Agents from Explosives or Blasting Agents (1,6)

Donor Weight		Minimum Separation Distance of Acceptor when Barricaded (²) feet		Minimum Thickness of Artificial Barricades (⁵) (in)
Pounds Over	Pounds Not Over	Ammonium Nitrate ⁽³⁾	Blasting Agent ⁽⁴⁾	
	100	3	11	12
100	300	4	14	12
300	600	5	18	12
600	1,000	6	22	12
1,000	1,600	7	25	12
1,600	2,000	8	29	12
2,000	3,000	9	32	15
3,000	4,000	10	36	15
4,000	6,000	11	40	15
6,000	8,000	12	43	20
8,000	10,000	13	47	20
10,000	12,000	14	50	20
12,000	16,000	15	54	25
16,000	20,000	16	58	25
20,000	25,000	18	65	25
25,000	30,000	19	68	30
30,000	35,000	20	72	30
35,000	40,000	21	76	30
40,000	45,000	22	79	35
45,000	50,000	23	83	35
50,000	55,000	24	86	35
55,000	60,000	25	90	35
60,000	70,000	26	94	40
70,000	80,000	28	101	40
80,000	90,000	30	108	40
90,000	100,000	32	115	40
100,000	120,000	34	122	50
120,000	140,000	37	133	50
140,000	160,000	40	144	50
160,000	180,000	44	158	50
180,000	200,000	48	173	50
200,000	220,000	52	187	60
220,000	250,000	56	202	60
250,000	275,000	60	216	60
275,000	300,000	64	230	60

Note 1: Recommended separation distances to prevent explosion of ammonium nitrate and ammonium nitrate-based blasting agents by propagation from nearby stores of high explosives or blasting agents referred to in the Table as the "donor." Ammonium nitrate, by itself, is not considered to be a donor when applying this Table. Ammonium nitrate, ammonium-fuel oil or combinations thereof are acceptors. If stores of ammonium nitrate are located within the sympathetic detonation distance of explosives or blasting agents, ½ the mass of the ammonium nitrate shall be included in the mass of the donor.

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Note 2: When the ammonium nitrate and/or Blasting agent is not barricaded, the distances shown in the Table shall be multiplied by six. These distances allow for the possibility of high velocity metal fragments from mixers, hoppers, truck bodies, sheet metal structures, metal containers, and the like which may enclose the "donor." Where storage is in bullet-resistance magazines recommended for explosives or where the storage is protected by a bullet-resistant wall, distances and barricaded thickness in excess of those prescribed in the American Table of Distances are not required.

Note 3: The distances in the Table apply to ammonium nitrate that passes the insensitivity test prescribed in the definition of ammonium nitrate fertilizer promulgated by the Fertilizer Institute: (Definition and test Procedures for Ammonium Nitrate Fertilizer, May 8, 1971) and ammonium nitrate failing to pass said test shall be stored in separation distances determined by competent persons and approved by the Marshal.

Note 4: These distances apply to blasting agents which pass the insensitivity test prescribed in regulations of the U.S. Department of Transportation and the U.S. Department of the Treasury, Bureau of Alcohol, Tobacco and Firearms.

Note 5: Earth, or sand dikes, or enclosures filled with the prescribed minimum thickness of earth or sand are acceptable artificial barricades. Natural barricades, such as hills or timber of sufficient density that the surrounding exposures which require protection cannot be seen from the "donor" when the trees are bare of leaves, are also acceptable.

Note 6: For determining the distances to be maintained from inhabited buildings, passenger railways, and public highways, use the American Table of Distances for Storage of Explosives Materials.

(4) Storage of Explosives on Water.

(a) No person shall store any explosives on the waters of the Commonwealth unless a permit for such storage has been secured from the State Fire Marshal, and unless the explosives are stored in accordance with the following requirements:

1. Such explosives shall be stored in a magazine located on a boat or vessel used exclusively for the purpose, and such boat or vessel shall be securely moored or anchored according to the direction of the harbor master having jurisdiction. The storage magazines shall be subject to the requirements of 527 CMR 13.05.
2. No detonators shall be stored or transported on a boat or vessel on which any explosives are kept or stored, except in accordance with the applicable provisions of 527 CMR 13.00.
3. No explosives shall be delivered to a boat or vessel or removed therefrom during foggy weather.
4. In the loading or unloading of any explosive, care shall be taken in the handling of same and it shall be so placed or stowed as to prevent displacement during transit.
5. No explosives shall be carried or transported on the waters of the Commonwealth on any vessel which is carrying passengers.
6. Any vessel containing explosives in transit on any of the waters of the Commonwealth shall display on a suitable staff an international Code Flag B (a red flag) readily discernible from a distance of not less than 1,000 feet by day and which shall be properly illuminated at night.
7. No smoking shall be allowed on any vessel containing explosives.
8. All such boats and vessels shall display the word "EXPLOSIVES" in a conspicuous manner so that it may be seen by day from all sides at a distance of not less than 200 feet, and shall be properly illuminated at night.

(b) The requirements of 527 CMR 13.05(4) shall be in addition to applicable U.S. Department of Transportation (U.S. Coast Guard) Regulations, 33 CFR 126 and 46 CFR 194.

(5) Basic Requirements.

(a) Smoking and Open Flames: Smoking, matches, open flames, and spark producing devices shall not be permitted:

1. In any magazine;
2. Within 50 feet of any outdoor magazine; or
3. Within any room containing an indoor magazine.

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(b) Restrictions: For the purpose of licensing and permitting in accordance with 527 CMR 13.00 the capacity of a storage magazine, in pounds, shall be the maximum constructed storage capacity of the magazine as reported to the Federal Bureau of Alcohol Tobacco and Firearms.

1. Magazines: Magazine storage capacities shall not exceed those allowed by the American Table of Distance, regardless of the magazine capacity licensed by M.G.L. c. 148, § 13.

Note: Whenever any Inhabited buildings are erected or new railroad tracks or highways are constructed near a magazine, the permissive capacity of storage magazines shall be reduced to conformity with the *American Table of Distances for the Storage of Explosives*. Whenever the constructed capacity of a magazine is changed, such fact shall be reported to the Marshal in writing without delay.

- a. Empty magazines shall be treated as if the magazines were at maximum allowable storage capacity.
- b. All types of blasting caps in strength through No. 8, shall be rated at 1½ pounds of explosives per 1,000 caps. The Marshal shall designate the ratings of caps higher in strength than No. 8.
- c. Magazines shall be sequentially numbered in minimum two inch block numbers plainly visible on the outside. This number shall correspond to those drawn on a storage facility site diagram, drawn to scale, clearly indicating the separation distances between magazines, inhabited buildings, railways, highways, and other magazines.
- d. Magazines shall be plainly posted on the interior side of the magazine door with the current Table of Distance storage capacity.

2. Detonators: Detonators shall not be stored in the same magazine with other explosive materials, except under the following circumstances:

- a. In a type 4 magazine, detonators that will not mass detonate may be stored with electric squibs, safety fuse, igniters, and igniter cord.
 - b. In a type 1 or type 2 magazine, detonators may be stored with delay devices.
 - c. Explosive materials in excess of 300,000 pounds or detonators in excess of 20 million pieces shall not be stored in one magazine unless approved in writing by the Marshal.
3. Storage within Types 1, 2, 3, and 4 magazines:
- a. Explosive materials within a magazine shall not be placed directly against interior walls and shall be stored so as not to interfere with ventilation. To prevent contact of stored explosive materials with walls, a non sparking lattice work or other non sparking material may be used.
 - b. Containers of explosive materials shall be stored so that marks are visible. Stocks of explosive materials shall be stored so they can be easily counted and checked upon inspection.

Except with respect to fiberboard or other nonmetal containers, containers of explosive materials shall not be unpacked or repackaged inside a magazine or within 50 feet of a magazine, and shall not be unpacked or repackaged close to other explosive materials. Containers of explosive materials shall be closed while being stored.

4. Tools used for opening or closing containers of explosive materials shall be of non sparking materials, except that metal slitters may be used for opening fiberboard containers. Metal tools other than non sparking transfer conveyors shall not be stored in any magazine containing high explosives.

All tools or other implements used in or within ten feet of a magazine shall be of wood, copper, brass or other non sparking material.

5. No person under the age of 18 years shall be employed in or have access to any magazine.

6. Each magazine shall at all times be under the control of a competent person. This shall mean that any penetration of the magazine or magazine area shall be protected by the continuous surveillance of an individual or by an electronic sensing device which shall upon such penetration notify either the head of the police or fire department as the head of the fire department may direct.

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7. All magazines shall be kept in good repair, clean and free from rubbish and empty packages, shall be kept closed and securely locked at all times, and shall be used exclusively for the storage of explosive materials. Oldest stock shall be used first.

8. Upon cessation of the exercise of a license, granted in accordance with M.G.L. c. 148, to store explosive material in a magazine, the holder of said license shall immediately notify the local licensing authority and the head of the fire department in his city, town and the Marshal. The head of the fire department shall ascertain that all hazardous conditions incident to such cessation are eliminated.

(6) Warning Signs: Signs required by 527 CMR 13.05(6) shall be constructed so as to be weather resistant with a reflective surface and conspicuous block lettering at least two inches in height.

(a) The entrance to the magazine area shall be posted with a warning sign with the words: "DANGER -- NEVER FIGHT EXPLOSIVE FIRES -- EXPLOSIVES ARE STORED ON THIS SITE -- CALL (Phone Number).

(b) All approaches to magazine areas shall be adequately posted with warning signs with the words: "DANGER -- KEEP AWAY". Signs shall be so located as to prevent bullets fired at the words into the signs from passing on into the magazine or in the direction thereof.

(7) Housekeeping: Magazines shall be kept clean, dry, and free of grit, paper, empty packages and containers, and rubbish. Floors shall be regularly swept. Brooms and other utensils used in the cleaning and maintenance of magazines shall have no spark producing metal parts, and may be kept in magazines. Floors stained by leakage from explosive materials shall be cleaned according to instructions of the explosives manufacturer. When any explosive material has deteriorated it shall be destroyed in accordance with the advice or instructions of the manufacturer. The area surrounding magazines shall be kept clear of rubbish, brush, dry grass, or trees (except live trees more than ten feet tall), for not less than 25 feet in all directions. Volatile materials shall be kept a distance of not less than 50 feet from outdoor magazines. Living foliage which is used to stabilize the earthen covering of a magazine need not be removed.

(8) Repair of Magazines: Before repairing the interior of magazines, all explosive materials shall be removed and the interior cleaned. Before repairing the exterior of magazines, all explosive materials shall be removed if there exists any possibility that repairs may produce sparks or flame. Explosive materials removed from magazines under repair shall be:

(a) Placed in other magazines appropriate for the storage of those explosive materials under 527 CMR 13.00, or

(b) Placed a safe distance from the magazines under repair where they shall be properly guarded and protected until the repairs have been completed.

