

Explosives Storage Guide

Background/Scope

This guidance document is limited to hazardous materials that are classified as explosive materials. It does not include requirements for fireworks, ammunition, rockets, ammonium nitrate, nor the manufacture or sale of explosive materials. This document includes requirements for storage and handling of 22.7 kg (50 lb) or less of explosive materials in indoor magazines. For materials, quantities, and storage locations outside the scope of this document, consult references listed below.

Applicable Codes and Standards for Explosive Material:

Title 24, California Code of Regulations (CCR), Section 9: California Fire Code (CFC) 2025

Title 19 (Public Safety), CCR, Division 1 (State Fire Marshal)

National Fire Protection Association (NFPA) 495, the Explosives Materials Code 2023

Title 27, Code of Federal Regulations (CFR), Part 555 (Commerce in Explosives)

Title 18, United States Code (USC), Section 1102, Chapter 40 (Importation, Manufacture, Distribution and Storage of Explosive Materials)

In California, certain explosive materials are exempted from these requirements (**CFC 5601.1**), including:

1. The Armed Forces of the United States, Coast Guard or National Guard.
2. Explosives in forms prescribed by the official United States Pharmacopoeia.
3. The possession, storage and use of small arms ammunition when packaged in accordance with DOTn packaging requirements.
4. The possession, storage and use of not more than 1 pound (0.454 kg) of commercially manufactured sporting black powder, 20 pounds (9 kg) of smokeless powder and 10,000 small arms primers for hand loading of small arms ammunition for personal consumption.
5. The use of explosive materials by federal, state and local regulatory, law enforcement and fire agencies acting in their official capacities.
6. Special industrial explosive devices that in the aggregate contain less than 50 pounds (23 kg) of explosive materials.
7. The possession, storage and use of blank industrial-power load cartridges where packaged in accordance with DOTn packaging regulations.
8. Transportation in accordance with DOTn 49 CFR Parts 100-185.
9. Items preempted by federal regulations.
10. Items preempted by state law and/or regulations.

27 CFR 555.141 provides additional exemptions, including:

8. Gasoline, fertilizers, propellant actuated devices, or propellant actuated industrial tools manufactured, imported, or distributed for their intended purposes.
9. Industrial and laboratory chemicals which are intended for use as reagents and which are packaged and shipped pursuant to U.S. Department of Transportation regulations, 49 CFR Parts 100 – 177, which do not require explosives hazard warning labels.
10. Model rocket motors that meet all of the following criteria—
 - i. Consist of ammonium perchlorate composite propellant, black powder, or other similar low explosives;
 - ii. Contain no more than 62.5 grams of total propellant weight; and
 - iii. Are designed as single-use motors or as reload kits capable of reloading no more than 62.5 grams of propellant into a reusable motor casing.

What are Explosives? The CFC definitions are below:

EXPLOSIVE. A chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord and igniters. The term “explosive” includes any material determined to be within the scope of USC Title 18: Chapter 40 and also includes any material classified as an explosive by the hazardous materials regulations of DOTn 49 CFR Parts 100–185.

High explosive. Explosive material, such as dynamite, which can be caused to detonate by means of a No. 8 test blasting cap where unconfined.

Low explosive. Explosive material that will burn or deflagrate when ignited. It is characterized by a rate of reaction that is less than the speed of sound. Examples of low explosives include, but are not limited to, black powder, safety fuse, igniters, igniter cord, fuse lighters, fireworks and propellants, 1.3C.

Mass-detonating explosives. Division 1.1, 1.2 and 1.5 explosives alone or in combination, or loaded into various types of ammunition or containers, most of which can be expected to explode virtually instantaneously when a small portion is subjected to fire, severe concussion, impact, the impulse of an initiating agent or the effect of a considerable discharge of energy from without. Materials that react in this manner represent a mass explosion hazard. Such an explosive will normally cause severe structural damage to adjacent objects. Explosive propagation could occur immediately to other items of ammunition and explosives stored sufficiently close to and not adequately protected from the initially exploding pile with a time interval short enough so that two or more quantities must be considered as one for quantity-distance purposes.

