



Administrative Policy
SMOKELESS PROPELLANTS
Public Safety – A701

Approved by Council:

November 12, 2009

Revised Date:

December 22, 2009

SMOKELESS PROPELLANTS

Summary

For the purposes of this policy, Smokeless propellants are used in small arms ammunition. Small scale manufacturing of small arms ammunition using smokeless powder has not been done in many municipalities, so guidelines are not available. The manufacturing use, storage and transportation of smokeless propellants is covered in various codes such as the National Fire Protection Association (NFPA) 495, International Fire Code, the International Building Code, Bureau of Alcohol, Tobacco and Firearms regulations, and the Federal United States Code, to name a few. The purpose of this policy is to clarify inconsistencies in various Codes and to create guidelines for the use of smokeless propellants in the manufacturing process in Payson. All requirements of the Codes pertaining to explosives and hazardous materials apply, unless in conflict with this policy. Following this policy does not exempt interested parties from working with the Building Department and the Fire Department for a business of this nature.

In accordance with NFPA 496 and as the Authority Having Jurisdiction (AHJ), the Town Council of the Town of Payson provides the following amplification and clarification.

Where conflict or ambiguity between NFPA 495, the IBC, the IFC, the USC or the CFR exists or is perceived to exist, the AHJ will determine building and operational compliance based on the attached documents and confirmed through Administrative Procedure.

Definitions

Authority Having Jurisdiction (AHJ) – An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or procedure.

CFR - Code of Federal Regulations

CONTROL AREA - Spaces within a building where quantities of hazardous materials not exceeding the maximum allowable quantities per control area are stored, dispensed, used or handled. (IFC 2702.1)

DOT – Department of Transportation

EXPLOSIVES – DIVISION 1.3. (For transportation) 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.



Administrative Policy
SMOKELESS PROPELLANTS
Public Safety – A701

Approved by Council:

November 12, 2009

Revised Date:

December 22, 2009

EXPLOSIVES – DIVISION 1.4. (For manufacturing) 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. (IFC 3302.1)

F-1 USE CLASSIFICATION – Moderate Hazard Occupancy. Factory Industrial uses which are not classified as Factory Industrial Group F-2 (Low Hazard Occupancy).

FACTORY INDUSTRIAL GROUP F - Occupancies includes, among others, the use of a building or structure, or a portion thereof, for assembling, disassembling, fabricating, finishing, manufacturing, packaging, repair or processing operations that are not classified as a Group H high-hazard or Group S storage capacity.

H-1 USE CLASSIFICATION - Buildings and structures containing materials that pose a detonation hazard. Such materials shall include, but not be limited to, the following: (IFC 202).

Explosives:

Division 1.1

Division 1.2

Division 1.3

Exception: Materials that are used and maintained in a form where either confinement or configuration will not elevate the hazard from a mass fire to a mass explosion hazard from a mass explosion hazard shall be allowed in H-2 occupancies.

Division 1.4

Exception: Articles, including articles packaged for shipment, that are not regulated as an explosive under Bureau of Alcohol, Tobacco and Firearms regulations, or unpackaged articles used in process operations that do not propagate a detonation or deflagration between articles shall be allowed in Group H-3 occupancies.

Division 1.5

Division 1.6

H-3 USE CLASSIFICATION - Buildings and structures containing materials that readily support combustion or that pose a physical hazard.



Administrative Policy
SMOKELESS PROPELLANTS
Public Safety – A701

Approved by Council:

November 12, 2009

Revised Date:

December 22, 2009

HAZARDOUS USE CLASSIFICATIONS - Hazardous uses are classified in Groups H-1, H-2, H-3, H-4, and H-5. (IFC 202)

HIGH HAZARD GROUP H - High hazard Group H occupancy includes, among other, the use of a building or structure, or a portion thereof, that involves the manufacturing, processing, generation or storage of materials that constitute a physical or health hazard in quantities in excess of quantities allowed in control areas constructed and located as required by the International Fire Code. (IFC 202)

Exceptions are listed and need to be researched as they pertain to the specific business use.

IBC – International Building Code

IFC – International Fire Code

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 includes, but are not limited to, black powder, safety fuse, igniters, igniter cord, fuse igniters, fireworks, 1.3G (Class B Special) and propellants, 1.3C.

NFPA – National Fire Prevention Association

OPERATING BUILDING – A building utilized in conjunction with the manufacture, transportation, or use of explosive materials.