(9) Lighting: Electric lighting used in any explosives storage magazine shall meet the standards prescribed by 527 CMR 12.00, the "Massachusetts Electrical Code," for the conditions present in the magazine at any time. All electrical switches shall be located outside of the magazine and shall also meet the standards prescribed by 527 CMR 12.00.

(a) Battery-activated safety lights or battery activated safety lanterns may be used in explosives storage magazines.

(b) Copies of invoices, work orders or similar documents which indicate the lighting complies with 527 CMR 12.00 shall be available for inspection by the head of the local fire department, the Marshal or their designees.

(10) Firefighting: No attempt shall be made to fight a fire that cannot be contained or controlled before it reaches explosive materials. In such cases, all personnel shall be immediately evacuated to a safe location, and the area shall be guarded from entry by spectators or intruders.

The local fire department and other emergency response agencies shall be notified of the location of all magazines and shall be notified of any changes in the location a magazine.

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(11) Operational Procedure Manual: A Magazine Facility Operational Procedure Manual shall be maintained on the storage facility which shall include the following: facility emergency policy and procedures, administrative and emergency notification procedures, scaled plot plan of the storage facility site, showing magazines, inhabited buildings railways and highways within 2,000 feet of the closest magazine, Explosive Material Manufacturers Safety Data Sheets (MSDS) for all explosive materials and SARA Title III Hazardous Materials on the site. This manual shall be kept current and a copy provided upon request to the head of the local fire department and the Marshal or their designees.

Note: a magazine facility containing 10,000 or less pounds of explosive materials shall be exempt from this requirement.

(12) Equivalent Alternate Construction Standards: Alternate storage facilities for explosive materials may be approved by the Marshal when it is shown that such alternate facilities are or will be constructed in a manner substantially equivalent to the standards of construction contained in 527 CMR 13.00 and such construction has been approved by 27 CFR 201(b).

(13) Magazine Alteration: No alteration changing the constructed storage capacity of a magazine shall be made without notifying the Marshal and the head of the local fire department in writing and then receiving written acknowledgment of receipt of the notification from the head of the local fire department or the Marshal.

13.06: Transportation(1) Basic Requirements.

(a) In addition to all applicable requirements of this regulation, intrastate transportation of explosive materials shall comply with the Hazardous Materials Regulations of the U.S. Department of Transportation, 49 CFR 100-179, and Federal Motor Carrier Safety Regulations, 49 CFR 387-397.

(b) 527 CMR 13.06 shall not apply to the transportation of small arms ammunition and components.

(c) Explosive materials shall not be transported through any prohibited vehicular tunnel or subway or over any prohibited bridge, roadway, or elevated highway .

(d) No person shall smoke, carry matches or any other flame-producing device, or carry unauthorized firearms or cartridges while transporting explosive materials.

(e) No person shall drive, load, or unload a motor vehicle transporting explosive materials in a careless or reckless manner.

(f) Explosive materials shall not be carried or transported in or upon a public conveyance or vehicle carrying passengers for hire.

(g) In the event of breakdown or collision, the head of the local fire department and the police authority having jurisdiction shall be promptly notified.

1. Explosive materials shall be transferred from the disabled vehicle to another under the supervision of a person qualified by the owner of the explosive material or at the direction of a police officer, fire officer or the Marshal.

2. Motor vehicles transporting explosives shall not be towed while containing explosive materials unless directed by a police officer, fire officer or the Marshal.

(h) Detonators: No detonating primer may be transported on the same motor vehicle with any Division 1.1, 1.2, or 1.3 (Class A or Class B) explosive material (except other detonating primers or detonators) blasting agent or detonating cord, Division 1.4, (Class C) explosive material. No detonator shall be transported on the same motor vehicle with any Division 1.1, 1.2, or 1.3, (Class A or Class B) explosive material (except other detonators or detonating primers), blasting agent or detonating cord, Division 1.4, (Class C) explosive material unless;

1. It is packed in a U.S. Department of Transportation specification container MC 201, (49 CFR 178.318), or an Institute of Makers of Explosives (IME) Standard Container described in Safety Library Publication 22, or

2. The packaging conforms with requirements prescribed in U.S. Department of Transportation Regulation 49 CFR 173.103(d), and its use is restricted to instances when:

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- a. There is no Division 1.1, 1.2, or 1.3 (Class A or Class B) explosive material or blasting agent loaded on the motor vehicle; and
- b. A separation of 24 inches is maintained between each package of detonators and each package of detonating cord, or
3. It is packaged and loaded in accordance with a method approved by the U.S. Department of Transportation. One method approved by the Department is as follows:

The detonators shall be in prescribed packages which in turn are loaded into suitable containers or separate compartments. Both the detonators and the container or the compartment shall meet the requirements of the Institute of Makers of Explosives Standard (IME) standard container described in Safety Library Publication 22.

(2) Transportation Vehicles.

- (a) Vehicles used for transporting explosive materials shall be capable of carrying the load and shall be in good mechanical condition.
- (b) When explosive materials are transported on a vehicle with an open body, a portable magazine, securely fastened to the vehicle body, shall be used to store the explosive materials.
- (c) Vehicles used for transporting explosive materials shall have no exposed spark-producing surface on the inside of the magazine body.
EXCEPTION: Transportation of bulk explosive materials may be exempted by written authority of the U.S. Department of Transportation.
- (d) Magazines when transporting explosive materials shall be kept locked.
- (e) Floors of transportation vehicles shall be tight.
- (f) Motor vehicles used for transporting any quantity of explosive materials on highways shall display all placards, lettering, or numbering required by the U.S. Department of Transportation.
- (g) Each motor vehicle used for transporting explosive materials shall be equipped with fire extinguishers according to the following schedule:
 1. Trucks—Gross Vehicle Weight (GVW) less than 14,000 lbs At least two extinguishers having combined capacity of 4-A:20-B, C.
 2. Trucks—GVW 14,000 lbs or greater; tractor or semi-trailer units At least two extinguishers having combined capacity of 4-A:70-B, C.
- (h) Only listed fire extinguishers shall be used. Fire extinguishers shall be designed, constructed, and maintained to permit visual determination of whether they are fully charged.
- (i) Extinguishers shall be located where they will be accessible for immediate use.
- (j) Extinguishers shall be examined and recharged periodically according to manufacturers recommendations.
- (k) Where motor vehicles are operated in temperatures below 0°F, dry chemical extinguishers shall be pressurized with nitrogen.
- (l) A motor vehicle used for transporting explosive materials shall be inspected to determine that it is in proper condition. The following items shall be checked:
 1. Fire extinguishers filled and in working order.
 2. All electrical wiring completely protected and securely fastened to prevent short-circuiting.
 3. Chassis, motor, oil pan, and body undersides reasonably clean and free of excess oil and grease.
 4. Fuel tank and fuel lines secure and not leaking.
 5. Brakes, lights, horn, windshield wipers, and steering apparatus functioning properly.
 6. Tires inflated properly and free of defects.
 7. Vehicle in proper condition in every other respect and acceptable for handling explosive materials.

(3) Operation of Transportation Vehicles.

- (a) Vehicles transporting explosive materials shall only be driven by and be under the control of a properly licensed driver who is physically fit, careful, capable, reliable, able to read and write the English language, and not addicted to the use of, or under the influence of, intoxicants, narcotics, or other dangerous drugs.

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(b) The driver of a vehicle transporting explosive materials on highways shall be not less than 21 years old. The driver shall be familiar with traffic regulations, applicable federal and state regulations concerning the transportation of explosive materials, and the provisions of 527 CMR 13.00.

(c) No vehicle transporting explosive materials shall be parked before reaching its destination, even though attended, on any highway adjacent to or in proximity to any bridge, tunnel, dwelling, building, or place where people work, congregate, or assemble.

Note: This requirement does not apply under emergency conditions or as directed by the Marshal, the head of the local fire department, the head of the local police department or their designees.

(d) Every motor vehicle transporting any quantity of explosives shall, at all times, be attended by a driver or other qualified representative of the motor carrier operating the vehicle. This attendant shall have been made aware of the class of the explosive in the vehicle and its inherent dangers, and shall have been instructed in the procedures to be followed in order to protect the public from those dangers. The attendant shall be familiar with the operation of the vehicle, shall be trained to handle the explosive material on board the vehicle, and shall be authorized to remove the explosive material from the vehicle when required.

(e) For the purpose of 527 CMR 13.00, a motor vehicle shall be considered "attended" only when the driver or attendant is physically on or in the vehicle or has the vehicle within his or her field of vision and can reach it quickly and with no interference. "Attended" also means that the driver or attendant is awake, alert, and not engaged in other duties or activities that may divert attention from the vehicle.

Note: Necessary communication with public officers or representatives of the shipper, carrier, or consignee and necessary absence from the vehicle to obtain food or provide for physical comfort does not violate this requirement if such communication or absence complies with U.S. Department of Transportation regulations.

(f) A vehicle carrying explosive materials may be left unattended if parked in an area where such parking is authorized by a storage license or a permit issued by the head of the fire department.

(g) No spark-producing metal or tools, oils, matches, firearms, electric storage batteries, flammable materials, acids, oxidizers, or corrosives shall be carried in the body of any motor vehicle transporting explosive materials.

Note: Exception if allowed by the U.S. Department of Transportation Hazardous Materials Regulations.

(h) Vehicles transporting explosive materials shall avoid congested areas and heavy traffic. If requested by the head of the local fire department, persons transporting explosives shall provide anticipated routes of travel. Where routes through congested areas have been specifically designated by the head of the local fire department such routes shall be followed.

(i) Delivery of explosives shall only be made to persons displaying proper permits and licenses and shall be delivered into magazines or temporary storage or handling areas as authorized by 527 CMR 13.00. No person shall deliver explosive materials to any magazine, building or structure that is not permitted by the Marshal in accordance with 527 CMR 13.04(3)(b). Any person who so delivers such explosive materials shall keep a record of the delivery transaction in accordance with 527 CMR 13.12(3)(a). Said record shall contain the permit number assigned by the Marshal to the magazine, building or structure where said materials are to be stored. The Marshal may suspend or revoke any certificate or permit issued by the Marshal under the provisions of 527 CMR 13.00 for any person who does not comply with the provisions of 527 CMR 13.06(3)(i).

(j) Tires shall be checked for proper inflation and general condition after each two hours or 100 miles of travel, whichever occurs first, and at every rest stop. Flat or overheated tires shall be removed from the vehicle immediately. After removal the tire shall be placed far enough from the vehicle so that a spontaneous ignition of the tire will not endanger the vehicle or its cargo. The tire shall not be replaced on the vehicle until it has been cooled below the danger of ignition nor shall it be used until the problem has been corrected.

(4) Underground Transportation of Explosives.

(a) All explosive materials in transit underground shall be taken to the place of use or storage without delay.