UN/DOTn Class 1 explosives. The former classification system used by DOTn included the terms “high” and “low” explosives as defined herein. The following terms further define explosives under the current system applied by DOTn for all explosive materials defined as hazard Class 1 materials. Compatibility group letters are used in concert with the division to

specify further limitations on each division noted (for example, the letter G identifies the material as a pyrotechnic substance or article containing a pyrotechnic substance and similar materials).

Division 1.1. Explosives that have a mass explosion hazard. A mass explosion is one which affects almost the entire load instantaneously.

Division 1.2. Explosives that have a projection hazard but not a mass explosion hazard.

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.

Division 1.4. Explosives that pose a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.

Division 1.5. Very insensitive explosives. This division is comprised of substances that have a mass explosion hazard but which are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.

Division 1.6. Extremely insensitive articles which do not have a mass explosion hazard. This division is comprised of articles that contain only extremely insensitive detonating substances and which demonstrate a negligible probability of accidental initiation or propagation.

Explosive Materials Storage

Explosive materials shall be stored in magazines constructed, located, operated, and maintained in accordance with CFC Chapter 56 and NFPA 495. Portable or mobile magazines less than 120 square feet need not comply with the California Building Code (CBC). **CFC 5604.2**

Explosive materials are prohibited from being stored in a building that is not equipped throughout with automatic fire sprinklers. **CFC Table 5003.1.1(1)** Approved hazardous materials storage cabinets (per CFC 5003.8.7) or dayboxes (Type 3 magazines) can be used within magazines. These may qualify for storage credit and allow for an increase in Fire Code Maximum Allowable Quantity (MAQ) per CFC Table 5003.1.1(1) for indoor storage.

Notification. Whenever a new explosive material storage site is established, the local fire department shall be notified at least 48 hours in advance. Notification shall include the quantity, type and location of explosive materials at the site. **CFC 5601.6**

Buildings Used for Storing Explosives (Occupancy Type)

Explosives are prohibited from being stored in Residential (Group R) occupancies. The use of indoor magazines for storage of explosives is limited to occupancies of Group F, H, M, or S, and research and development laboratories (Group B or L). **CFC 5604.5.1.1, 5604.5.1.4**

Storage Amounts and Magazine Type

Small quantities of explosive materials can be stored in an indoor or outdoor control area (within a magazine). **CFC Table 5604.3** Quantities exceeding these amounts shall be stored in Group H-1 occupancies.

Codes / California / 2022 California Fire Code, Title 24, Part 9 with July 2024 Supplement
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Chapter 56 Explosives and Fireworks

TABLE 5604.3
STORAGE AMOUNTS AND MAGAZINE REQUIREMENTS FOR EXPLOSIVES, EXPLOSIVE MATERIALS AND FIREWORKS, 1.3G MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA

| NEW UN/DOTh DIVISION | OLD DOTh CLASS | ATF/OSHA CLASS | INDOOR ^a (pounds) | | | | OUTDOOR (pounds) | MAGAZINE TYPE REQUIRED | | | | |
|----------------------|----------------|----------------|------------------------------|---------|------------|----------------------|------------------|------------------------|---|---|---|---|
| | | | Unprotected | Cabinet | Sprinklers | Sprinklers & cabinet | | 1 | 2 | 3 | 4 | 5 |
| 1.1 ^b | A | High | 0 | 0 | 1 | 2 | 1 | X | X | X | — | — |
| 1.2 | A | High | 0 | 0 | 1 | 2 | 1 | X | X | X | — | — |
| 1.2 | B | Low | 0 | 0 | 1 | 1 | 1 | X | X | X | X | — |
| 1.3 | B | Low | 0 | 0 | 10 | 20 | 1 | X | X | X | X | — |
| 1.4 | B | Low | 0 | 0 | 50 | 100 | 1 | X | X | X | X | — |
| 1.5 | C | Low | 0 | 0 | 1 | 2 | 1 | X | X | X | X | — |
| 1.5 | Blasting Agent | Blasting Agent | 0 | 0 | 1 | 2 | 1 | X | X | X | X | X |
| 1.6 | Not Applicable | Not Applicable | 0 | 0 | 1 | 2 | 1 | X | X | X | X | X |

Indoor Magazines:

CFC 5604.5.1.2 Indoor magazines shall comply with the following construction criteria:

1. Construction shall be fire resistant and theft resistant.
2. Exterior shall be painted red.
3. Base shall be fitted with wheels, casters or rollers to facilitate removal from the building in an emergency.
4. Lid or door shall be marked with conspicuous white lettering not less than 3 inches high and minimum ½ inch stroke, reading “EXPLOSIVES – KEEP FIRE AWAY.”
5. The least horizontal dimension shall not exceed the clear width of the entrance door.