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- (b) The quantity of explosive material taken to an underground loading area shall not exceed the amount estimated by the blaster in charge to be necessary for the blast.
- (c) Explosive material in transit shall not be left unattended.
- (d) The hoist operator shall be notified before explosives or blasting agents are transported in a shaft conveyance.
- (e) Vehicles used for the transportation of explosive material underground shall have the electrical system checked weekly to detect any failures which may constitute an electrical hazard. A certification record shall be kept which includes the date of the inspection; the signature of the person who performed the inspection; and a serial number, or other identifier, of the vehicle inspected.
- (f) The installation of auxiliary lights on vehicle beds which are powered by the truck's electrical system shall be prohibited.
- (g) Explosive materials shall be hoisted, lowered or conveyed in a powder car. No other materials, supplies or equipment shall be transported in the same conveyance at the same time. No one except the operator, his helper, and the powder man shall ride on this powder car.
- (h) No explosive material shall be transported on any locomotive. At least two car lengths shall separate the locomotive from the powder car.
- (i) No explosive materials shall be transported on a man haul.
- (j) Compartments for transporting detonators and explosives in the same car or conveyance shall be physically separated by a distance of 24 inches or by a solid partition of at least six inches.

13.07: Explosive Materials Mixing(1) Blasting Agents:

- (a) The requirements of 527 CMR 13.07 shall not apply to slurry, emulsion and water gel explosive materials.
- (b) Fixed Location Mixing. Buildings or other facilities used for the mixing of blasting agents shall conform to the following requirements, unless other requirements are specifically mandated by the Marshal, the head of the local fire department or their designees:
 1. The exterior shall be constructed of non-combustible materials.
 2. Floors shall be of concrete or other non-absorbent material. They shall have no drains or piping into which molten materials could flow and be confined during a fire.
 3. All liquid fuel storage facilities, including fuel oil, shall be separated from the mixing building, and located in such a manner that in case of tank rupture the liquid will drain away from the mixing building; or diked in a manner to contain the tank contents in case of rupture.
 4. Only heating units which do not depend on combustion processes, properly designed and located, may be used in the plant. Electric heaters with exposed resistance elements shall be prohibited. All combustion sources of heat shall be provided from units located outside the mixing plant.
 5. All internal-combustion engines, such as diesel or gasoline-powered generators, shall be located outside the mixing plant, or shall be properly ventilated and isolated by a permanent firewall. The exhaust systems on all such engines shall be provided with spark-arrested mufflers, or be remotely located, so that any spark emission will not be a hazard to any materials in or adjacent to the plant.

(c) Equipment Used for Mixing.

1. The design of the processing equipment, including mixing and conveying equipment, shall be compatible with the relative sensitivity of the materials being handled. Equipment shall be designed to minimize the possibility of frictional heating, compaction, overloading, accumulation of dust, and confinement. All surfaces shall be accessible for cleaning. All hollow shafts shall be constructed to permit venting with an opening of at least ½ inch diameter.
2. Means shall be provided to prevent the flow of fuel to the mixer in case of fire. In gravity flow systems, an automatic spring-loaded shut-off valve with fusible link shall be installed.

(d) Mix Plant Operation.

1. The mixing, loading, and ingredient transfer areas where residues or spilled materials may accumulate shall be cleaned periodically. A cleaning and collection system for dangerous residues shall be provided.

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2. A daily visual inspection shall be made of the mixing, conveying and electrical equipment to determine that such equipment is in good operating condition. A program of systematic maintenance shall be conducted on a regular schedule.
 3. The entire mixing and packaging plant shall be cleaned regularly and thoroughly to prevent excessive accumulation of dust, grease, and product ingredients.
 4. Smoking, matches, flame-producing devices, open flames and firearms or cartridges shall not be permitted inside of, or within 50 feet of, any building used for the mixing of blasting agents.
 5. Empty ingredient bags shall be disposed of daily in a safe manner.
 6. No welding shall be permitted nor open flames allowed in or around the mixing or storage area of the plant, unless the equipment and area have been completely washed down and all fuels and oxidizing material removed.
 7. Before welding or making repairs to hollow shafts, all fuels and oxidizing material shall be removed from the outside and inside of the shaft by a thorough washing, and the shaft shall be vented.
 8. Other explosive materials shall not be stored in any building used for the mixing of blasting agents.
- (e) Construction of Bulk Delivery and Mixing Vehicles.
1. The body of each vehicle used for the bulk delivery and mixing of blasting agents shall be constructed of noncombustible materials.
 2. All moving parts of the mixing system shall be designed so as to prevent heat build-up. Shafts or axles which contact the product shall have outboard bearings.
 3. Bulk mix delivery equipment shall be strong enough to carry the load without difficulty and be in good mechanical condition.
 4. When electric power is supplied by a self-contained motor generator located on the vehicle, the motor generator shall be separated from the blasting agent discharge.
 5. Processing equipment shall conform to the provisions of 527 CMR 13.07(1)(c).
 6. A positive action parking brake which will set the wheel brakes on at least one axle shall be provided on vehicles equipped with air brakes and shall be used during bulk delivery operations. Wheel chocks shall supplement parking brakes.
- (f) Blasting Site Operation of Bulk Delivery and Mixing Vehicles.
1. Motor vehicles transporting blasting agents shall be driven by a properly licensed driver not less than 21 years of age. The driver shall be physically fit, careful, capable, reliable, and able to read and write the English language. The driver shall be familiar with applicable local, state, and federal laws and regulations governing the transportation of explosive materials to the location and on the site.
 2. The driver shall not be an unlawful user of or addicted to alcohol, narcotics, or dangerous drugs.
 3. The driver shall be trained in the safe operation of the vehicle, together with its mixing, conveying, and related equipment. He shall be familiar with the product being delivered and the general procedure for handling emergency situations.
 4. No one shall be permitted to ride on, or load or unload, a vehicle containing blasting agents while under the influence of intoxicants, narcotics, or dangerous drugs.
 5. No person shall smoke, carry matches or any other flame-producing device, or carry any firearms while in or near bulk vehicles effecting the mixing, transfer or down-the-hole loading of blasting agents at or near the blast site.
 6. Caution shall be exercised in the movement of the motor vehicle at the blast site to avoid driving the vehicle over or dragging hoses over firing lines, detonator wires or tubes, or explosive materials.
 7. No in-transit mixing of blasting agents shall be performed.
- (g) Repairs to Bulk Delivery and Mixing Vehicles.
1. No welding or open flames shall be used on or around any part of a bulk delivery vehicle until all oxidizing materials and blasting agents have been removed and the equipment has been completely washed down.
 2. Before welding or making repairs to hollow shafts, all fuel and oxidizing material shall be removed from the outside and inside of the shaft by a thorough washing, and the shaft shall be vented with a minimum ½ inch diameter opening.
- (2) Slurry, Emulsion and Water Gel Explosive Materials.
- (a) The following requirements shall apply to the manufacture of slurry, emulsion and water gel, explosive materials.

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- (b) Basic Requirements. Handling and processing procedures shall prevent the explosive materials, or their liquid ingredients, from drying out or otherwise losing their liquid or water content.
- (c) Fixed Location Mixing.
1. The exterior of mixing buildings shall be of noncombustible construction.
 2. Floors shall be of concrete or other nonabsorbent material. They shall have no drains to piping into which molten materials could flow and be confined during a fire.
 3. All liquid fuel storage facilities, including fuel oil, shall be separated from the mixing building and located in such a manner that in case of tank rupture, the liquid will drain away from the mixing plant; or be diked in a manner to contain the tank contents in case of rupture.
 4. Mixing buildings shall be ventilated to prevent harmful exposure to fumes or dusts.
 5. Only heating units which do not depend on combustion processes, properly designed and located, shall be used in the plant. Electric heaters with exposed resistance elements shall be prohibited. All combustion sources of heat shall be provided from units located outside the manufacturing building.
 6. Spills or leaks of oxidizer salt solution which may contaminate combustible materials shall be cleaned up immediately.
 7. Metal powders such as aluminum shall be kept dry and shall be stored in containers or bins which are moisture-resistant or weather tight. Solid fuels shall be handled in such manner as to prevent dust explosion hazards.
 8. Oxidizers and fuels shall be stored in separate buildings or in such a manner that intermixing will not occur in the event of spills.
 9. The design of the processing equipment, including mixing and conveying equipment, shall be compatible with the relative sensitivity of the materials being handled. Equipment shall be designed to minimize the possibility of frictional heating, compaction, overloading, and confinement.
- (d) Construction of Bulk Delivery and Mixing Vehicles.
1. Motor vehicles used over highways for the bulk transportation of slurry, emulsion and water gel explosive materials or ingredients used in their formulation, shall meet the requirements of 527 CMR 13.06: *Transportation*.
 2. Processing equipment shall conform to the requirements of 527 CMR 13.07(2)(c).
 3. A positive action parking brake which will set the wheel brakes on at least one axle shall be provided on motor vehicles equipped with air brakes and shall be used during bulk delivery operations. Wheel chocks shall supplement parking brakes.
 4. Pressure relief valves shall be installed on containers of ingredients that may produce pressures under confinement. The valve discharge shall be directed so as to prevent harm to personnel in the vicinity of the motor vehicle in the event of over pressurization.
 5. Liquid ingredient tanks shall be constructed to dampen movements of contents during transportation if such movements could cause a loss of motor vehicle control or any other hazardous condition.
- (e) Blasting Site Operation of Bulk Delivery and Mixing Vehicles.
1. Motor vehicles transporting slurry, emulsion and water gel, explosive materials or ingredients for the formulation, shall be driven by a properly licensed driver not less than 21 years of age. The driver shall be physically fit, careful, capable, reliable, and able to read the English language. The driver shall be familiar with applicable local, state, and federal laws and regulations governing the transportation of explosive materials, or ingredients for their formulation, to the location and on the site.
 2. The driver shall not be an unlawful user of or addicted to alcohol, narcotics or dangerous drugs.
 3. The driver shall be trained in the safe operation of the motor vehicle together with its mixing, conveying, and related equipment. He shall be familiar with the product being delivered and the general procedure for handling emergency situations.
 4. No one shall be permitted to ride on, or load or unload, a motor vehicle containing explosive materials, or ingredients for their formulation, while under the influence of intoxicants, narcotics, or dangerous drugs.

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5. No person shall smoke, carry matches or any other flame-producing device, or carry any firearms while in or near motor vehicles effecting the mixing, transfer, or down-the-hole loading of explosive materials.
6. Caution shall be exercised in the movement of the motor vehicle over or dragging hoses over firing lines, detonator wires or tubes, or explosive materials.
7. No in-transit mixing of explosive materials shall be performed.

13.08: Plosophoric Materials (Binary Explosive Material)(1) Storage.

- (a) Plosophoric components shall be stored in separate locked containers. If any component possesses a hazard classification, it shall be stored in a location and manner appropriate to its hazard class.
- (b) Plosophoric materials may be stored in the same magazine with explosive materials, provided their total weight is included in the weight of explosives permitted in the magazine so as to comply with the quantity-distance requirements of the American Table of Distances. Storage shall not introduce a hazard due to chemical incompatibility.

(2) Use.

- (a) When plosophoric materials are mixed or combined at the point of use, the procedures recommended by the manufacturer shall be strictly followed.
- (b) Since the mixing or combining of plosophoric components produces an explosive material the number of packages combined at any one time shall be limited to the number needed for immediate use.
Note: This requirement may be waived if the extra explosive material produced can be handled and stored as such.
- (c) Mixed or combined plosophoric materials shall be transported, stored, and used in the same manner as explosives.
- (d) For transportation and storage, individual packages of each plosophoric component shall be packaged in separate shipping containers, in compliance with U.S. Department of Transportation Hazardous Materials Regulations.

13.09: Use of Explosive Materials (Blasting)(1) Basic Requirements.

- (a) All state, and local laws and regulations applicable to obtaining, keeping, transporting, storing, handling, and using explosive materials shall be followed. The purpose of 527 CMR 13.09 also provides for the establishment of limits on the permissible levels of blasting effects to reasonably assure that blasting does not cause injury, or damage outside the blast area.
- (b) Explosive materials shall be protected from unauthorized possession and shall not be abandoned.
- (c) Explosive materials shall be used under the control of experienced blasters who are familiar with the hazards involved and who hold all required licenses, permits, certificates and authorizations.
 1. Loading shall be performed or supervised by a blaster possessing a current Certificate of Competency.
 - a. No blasting operation shall be conducted at any time unless a blaster holding a Certificate of Competency shall be physically present to direct, supervise and be responsible for such blasting operation.
 - b. Trainees, helpers, and other persons shall work only under the supervision of a blaster holding a Certificate of Competency.
 2. No boreholes shall be loaded except those to be fired in the next round of blasting. After loading, all remaining explosives and excess blasting caps shall be immediately returned to their separate storage magazines.
 3. Stemming shall consist of clean fine clay, sand or crushed rock. The use of leaves or trash is prohibited. Each blast hole shall be stemmed to the collar and provide sufficient confinement of the charge to minimize the chance of injury to personnel from flying material.

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4. No person shall buy, receive, accept delivery, keep or store, any explosive material unless he possesses storage facilities as required by 527 CMR 13.00.
 - a. The provisions of 527 CMR 13.00 as they apply to job site magazines may be waived if delivery is made from an approved magazine or a U.S. Department of Transportation approved container direct to a blast site for immediate placement in previously prepared boreholes and further provided that the explosives shall be detonated in their entirety prior to sunset of the day of delivery, or removed from the site.
 - b. All storage magazines, when containing explosive materials, shall be locked and safeguarded against theft or tampering.
- (d) No explosive materials shall be located, kept or stored where they may be exposed to flame, excessive heat, sparks, impact or theft.
 1. No firearms shall be discharged into or in the vicinity of a vehicle containing explosive materials or into or in the vicinity of a location where explosive materials are being handled, used, or stored.
 2. No smoking shall be permitted within 50 feet of any location where explosives are being handled or used.
 3. No person within 50 feet of any location where explosives are being handled or used shall carry any matches, open light, or other fire or flame.

Note: Suitable devices for lighting safety fuse are exempt from this requirement.
- (e) No person under the influence of intoxicating liquors, narcotics, or other dangerous drugs shall be allowed to handle explosive materials.
- (f) No attempt shall be made to fight a fire that cannot be contained or controlled before it reaches explosive materials. In such cases the local fire department shall be immediately notified, all personnel shall be immediately evacuated to a safe location, and the site guarded from entry by spectators or intruders until the arrival of the head of the fire department or his designee.
- (g) Unauthorized or unnecessary personnel shall not be present where explosive materials are being handled, used, or stored.
- (h) Explosive materials shall be kept in properly marked closed containers or packages while being transported between the storage magazine and the blasting site.

Note: Partial reels of detonating cord need not be in closed containers, unless transported over highways.
- (i) Containers of explosive materials shall not be opened in any magazine or within 50 feet of any magazine.

Non sparking tools shall be used for opening any package or container of explosive materials.

Note: Metal slitters may be used for opening fiberboard containers
- (j) Explosive material shall not be used in a manner contrary to the instructions of the manufacturer of the explosive materials.
- (k) **Blast Analysis:** Before conducting a blast the blaster shall conduct a blast analysis of the overall factors affecting the blasting operations. This analysis shall consider; adjacent area structure(s), building(s), building foundations, utilities, including gas and water supply lines, septic systems and swimming pools, and area geology within 250 feet of the center of the blast site and the identification of commercial equipment such as computers, electron microscopes, laser equipment, relays etc., which are sensitive to vibrations, and other underground objects that might be damaged by the effects of a blast.
 1. A blast analysis shall be compared to the blast design plan [described in 527 CMR 13.09(1)(l)] to establish a sound relationships between the blast design and the effects of blasting upon the neighborhood within the blast area. The blast analysis shall contain a discussion of plan factors to be used which protect the public and meet the applicable airblast, flyrock, and ground vibration standards of 527 CMR 13.00.
 2. The area of the blast analysis shall be within 250 feet from the closest borehole.
- (l) **Blast Design Plan:** When blasting is done in a congested area or within 250 feet of a building, structure, railway, or highway, or any other installation that may be affected, precautions shall be taken by the blaster in the design of the blast plan to prevent damage and to minimize adverse effects including ground vibrations, air blast and flyrock.
 1. Such precautions shall include but not be limited to, review of each shot variable or dimension to ensure a blast design plan which establishes sound relationships between current industry standards and the allowable limits of the effects of blasting.

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2. A blast design plan shall describe as a minimum, the amount of material to be removed, benches and lifts, sketches of proposed drill patterns, spacings, free face, borehole size, depth, and angle, stemming, decking, weight of explosive material per delay, delay periods, initiation techniques, the amount of explosive material to be used, critical dimensions, location and descriptions of building(s) and structure(s) to be protected, their number, and the placement of seismographs.

a. All shots shall be designed using the most current industry standards, to prevent excessive air blast, ground vibration, and flyrock.

b. Blasting mats shall be required if the material to be blasted lies within 100 feet of a highway, an inhabited building or structure not under the control of the project.

Note: The requirement of 527 CMR 13.09(1)(k) and (l) shall not affect the issuance of a Use and Handling permit.

(m) A blaster authorized to prepare explosive charges or to conduct blasting operations shall use every reasonable precaution, including but not limited to warning signals, flags, barricades, or other equally effective means to ensure the safety of the general public and workers.

1. A code of blasting signals shall be posted on one or more conspicuous places at the operation. All employees shall be required to familiarized themselves with this code. The code shall be:

WARNING SIGNAL: Three long blasts five minutes prior to blast signal.

BLAST SIGNAL: Two blasts one minute prior to the shot.

2. Blast signals shall be clearly audible for a distance of 250 feet of the blast site.

ALL CLEAR SIGNAL: A prolonged blast following the inspection of the blast area.

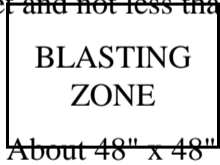
(n) No person shall fire a blast in any blasting operation on Sunday or between the hours of sunset and sunrise unless otherwise authorized in writing by the Marshal or the head of the local fire department, but in any case the authority of the Marshal shall prevail.

(o) Whenever blasting is being conducted in the vicinity of utility lines or rights-of-way, the blaster shall notify the appropriate representatives of the utilities at least 24 hours in advance of blasting, specifying the location and intended time of such blasting. A Dig-Safe number shall be obtained,

Note: This time limit may be waived by the head of the local fire department or the Marshal.

(p) Precautions shall be taken to prevent accidental discharge of electric detonators from currents induced by radar and radio transmitters, lightning, adjacent power lines, dust and snow storms, or other sources of extraneous electricity. These precautions shall include:

1. The posting of signs warning against the use of radio transmitters on all roads within 500 feet ~~and not less than~~ 100 feet of blasting operations.



Specimens of signs which would meet the requirements of 527 CMR 13.09(1).

2. Observance of the latest recommendations with regard to blasting in the vicinity of radio transmitters or power lines, as set forth in IME Safety Library Publication No. 20, *Safety Guide for the Prevention of Radio Frequency Radiation Hazards in the Use of Commercial Electric Detonators (Blasting Caps)*.

3. Surface and underground use, and all handling of explosive materials shall be discontinued during the approach and progress of an electrical storm. All personnel shall move to a safe location.

Consideration shall be given to the fact that lightning has been known to follow steel, piping, and conductive ore.

(2) Blasting Operations.

(a) During the time that boreholes are being loaded or are loaded with explosive materials, blasting agents, or detonators, the blast site shall be barred to all but those persons engaged in the drilling and loading operations or otherwise authorized to enter the site.

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- (b) Boreholes shall be large enough to permit free insertion of cartridges of explosive materials. Boreholes shall not be collared in bootlegs or in holes that have previously contained explosive materials. Holes shall not be drilled where there is a danger of intersecting another hole containing explosive material.
- (c) All boreholes shall be inspected and cleared of any obstruction before loading.
- (d) Pneumatic loading of blasting agents into boreholes primed with electric detonators or other static sensitive initiation systems shall comply with the following requirements:
 - 1. A positive grounding device shall be used for the equipment to prevent accumulation of static electricity.
 - 2. A semi-conductive discharge hose shall be used.
 - 3. A qualified person shall evaluate all systems to assure that they will adequately dissipate static charges under field conditions.
- (e) Tamping shall be done only with wooden rods or approved plastic poles having no exposed metal parts.

Note: Non sparking metal connectors may be used on jointed tamping pole.

 - 1. Violent tamping shall be avoided.
 - 2. The primer shall never be tamped.
- (f) After loading boreholes for a blast is completed and before firing, all excess explosive materials shall be removed from the area and returned to the proper storage facilities.
- (g) As soon as practical after all boreholes are connected, prior to connecting to a source of initiation such as a blasting machine and until the shot has been fired and subjected to post-blast examination, the blast area shall be guarded or barricaded and posted.

(3) Initiating Blasts.

- (a) The blaster shall establish the boundaries of the blast site and secure the blast area prior to firing the blast.
- (b) Cap and fuse shall not be used to initiate blasts in congested areas or on or adjacent to highways open to traffic.