Indoor magazines must be located within 10 feet of a building entrance. They must be located either on the ground floor or having ramp access to the exterior grade level. **CFC 5604.5.1.5** No more than 2 magazines are allowed per building. They must be separated by at least 10 feet.

CFC 5604.5.1.6-7 Magazines shall meet construction requirements of NFPA 495.

There are five types of magazines (**27 CFR 555.203 and NFPA 495 9.6**):

- a. **Type 1 magazines.** Permanent magazines for the storage of high explosives. Other classes of explosive materials may also 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 magazines for the temporary storage of high explosives while attended (day box). Other classes of explosive materials may also be stored in Type 3 magazines.
- d. **Type 4 magazines.** Permanent, portable or mobile magazines for the storage of low explosives.
- e. **Type 5 magazines.** Permanent, portable or mobile magazines for the storage of low explosives such as blasting agents.

Outdoor Magazines:

Outdoor magazines need to meet stringent separation requirements per **CFC Table 5604.5.2(1-3)** relative to inhabited buildings, roads, and other magazines. Distances can be reduced when magazines are barricaded. Separation distances are dependent on quantity and type of explosive materials being stored.

Storage Within Magazines

Magazines shall be supervised at all times by a competent person who is at least 21 years old and who is responsible for the enforcement of all safety precautions. **NFPA 495 9.7.1**

Magazines containing explosive materials shall be physically inspected at least every 7 days to verify that all explosive materials are accounted for. **CFC 5604.9** Magazines shall be kept locked at all times, except when explosives are being added or removed for the magazine, or when the magazine is empty of explosives. **NFPA 495 9.7.3**

Safety rules covering the operation of magazines shall be posted on the interior of the magazine in a visible location. **CFC 5603.7**

Smoking, matches, open flames, spark-producing devices, and sources of ignition shall not be allowed inside the magazine or within 50 feet of the magazine. **NFPA 495 9.8.1** Combustible materials shall not be stored within 50 feet of magazines. **CFC 5604.7.4** Metal tools shall not be stored in a magazine containing explosives. **NFPA 495 9.7.14** Magazines shall be used exclusively for the storage of explosive materials. **CFC 5604.7.7** No container without a closed lid shall be permitted to be stored in the magazine. **NFPA 495 9.7.9.2**

Magazine Housekeeping

Magazine floors shall be regularly swept and kept clean, dry, and free of grit, paper, empty packages and rubbish. Brooms and other cleaning utensils shall not have any spark-producing

metal parts. Sweepings from magazine floors shall be disposed of in accordance with the manufacturer's approved instructions. **CFC 5604.8.1**

Explosives Materials Handling

All persons using, handling or supervising storage and handle explosives must meet training requirements and qualifications.

All explosives must be stored in a magazine. Individual containers may be removed from the magazine by approved individuals for research experiments. At the end of the experiment, the explosive materials shall be returned to the magazine. Individual containers shall be inspected for deterioration, cracks, or damage. Damaged containers shall be disposed of as hazardous waste.

Open containers of explosive materials shall be closed securely before being returned to the magazine. **NFPA 495 9.7.9.1**

Qualifications

Persons in charge of magazines shall not be under the influence of alcohol or drugs that impair sensory or motor skills, shall be not less than 21 years of age and shall demonstrate knowledge of all safety precautions related to storage, handling or use of explosive materials. **CFC 5601.4**

Recordkeeping

Records of the receipt, handling, use or disposal of explosive materials, and reports of any accidents, thefts or unauthorized activities involving explosive materials shall be maintained.

CFC 5603.1 Loss, theft or unauthorized removal of explosives from a magazine or facility shall be reported immediately to the Fire Code Official (Campus Fire Marshal). **CFC 5603.3** Accidents involving explosives shall be reported immediately to the Fire Code Official. **CFC 5603.4**

A physical inventory of each magazine shall be recorded annually.

Users must sign-out any explosives that they are removing from the magazine with the date, user's name, user's role, user's phone number, PI name, room number and building where explosives will be used. They must be returned to the magazine at the end of the day.