When safety fuse is used, the burning rate shall be determined and in no case shall fuse lengths less than 120 seconds be used. The detonator shall be securely attached to the fuse with a standard ring-type cap crimper.
- (c) When electric detonators are used, stray current tests shall be made as frequently as necessary. Maximum stray current shall not exceed 0.05 amperes through a 1-ohm resistor, measured at the blast site. Non-electric initiating systems shall be used unless corrective action is taken to reduce the stray current below the limits indicated in 527 CMR 13.09(3)(c).
- (d) Electric detonators of different brands shall not be used in the same firing circuit.
 - 1. Electric detonators shall be fired within the firing currents in the range recommended by the manufacturer.
 - 2. The firing circuit shall be completely insulated from ground or other conductors.
 - 3. Aluminum wire shall not be used in blasting circuits.
 - 4. No damaged leading or connecting wire shall be used in any blasting circuits.
 - 5. All wire ends shall be clean before connecting.
- (e) All electric blasting circuits and other initiating systems whose continuity can be tested (such as gas detonator initiating systems) shall be tested with a blasting galvanometer or other blast continuity test instrument, as appropriate, that has been designed and approved for the purpose. All electrically initiated blasts shall be made by using blasting machines suitable for the circuitry being fired.
- (f) No detonator shall be inserted in explosive materials that do not have a cap well without first making a hole in the cartridge with a proper size suitable non sparking tool made for the purpose.
 - 1. Primers shall not be assembled closer than 50 feet from any magazine. Primers shall be made up only when and as required for immediate needs.
 - 2. Adequate priming shall be used. If any uncertainty exists about the amount of priming necessary, the manufacturer shall be consulted.
 - 3. Primers shall be made up only at the time of use and as close to the blast site as conditions allow.
 - 4. When using non-electric initiation systems:
 - a. The selection of the initiation system and the design of the blast shall be under the supervision of the blaster in charge;

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- b. The initiation system shall be used in accordance with the manufacturer's instructions;
 - c. The blaster in charge shall conduct a visual check after blast hookup;
 - d. When using a system that can be tested for continuity, the blast layout shall be tested for continuity as recommended by the manufacturer; and
 - e. Where judged to be necessary by the blaster in charge, a double trunkline or closed-loop hookup shall be used.
- (g) Only the blaster in charge shall fire the blast. All connections shall be made progressively from the borehole back to the initiation point. Blasting lead lines shall remain shunted (shorted) and shall not be connected to the blasting machine or other source of current until the blast is to be fired.
- (h) No blast shall be fired until the blaster in charge has made certain that all surplus explosive materials are in a safe place, all persons and equipment are at a safe distance or under sufficient cover, and that an adequate warning signal has been given.
- 1. No blast shall be fired without a positive signal from the blaster in charge.
 - 2. Adequate warning shall be given to all personnel in proximity to the blast site at least five minutes in advance of each blast.
- (4) Procedures After Blasting.
- (a) No person shall return to the blast area until permitted to do so by the blaster.
 - (b) The blaster shall allow sufficient time for smoke and fumes to dissipate and for dust to settle before returning to the blast site.
 - (c) The blaster shall inspect the entire blast site for misfires before allowing other personnel to return to the blast area.
- (5) Misfires.
- (a) If a misfire is found, the blaster shall provide safeguards for excluding all personnel from the blast area.
 - (b) No other work shall be done other than that necessary to remove the hazard. Only those persons necessary to do this work shall remain at the blast site.
 - (c) No attempt shall be made to extract explosive materials from a misfired hole. A new primer shall be inserted, and the hole shall be re-blasted.
Note: If re-blasting presents a hazard, the explosive materials may be washed out with water, or, where the misfire is under water, blown out with air.
 - (d) If there are any misfires using cap and fuse, all personnel shall stay out of the blast site for at least 30 minutes.
 - (e) If there are any misfires using other non electric detonators (*i.e.*, other than cap and fuse) or using electric detonators, all personnel shall stay out of the blast site for at least 15 minutes.
 - (f) If there is reason to believe that the explosive is burning in the hole, no person shall return to the vicinity of the misfire for at least 12 hours, and the site shall be guarded in the interim.
 - (g) If a misfire is suspected, all initiating circuits (electric or non-electric) shall be carefully traced and a search made for unexploded charges.
 - (h) No drilling, digging, or picking shall be permitted until all misfires have been detonated or until the blaster in charge approves the resumption of work.
 - (i) No person shall be permitted to examine a shot after a misfire until specifically authorized by the blaster. If practicable the misfired charge shall be re-primed and fired. Misfires shall be handled only by or under the direction of the blaster.
- (6) Disposal of Explosive Materials.
- (a) Empty containers and packages and paper or fiberboard packing materials that have previously contained explosive materials shall not be reused for any purpose. Such packaging materials shall be destroyed by burning at an approved outdoor location. All personnel shall remain at a safe distance from the disposal area.
 - (b) All explosive materials that are obviously deteriorated or damaged shall not be used and shall be destroyed according to the instructions of the manufacturer.
 - (c) In the event that it becomes necessary to destroy any explosives, either because of damage to containers, deterioration, or any other reason, all handling of explosives shall cease and the manufacturer shall be immediately contacted for assistance. The manufacturer's advice shall be followed without deviation.

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(7) Quarry Blasting.

(a) Quarry blasting shall be conducted in strict compliance with 527 CMR 13.09.

(b) Whenever quarry blasting is conducted within 500 feet of building(s) used for human habitation a series of durable warning signs shall be erected along the entire perimeter of any rock face more than six feet high. They shall be spaced not more than 75 feet apart and set back a reasonable distance from the face. Each sign shall contain the words "WARNING - BLASTING AREA - DANGER" in letters at least two inches in height.

(c) Alternative Allowable Vibration Levels: Alternative limits of the effect of blasting may be adopted for quarry operations located adjacent to inner city areas as a local municipal regulation adopted in accordance with M.G.L. c. 148, § 9.

(8) Blaster's Log:

(a) A blaster who performs blasting operations shall maintain a blaster's log on a form approved by the Marshal recording each blast. The blaster's log shall be completed within six hours of a blast and retained for a minimum of three years from the date of the blast.

(b) Blasters' logs shall be made readily available to the Marshal, the head of the local fire department or their designees. The blaster's log shall contain the;

1. Name, signature, and Certificate of Competency Number of the blaster in charge.
2. Blast location, address, city, description
3. Date and time of blast
4. Type of material blasted
5. Distance in feet, to the nearest inhabited building or structure, neither owned or leased by holder or holder client of the Explosives User Certificate.
6. Scaled distance or alternative option used to determine blast design
7. Type of matting or cover over blast if applicable
8. Weather conditions, including temperature, cloud cover, wind direction
9. Blast plan and sketch showing blast hole diameter, delay, delay pattern and types of detonators, spacing, depth of blast hole, hole pattern and number of holes
10. Explosive material type, size, total weights of each explosive by hole
11. Type of initiation system. (Methods of firing and type of circuit)
12. Feet of over burden, depth and type of stemming
13. Maximum weight of explosives detonated within any eight millisecond period.
14. The seismograph(s) location(s) including distance and direction from the seismograph to the closest borehole and from the seismograph to the closest structure.
15. Seismograph readings including peak particle velocity, frequency and airblast
16. Type of seismograph, instrument make, model serial number, calibration date and sensitivity settings
17. Name of person taking the seismograph reading. The name and firm analyzing the seismograph record if applicable.
18. Complaints or comments following the blast.

(c) Blasts that exceed the maximum allowable peak particle velocity frequency or decibel levels established by 527 CMR 13.00 or are known by the blaster in charge to have produced flyrock, shall be reported to the head of the local fire department within 24 hours and a written report shall be provided within five days.

(d) Blasters' logs shall be available at any time for inspection by the head of the local fire department, the Marshal, their designees, or a police officer representing the Use and Handling permit issuing authority.

(9) Allowable Limits of Effects of Blasting.

(a) Blasting effects include ground vibration, airblast and flyrock. Allowable limits of airblast and ground vibration contained in 527 CMR 13.00 are based, with a conservative factor of safety, upon extensive government, university, and engineering research which has established the amount and character of vibration so as to prevent damage and to insure the safety of the public and the protection of property adjacent to the blast area.

Except as otherwise authorized by 527 CMR 13.00, blasting shall be conducted so that the affects of ground vibration and airblast, as indicated by the seismograph readings (including extrapolations when required), do not exceed the limits specified in 527 CMR 13.09(9) figures (a) and (b), and Table 3, and shall conform to either Option 1 or Option 2 listed in 527 CMR 13.09(9)(b).

13.09: continued

(b) The blaster shall use one of the options specified below:

Option 1: Scaled Distance Equations. The blasting operation shall use a seismograph to monitor a blast to assure compliance with Table 1 and Table 2 and Figure (a) and (b), or may be granted special permission by the Marshal or the head of the local fire department to utilize a modified scaled distance factor.

Table 1

Distance from Blast (Feet)	Scaled Distance Factor (D _s)
0 - 49	Construction*
50 - 300	50
301 - 5000	55
Over 5001	65

*Explosive weights are as contained in the Example

SCALED DISTANCE

Formula Charge weight per delay (W) = (D / D_s)²

Where W = Weight of explosives detonated per delay period
(within 8 milliseconds) in pounds

 D = Distance from borehole to closest structure in feet.

 D_s = Scaled Distance Factor (in Ft / lbs to the 0.50 power)

Example Distance to structure = 100 feet
 Scaled distance (from Table 1) = 50
 Weight = ?

$$W = (100 / 50)^2 = (2)^2 = 4 \text{ lbs. per delay}$$

Formula Distance per Charge weight D = D_s (W)^{0.5}

Example 50(4)^{0.5} = 100 feet

Where W = Weight of explosives detonated per delay period
(within 8 milliseconds) in pounds

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13.09: continued

Table 2

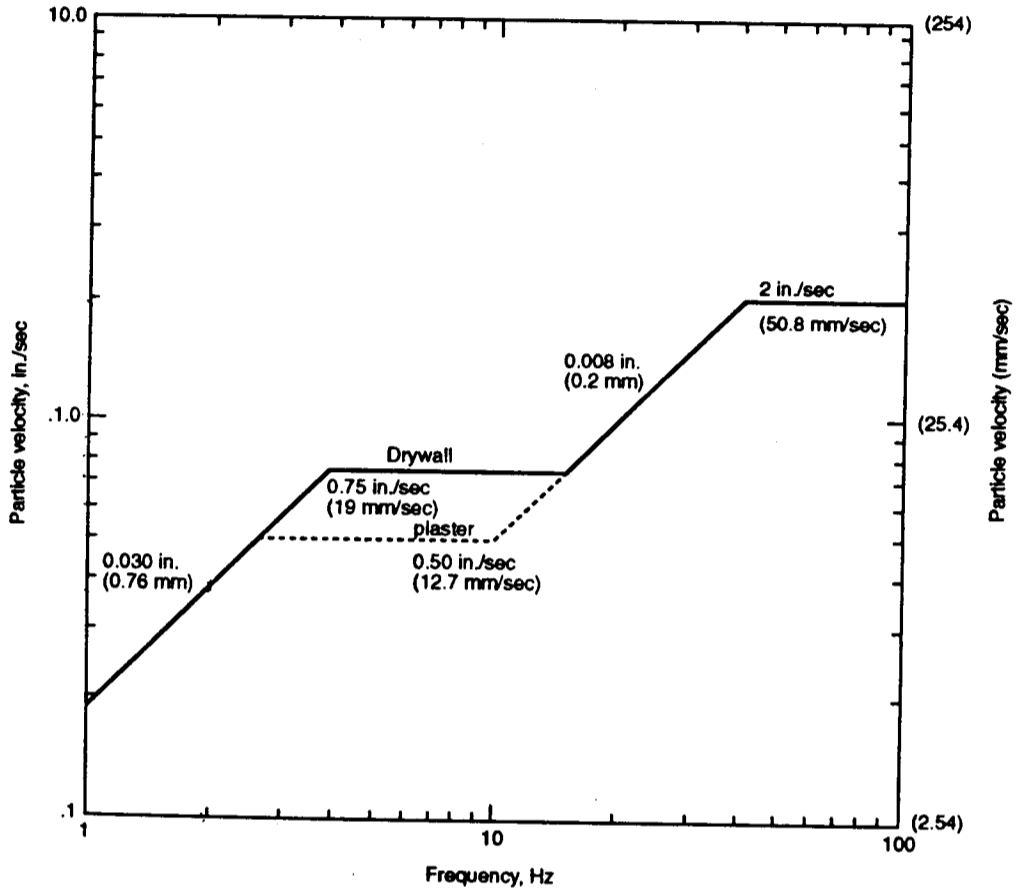
Distance in Feet	Construction Distance 0-49 (W=lbs)	Scaled Distance 50 50 - 300 (W=lbs)	Scaled Distance 55 301-5000 (W=lbs)	Scaled Distance 65 Over 5001 (W=lbs)
0-10	0.12			
11-15	0.25			
16-20	0.50			
21-24	0.75			
25-49	0.85			
50		1.00		
75		2.25		
100		4.00		
200		16.00		
300		36.00		
400			52	
500			82	
600			119	
700			161	
800			211	
900			267	
1000			330	
1500			743	
2000			1322	
3000			2975	
4000			5289	
5000			8264	
6000				8520
7000				11597
8000				15147
9000				19171
10000				23668

When the blasting operation considers the scaled distance equations of Option 1 as being too restrictive, the operation may petition the Marshal or the head of the local fire department to use a modified scaled distance equation. Such a petition shall demonstrate that the use of a modified scaled distance equation would not cause predicted ground vibration to exceed the peak particle velocity limits specified in Figure (a) or Figure (b). Any petition for modification of the scaled distance equations shall be thoroughly substantiated by seismograph recordings to show that the limitations of Figure (a) or Figure (b) will not be exceeded.

13.09: continued

Option 2: In lieu of tables 1 and 2, a blaster may, after notification to the permit granting authority, have the option to use the graphs shown in Figures (a) or (b) to limit peak particle velocity based upon the frequency of the blast vibration.

Figure (a)

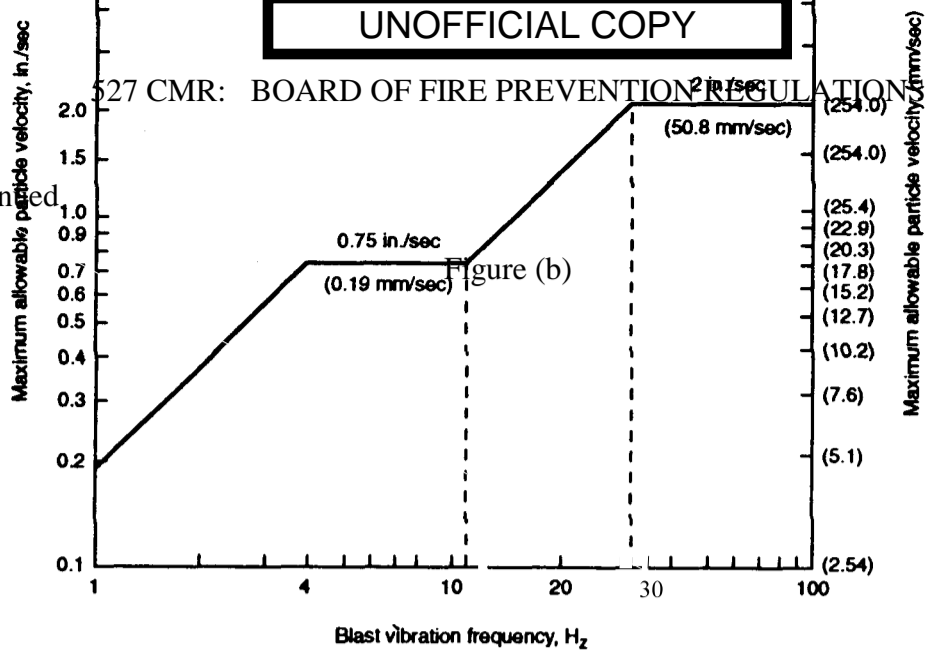


PARTICLE VELOCITY v. FREQUENCY
UNITED STATES BUREAU OF MINES RECOMMENDATION
(RI850 7, 1980)

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527 CMR: BOARD OF FIRE PREVENTION REGULATION

13.09: continued



PARTICLE VELOCITY v. FREQUENCY
OFFICE OF SURFACE MINING REGULATION

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13.09: continued

Air blast. Airblast as indicated by readings of a seismograph placed in accordance with 527 CMR 13.09(9)(c) 3, shall not exceed the maximum limits in Table 3.

Exception: The owner of any property not owned, leased or controlled by the blasting operation has provided a written waiver to the blasting operation to exceed the limits in Table 3 at said property.

Table 3

Lower Frequency Limit of Measuring System		Maximum Allowable Level (Decibels)
0.1 Hertz or lower when using a 0.1 Hz high pass linear measurement method*	Flat Response	134 Peak
2 Hertz or lower when using a 2.0 Hz linear peak response	Flat Response	133 Peak
6 Hertz or lower when using a 5 or 6 Hz linear peak response	Flat Response	129 Peak
C - Weighted when using the db-C weighting scale and when events do not exceed a 2 second duration	Slow Response	105 Peak dbc

*Only when approved by the Marshal or the head of the local fire department

Flyrock. Flyrock traveling in the air or along the ground shall not be cast from the blast site in an uncontrolled manner which could result in personal injury or property damage. Flyrock shall not be propelled from the blast area onto property not controlled by the blasting operation.

(c) Seismic instruments shall be capable of reading and recording the acceptable level limits specified in this section and shall be maintained and calibrated in accordance with the instructions of the instrument manufacturer. Records of maintenance and calibration shall be made available to the Marshal and the head of the local fire department upon request.

1. In order to meet the intent of 527 CMR 13.00 seismic measurement records shall include peak particle velocity, particle velocity, time history, and vibration frequency levels, the distance and direction from the closest borehole, and the exact location of the instrument.
2. All seismographs used to comply with 527 CMR 13.00 shall meet the following minimum specifications:
 - a. Seismic Frequency Range: 2 to 200 Hz (\pm 3db)
 - b. Acoustic Frequency range; 2 to 200 Hz (\pm 1db)
 - c. Velocity Range: 0.02 to 4.0 inches/second
 - d. Sound Range: 90 to 140 db Linear
 - e. Transducers: Three mutually perpendicular axes (Radial, Transverse and Vertical)
 - f. Recording: Provide time-history of waveform
3. Seismograph Placement: The seismograph shall be placed at the nearest inhabited building or structure adjacent to the blast area that is not owned, leased, or controlled by the blasting operation. The seismograph shall also be placed on or in the ground on the side of the structure directly facing the blast site and shall be placed within five to ten feet of the structure. In these cases compliance with 527 CMR 13.00 shall be determined by the recordings at the seismograph. If there is no suitable location for seismograph placement within ten ft. of the structure that is mutually agreed upon by the blaster and the head of the fire department or his designee, the condition which made it unsuitable to place to seismograph within ten feet of the structure and the alternative location agreed upon by the head of the fire department or his designee shall be noted, in writing in the blast plan. In these cases, compliance with 527 CMR 13.00 shall be determined by using seismograph recordings and extrapolating ground vibration and air blast, to the nearest inhabited structure, using accepted engineering practices.

13.09: continued

Exception: If the person in control of said nearest structure refuses to grant permission for seismograph placement as required by 527 CMR 13.09(9)(c)3., the head of the fire department shall be immediately notified. Such refusal shall be further documented in writing by the blaster and be placed in the blasting record. Placement of the seismograph shall then be at a location mutually agreed upon by the blaster and the head of the fire department or his designee.

(d) In the case of underground pipelines, bridges, roadways, steel construction and other heavy construction where prescribed vibration or airblast levels would be overly restrictive in relation to the nature of the project vibrations and airblast levels in excess of the tables listed above shall be allowable when authorized in writing by the owner or representative of the owner of adjacent inhabited building(s) or structure(s) within the blast area.

(e) Preblast surveys shall be conducted in accordance with 527 CMR 13.09(10). Preblast surveys may be waived in Construction blasting at the option of the head of the local fire department.

(f) Seismograph monitoring shall be required for all blasting operations.

(10) Preblast Inspection Surveys.

(a) The intent of a preblast survey is to provide documentation of the existing physical condition of buildings and structures within the blasting area with the dimensions of each observed defect clearly noted. When blasting within 250 feet of a structure, as measured from the closest borehole to the structure, or structures, not owned or controlled by the project, a pre blast inspection survey shall be offered. It shall be the responsibility of the blaster to notify structure owners of the survey.

1. The preblast survey shall document the existing visual conditions of the interior and exterior of the structure including improvements to the property and other physical factors that could reasonably be affected by the blasting. Structures such as pipelines, cables, transmission lines, cisterns, wells, and other water systems warrant special attention; however the assessment of these structures may be limited to surface conditions and other readily available data.

2. The survey shall accurately record deficiencies by means of written notes, sketches, photographs, video tape, cassette tape narrative or any other format or combination that sufficiently depicts the pre-existing conditions prior to the blasting.

3. If the owner refuses the survey the inspector shall request that he sign a waiver of the survey. A pre blast survey waiver shall be made on a form approved by the Marshal. If the owner or occupant refuses to sign a waiver, the inspector shall sign the waiver attesting to the refusal.

4. Three attempts shall be made to contact the owner to offer the survey. If no response is made after the second attempt, or the owner refuses to sign a survey waiver, a notice offering the survey shall be sent via any carrier capable of providing a receipt of delivery. A receipt of delivery shall satisfy this requirement.

(b) Surveys shall be conducted by technicians familiar with construction methods and materials, familiar with blasting procedures, and 527 CMR 13.00.

(c) Surveys in excess of the above may be conducted at the discretion of the blaster. If the owner or occupant request surveys in excess of 527 CMR 13.09(10), the cost of the survey(s) shall be paid by the owner or occupant of the structure.

(d) Requirements for pre blast survey may be suspended if the blaster adheres to 527 CMR 13.09(9)(b), Option 1. If this option is selected the blaster named on the Use and Handling Permit shall sign a statement of compliance, on a form approved by the Marshal, to adhere to a Scaled Distance.

(e) When a blast inspection is made, the results of that inspection may only be made available to the head of the local fire department, the Marshal or their designees upon request with the written consent of the occupant of the structure. The blast inspection shall be made available to the owner of the inspected property within a reasonable time after request is made in writing. Failure to provide a blast inspection report within 30 days of such request shall be grounds for revocation of a Use and Handling permit.

(11) Underwater Blasting.

(a) Loading of tubes and casings of dissimilar metals shall not be used because of possible transient electric currents from galvanic action of the metals and water.

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13.09: continued

- (b) Only water resistant blasting caps and detonating cords shall be used for all marine blasting. Loading shall be done through a non sparking metal loading tube when a tube is necessary.
- (c) No blast shall be fired while any vessel under way is closer than 1,500 feet from the blast area. Those on board vessels or craft moored or anchored within 1,500 feet shall be notified before a blast is fired.
- (d) No blast shall be fired while any swimming or diving operations are in progress in the vicinity of the blasting area. If such operations are in progress, signals and arrangements shall be agreed upon to assure that no blast shall be fired while any person is in the water.
- (e) A red blasting flag, 18 inches by 30 inches with the word "EXPLOSIVES" thereon in white letters, at least six inches in height, shall readily be visible in all directions.
- (f) The storage of explosive material shall be in accordance with 527 CMR 13.05(4).
- (g) When more than one charge is placed under water, a float device shall be attached to an element of each charge in such a manner that it will be released by firing. Misfires shall be handled in accordance with 527 CMR 13.09(5).

(12) Charge Activated Device. The use of charge activated hydraulic devices shall comply with the following:

- (a) Use and Handling Permits shall be obtained as required in 527 CMR 13.04(11).
- (b) They shall be exempt from the following, 527 CMR 13.09(1)(k) Blast Analysis, 527 CMR 13.09(9)(f) the use of a seismograph. However, the Blast Design Plan, 527 CMR 13.09(1)(l) is required.
- (c) A blaster's log shall be maintained in accordance with 527 CMR 13.09(8).
- (d) Matting of sufficient size and strength shall be utilized during all detonations.
- (e) All holes must be drilled to the manufacturers specifications and no hole shall be redrilled.

(13) Blasting Damage Complaint.

- (a) Any person or firm alleging damage as a result of blasting operations shall make a complaint on a "Blasting Damage Complaint" form approved by the Marshal and obtained from the local fire department of the city or town where damage occurred. The Complaint shall contain a signed certification. Completed complaint forms shall be returned within 30 days of blasting incident to the head of the fire department concerned.
- (b) The head of the local fire department upon receiving a Blasting Damage Complaint form shall cause the holder of the "Explosives Users Certificate" [Own and Possess] and the blaster in charge, to report to the local fire department with copies of pertinent blasters' logs for the dates in question and to provide copies of the blaster's log for the dates alleged. The blaster in charge shall be interviewed and blast logs examined to determine any violations of 527 CMR 13.00. The local fire department authority shall record the results of his inquiry on the Blasting Damage Complaint Form. The head of the fire department shall retain the original of the complaint form and forward a copy to the Marshal's Office. The holder of the Explosives Users Certificate [Own and Possess] shall receive a copy of the complaint form and acknowledge receipt by signature and date in the space provided on the complaint form. The holder of the Explosives Users Certificate or the holder's insurance carrier shall respond to the claimant within 30 days after the date that the holder received the complaint form.

13.10: Explosive Manufacturing

- (1) Manufacture of explosives shall only be conducted by persons possessing a Federal Explosives Manufacturer License granted in accordance with 27 CFR Part 55. A permit for the manufacturing of explosives shall also be obtained from the Marshal. Said permit shall not be issued until the applicant exhibits a valid Federal Explosives Manufacturer License granted in accordance with 27 CFR Part 55.
- (2) All explosives manufactories shall be supplied with some means of direct communication with the local fire department, such as telephone or fire alarm boxes, for immediate notice in case of fire.
- (3) There shall be a competent watchman on guard at all explosive manufactories except when the same are in actual operation.

13.10: continued

- (4) The entire occupied portion of the premises of an explosives manufacturing building shall be enclosed by a suitable fence to enable the management to have control of all persons entering such premises, and any building in which wet fulminate is stored or dried shall be likewise enclosed within a separate enclosure, the entrance to which shall be kept locked. There shall be a sufficient number of notices conspicuously posted on the outside of these enclosures warning of the business conducted therein.
- (5) No dry vegetation or combustible rubbish shall be allowed to accumulate within 50 feet of any building connected with such manufactories.
- (6) The mixing, compounding, handling, charging or loading of ingredients used in an explosives manufactory shall be conducted by a competent person.
- (7) Persons under the age of 18 years shall not be employed in an explosive manufactory and shall not be permitted to enter such manufactory unless accompanied at all times by some responsible adult person.
- (8) Smoking shall be prohibited upon the premises of explosive manufactories except that smoking may be permitted in such places as may be designated by the head of the fire department in writing. Green and white "smoking area" signs shall be prominently displayed in areas where smoking is permitted. Red and White "No Smoking" signs shall be conspicuously posted about the premises where smoking is prohibited. The carrying of matches or other flame-producing devices upon the premises of explosive manufactories shall be prohibited except in the receptacles especially provided, and only when authorized by the person in charge of the manufactory.

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NON-TEXT PAGE

13.11: Small Arms Ammunition and Primers, Smokeless Propellants, and Black Powder(1) Basic Requirements.

- (a) 527 CMR 13.11 shall apply to the transportation and storage of small arms ammunition, primers and components, smokeless propellants and black powder.
- (b) In addition to all other applicable requirements of 527 CMR 13.00, intrastate transportation of small arms ammunition, small arms primers, smokeless propellants, and black powder shall comply with U.S. Department of Transportation Hazardous Materials Regulations.
- (c) 527 CMR 13.11 shall apply to the channels of distribution of and to the users of small arms ammunition, small arms primers, smokeless propellants, and black powder.
- (d) 527 CMR 13.11 shall not apply to in-process storage and interplant transportation during manufacture.

(2) Small Arms Ammunition.

- (a) No restrictions shall be imposed on the interstate transportation of small arms ammunition other than those imposed by the U.S. Department of Transportation or by other hazardous materials regulations.
- (b) Quantity limitations may be imposed by the head of the local fire department on the storage of small arms ammunition in warehouses, retail stores, and other occupancies by the limitations of the storage facility and by 527 CMR 13.00.
- (c) Small arms ammunition shall be separated from materials classified by the U.S. Department of Transportation as flammable or combustible liquids, flammable solids, and oxidizing materials by a distance of 15 feet or by a fire partition having a fire resistance of at least one hour.
- (d) Small arms ammunition shall not be stored together with explosives unless the storage facility is suitable for the storage of explosives.
- (e) Small arms ammunition that has been exposed to fire or damaged by exposure to water shall not be returned to commercial channels for reasons of consumer safety. The manufacturer shall be contacted to obtain recommendations for disposal of damaged ammunition.

(3) Small Arms Ammunition Primers.

- (a) Small arms ammunition primers shall be transported, kept, or stored in containers approved by the U.S. Department of Transportation.
- (b) Transportation of small arms ammunition primers shall comply with U.S. Department of Transportation Regulations.
- (c) No more than 5,000 small arms ammunition primers shall be transported in a private vehicle.
- (d) No more than 5,000 small arms primers shall be stored in residences.
- (e) No more than 10,000 small arms primers shall be placed on display in commercial establishments.
- (f) Commercial stocks of small arms primers shall be stored as follows:
 - 1. Quantities not exceeding 750,000 may be stored in a building if not more than 100,000 are stored in any one pile and piles are at least 15 feet apart.
 - 2. Quantities exceeding 750,000 may be stored in a building if the following conditions are met:
 - a. The warehouse or storage room shall not be accessible to unauthorized personnel.
 - b. Primers shall be stored in cabinets. No more than 200,000 primers shall be stored in any one cabinet.
 - c. Shelves in cabinets shall have vertical separation of at least two feet.
 - d. Cabinets shall be located against walls of the warehouse or storage room with at least 40 feet between cabinets.
 - e. Separation between cabinets may be reduced to 20 feet if barricades twice the height of the cabinets are attached to the wall midway between each cabinet. The barricades shall extend at least ten feet outward, shall be firmly attached to the wall, and shall be constructed of ¼-inch boiler plate, two-inch thick wood, brick, or concrete block.
 - f. Primers shall be separated from materials classified by the U.S. Department of Transportation as flammable liquids, flammable solids, and oxidizing materials by a distance of 25 feet or by a fire partition having a fire resistance of at least one hour.

13.11: continued

g. The building shall be protected by an automatic sprinkler system installed according to 780 CMR, the Massachusetts Building Code and NFPA 13, *Standard for the Installation of Sprinkler Systems*.

(g) Small arms primers not stored according to 527 CMR 13.11(3)(a) or (b) shall be stored in a Type 4 magazine constructed and located according to 527 CMR 13.00.

(4) Smokeless Propellants.

(a) Transportation of smokeless propellants not exceeding 25 lbs in a private vehicle, shall be transported in shipping containers approved by the U.S. Department of Transportation.

(b) Transportation of quantities of smokeless propellants exceeding 25 lbs but not exceeding 48 lbs, in a private vehicle, shall be transported in a portable magazine having wood walls of at least one inch nominal thickness, and permitted by the Marshal in accordance with 527 CMR 13.04(6).

(c) Transportation of more than 48 lbs. of smokeless propellants in a private vehicle is prohibited.

(e) Smokeless propellants shall be stored in original shipping containers specified by U.S. Department of Transportation Hazardous Materials Regulations.

(f) Smokeless propellants intended for private use in quantities not exceeding 48 lbs stored in residences shall be kept in the original manufacturers container or in a wooden box or cabinet having wooden walls of at least one-inch nominal thickness. All smokeless propellants stored in private residences shall be stored in the original containers; such containers shall be secured in a locked cabinet, closet, or box when not in use.

(g) Smokeless propellants intended for sale in quantities not exceeding 25 lbs, stored in original manufacturers containers of one lbs maximum capacity, may be displayed in commercial establishments without a permit from the head of the local fire department.

(h) Commercial stocks of smokeless propellants shall be stored as follows:

1. Quantities exceeding 25 lbs, but not exceeding 100 lbs, shall be stored in portable wooden boxes having walls of at least one-inch thickness.

Smokeless propellants of 100 pounds or less kept for sale in a building or structure shall be stored in a box or cabinet with wooden walls at least one inch thick. The box or cabinet shall be plainly marked "GUNPOWDER" and shall be kept locked at all times except when necessary to gain access and shall be located on the first floor of the building or structure and shall not be more than ten feet from an exit door.

2. Quantities exceeding 100 lbs, but not exceeding 800 lbs, shall be stored in original manufacturers containers in non portable storage cabinets having walls of at least one inches thickness. Not more than 400 lbs may be stored in any one cabinet, and cabinets shall be separated by a distance of an least 25 feet or by a fire partition having a fire resistance of at least one hour.

3. Quantities exceeding 800 lbs, but not exceeding 5,000 lbs, may be stored in a building if the following requirements are met:

a. The warehouse or storage room shall not be accessible to unauthorized personnel.

b. Smokeless propellant shall be stored in non portable storage cabinets having wood walls at least one inch thick and having shelves with no more than three feet separation between shelves.

c. No more than 400 lbs shall be stored in any one cabinet.

d. Cabinets shall be located against walls of the storage room or warehouse with at least 40 feet between cabinets.

e. Separation between cabinets may be reduced to 20 feet if barricades twice the height of the cabinets are attached to the wall, midway between each cabinet. The barricades shall extend at least ten feet outward, shall be firmly attached to the wall, and shall be constructed of ¼ inch boiler plate, two inches thick wood, brick, or concrete block.

f. Smokeless propellant shall be separated from materials classified by the U.S. Department of Transportation as flammable liquids, flammable solids, and oxidizing materials by a distance of 25 feet or by a fire partition having a fire resistance of at least one hour.

g. The building shall be protected by an automatic sprinkler system installed according to 780 CMR, the Massachusetts State Building Code and NFPA 13, *Standard for the Installation of Sprinkler Systems*.

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13.11: continued

- (i) Smokeless propellants not stored according to 527 CMR 13.11(1), (2), and (3) shall be stored in a type 4 magazine constructed and located according to 527 CMR 13.00.
- (5) Black Powder.
- (a) Black powder not exceeding five lbs transported in a private vehicle, shall be transported in shipping containers approved by the U.S. Department of Transportation.
- (b) Transportation of quantities of black powder exceeding five lbs but not exceeding 25 lbs, in a private vehicle, shall be transported in a portable magazine having wood walls of at least one inches nominal thickness, and permitted by the Marshal in accordance with 527 CMR 13.04(6).
- (c) Transportation of more than 25 lbs. of black powder in a private vehicle is prohibited.
- (d) Transportation of black powder in excess of 25 lbs, interstate, shall be according to U.S. Department of Transportation Regulations.
- (e) Black powder shall be stored in shipping containers specified by the U.S. Department of Transportation Hazardous Materials Regulations.
- (f) Black powder intended for private use in quantities not exceeding five lbs, stored in residences, shall be kept in manufacturers containers or in a wooden box or cabinet having wooden walls of at least one inch nominal thickness. All black powder stored in private residences shall be secured in a locked cabinet, closet or box when not in use.
- (g) Black Powder intended for sale in quantities exceeding five lbs, stored in the original manufacturers containers of one lb maximum capacity may be displayed in commercial establishments with a permit from the head of the local fire department.
- (h) Commercial stocks in a building in quantities not exceeding 50 lbs shall be stored in a Type 4 indoor magazine that is plainly marked "GUNPOWDER". The magazine shall be kept locked at all times except when necessary to gain access and shall be located on the first floor of the building or structure and not more than ten feet from an exit door..
- (i) Commercial stocks in quantities exceeding 50 lbs shall be stored in a Type 4 outdoor magazine.
- (j) If smokeless propellants are stored in the same magazine with black powder, the total quantity shall not exceed that permitted for black powder.
- (k) Commercial shipments of black powder intended for use in small arms may be shipped [in quantities not exceeding 50 lbs], subject to the requirements set forth in U.S. Department of Transportation, Exemption Certificate E-8958.

13.12: General Provisions

- (1) All premises where explosive materials are handled or kept shall be provided with such additional fire protection equipment as the Marshal or head of the local fire department may require.
- (2) No flammable or combustible liquid, sulfur, carbon or any other organic chemical shall be stored in close proximity to any chlorate or perchlorate or any other oxidizing agents.
- (3) Explosives Transaction Records.
- (a) All persons keeping, storing, using, selling, manufacturing, handling or transporting explosive material shall maintain records so that the quantity and location of such explosive materials are readily available for inspection by the head of the fire department, the Marshal, their designees, or a police officer. Quantity and location records shall be delivered to the Marshal forthwith upon demand.
- (b) Daily Summary of Magazine Transactions: In taking the inventory required by 527 CMR 13.12(3)(a), a licensee or permittee shall enter the inventory in a record of daily transactions which shall be kept for each magazine on a storage facility. These records may be kept at one central location on the business premises if separate records of daily transactions are kept for each magazine. Not later than the close of the next business day, each licensee or permittee shall record by the manufacturer's name or brand name, the total quantity received in and removed from each magazine during the day, and the total quantity remaining on hand at the end of the day. Any discrepancy which might indicate a theft or loss of explosive materials shall be reported to the Marshal immediately.

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(c) Discontinuance of Business: Where an explosive materials business or operations is discontinued or succeeded by a new licensee or registrant, the records prescribed by 527 CMR 13.12(3) shall appropriately reflect such facts and shall be delivered to the successor. Where discontinuance of the business or operation is absolute, copies of the records required by 527 CMR 13.12 shall be delivered to the Marshal within 30 days following the business or operation discontinuance.

(d) Any person who transports or delivers explosive materials to any magazine, building or structure shall keep a record of the permit number assigned to said magazine, building or structure by the Marshal in accordance with 527 CMR 13.04(3)(b).

(4) Theft: The loss or theft of any explosives shall be immediately reported to the Marshal and confirmed in writing within 24 hours..

(5) No explosive subject to 527 CMR 13.00 shall be sold or exposed for sale on any highway.

(6) No high explosive subject to 527 CMR 13.00 shall be sold to any person under 21 years of age.

(7) The Marshal or his designee may, in his discretion, upon discovering a violation of 527 CMR 13.00 or upon determination of a fire or explosion hazard, require the removal of any explosive material or that a watchman be placed continuously in charge of it. The expense of said removal or watchman shall be the responsibility of the person in whose possession the explosive material is found.

(8) Any explosion, fire or collision occurring in connection with the keeping, storage, manufacture, sale, transportation or use of explosive material causing loss of life or injury to any person or damage to property shall be reported immediately to the Marshal and the head of the fire department, giving an account of the same, and then confirmed giving a detailed account in writing within 24 hours.

(9) Any explosive used, sold, transported or stored within the Commonwealth shall be legibly identified by a characteristic number, color code, or other mark placed by the manufacturer which may be viewed by one skilled in making such identification. Such numbering systems may be limited to the identification of each manufacturer, and the location, date, and shift of manufacture, and shall be included on each piece of the smallest subdivision of explosive.

(a) Manufacturer's identification described above shall be placed on the outside of each cartridge, bag, or other immediate container of explosive materials.

(b) Blasting caps shall be identified, by identification marks prescribed in 527 CMR 13.12(9), placed on the outside of immediate containers used for packaging the blasting cap.

(10) Any person, firm or corporation in the Commonwealth who keeps, uses, sells, transports or stores any explosive shall keep a record of the disposition of such explosive by recording the batch number, if any, from the case from which individual explosive has been removed, if sold in less than case lots, or the number of cases with their batch numbers if sold in case lots. The person to whom such explosive has been transferred shall record the transaction and such records shall be maintained for ready inspection by the Marshal, the head of the local fire department, or the head of the police department, or their designees, for a period of three years.

(11) No person shall use, keep, store, handle, or transport explosive materials or blasting agents when such use, keeping, storage, handling or transportation constitutes a hazard to life or property. The Marshal may, in his discretion, further increase or restrict any requirement or provision of 527 CMR 13.00.

(12) Laboratories: Industrial laboratories, laboratories of technical institutes, colleges, universities, and similar institutions may be permitted to keep, store and use explosives or blasting agents when confined to the purpose of scientific or technical instruction or research, provided the storage and use of explosives or blasting agents is conducted or supervised by a person holding a Certificate of Competency and not more than 50 pounds of explosive are kept on hand at any time in such laboratories.

13.13: References

International Society of Explosives Engineers. ISEE Field Practice Guidelines for Blasting Seismographs (ISEE Approved December 1999), ISEE Blaster's Handbook, 17th edition

IME Publications

Safety Library Publication No. 1, *Construction Guide for Storage Magazines*, August 1993

Safety Library Publication No. 2, *The American Table of Distances*, June 1991

Safety Library Publication No. 3, *Suggested Code of Regulations for the Manufacture, Transportation, Storage sale, Possession, and Use of Explosive Materials*, January 1985

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Fire Prevention; Massachusetts General Law, Chapter 148.

527 CMR: BOARD OF FIRE PREVENTION REGULATIONS

13.14: Pre / Post Blast Inspection Waiver

Date of Survey:

Location of Property:

Type of Structure:

Property Owners Name:

Property Owners Address:

Property Owners Telephone Number:

I hereby declare I am the owner of the above property located within 250 feet of a planned blasting site. I acknowledge that I have been made aware of my rights, in accordance with 527 Code of Massachusetts Regulation (CMR 13.00: *Explosives*. to have at my option a Preblast Inspection Survey performed upon my property at no expense to myself.. I understand the purpose of this Survey is to record the existing condition of my property prior to blasting. By my signature below I hereby waive my right to a Preblast Inspection Survey.

Signature of Property Owner:

Date Signed:

CERTIFICATION OF SURVEYOR OFFERING SURVEY

Name of Blaster or firm offering Survey:

Address of Blaster or firm offering Survey:

Date of Survey Refusal:

I hereby declare under the penalty of perjury that I have contacted the property owner listed above and have advised this person of his right to have a Preblast Survey conducted at no expense to himself. By my signature below I declare the property owner has refused the offer of a survey and has also refused to initiate a survey waiver. I further declare the statements made and the information given herein are true. I am aware that there are significant penalties for submitting false information including possible fines, civil penalties and imprisonment.

Signature of Blaster:

Date Signed:

RECORDING OF SURVEY REFUSAL

Fire Department:

Name of Officer Receiving Waiver:

Date:

Blaster or firm Offering Survey:

Date of Refusal:

Use and Handling [Permit to Blast] Issued to:

Date of Anticipated Blast:

Blasters Name:

Certificate of Competency No:

Signature of Officer Acknowledging Refusal:

Date:

13.15: Blasting Damage Complaint Form

Any blasting damage complaint shall be on a blasting damage complaint form approved by the Marshal.

REGULATORY AUTHORITY

527 CMR 13.00: M.G.L. c. 148 §§ 9, 10, 12, 13, 15, 16, 31, and 35.