OUTDOOR CONTROL AREA -An outdoor area that contains hazardous materials in amounts not exceeding the maximum allowable quantities of Table 2703.1.1 (3) or Table 2703.1.1 (4) (IFC 2702.1)

SAMMI - Sporting Arms and Ammunition Manufacturers' Institute Inc.

SMALL ARMS AMMUNITION - A shotgun, rifle or pistol cartridge and any cartridge for propellant actuated devices. This definition does not include military ammunition containing bursting charges or incendiary, trace, spotting or pyrotechnic projectiles. (IFC 3302.1)

SMALL ARMS 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 and similar articles. (IFC 2203.1)

USC – United States Code



Administrative Policy
SMOKELESS PROPELLANTS
Public Safety – A701

Approved by Council:

November 12, 2009

Revised Date:

December 22, 2009

Process

ZONING

- (A) Smokeless propellant manufacturing businesses shall be allowed in Manufacturing and/or Industrial zones only.

OCCUPANCY CLASSIFICATION

- (A) **F-1.** Moderate hazard occupancy: Factory uses which are not classified as Factory Industrial Group F-2 (Low-hazard) shall be classified as F-1 Moderate Hazard.

Used for indoor occupancies if an exception to the H classification applies.

- (B) **H-3.** Buildings and structures containing materials that readily support combustion or that pose a physical hazard, based on the exception in Division 1.4.

- (C) Ignition occurs when the powder granules are heated above their ignition temperature. This can occur by exposing the powder to: (SAMMI)

1. A flame such as a match or primer flash
2. An electrical sparks or sparks
3. Heat from an electric hot plate or a fire directed against or near a closed container

- (D) Occupancy classifications may be different for indoor usage/storage and outdoor storage capacities.

EXPLOSIVE CLASSIFICATION

- (A) Based on the quantities and purpose, the manufacturing of small arms ammunition using smokeless propellant falls under two explosive categories.

1. Manufacturing – 100 pounds or less daily use per control area in the manufacturing process = Division 1.4
2. Transporting – Follow DOT standards

- (B) **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.

- (C) **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. (IFC 3302.1)



Administrative Policy
SMOKELESS PROPELLANTS
Public Safety – A701

Approved by Council:

November 12, 2009

Revised Date:

December 22, 2009

SPRINKLER SYSTEM

Chapter 27 of the International Fire Code addresses Hazardous Materials. Exceptions to this chapter, as noted in the chapter, is “The display, storage, sale or use of fireworks and explosives in accordance with Chapter 33”.

IFC chapter 33 – Explosives and Fireworks applies unless one of the exceptions applies. Exception 3 states:

The possession, storage and use of small arms ammunition when packaged in accordance with DOTn packaging requirements.

For small arms ammunition not packaged in accordance with DOTn packaging requirements, the following apply:

- (A) Sprinklers are required in each control area. (IFC Table 3304.3)
- (B) Division 1.4
 - 1. 50 lbs of explosive material allowed, per control room, with sprinklers.
 - 2. 100 lbs of explosive material allowed, per control room, with sprinklers and in cabinets.

The availability of water and pipe size required shall be determined by the Water Department.

BUILDINGS AND EQUIPMENT

- (A) Buildings or rooms that exceed the maximum allowable quantity per control area of explosive materials shall be operated in accordance with this section and constructed in accordance with the requirements if the International Building Code for Group H occupancies. (IFC 3305.5)

CONTROL AREAS

- (A) A control area may be constructed to constitute a “building” within the large building.
- (B) Design and number of control areas shall comply with Table 2703.8.3.2 of the International Fire Code.
- (C) Fire resistance rating for control areas shall comply with Table 2703.8.3.2 of the International Fire Code.
- (D) Division 1.4, Group H-3
 - 1. Maximum allowable quantity is 50 pounds per control area (IFC Table 2703.1.1(1))



Administrative Policy
SMOKELESS PROPELLANTS
Public Safety – A701

Approved by Council:

November 12, 2009

Revised Date:

December 22, 2009

2. Maximum allowable quantity shall be increased 100 percent when stored in approved storage cabinets, day boxes, gas cabinets, exhausted enclosures of safety cans.
 3. **Allowed only in buildings equipped with an approved sprinkler system. – if not packaged in accordance with DOTn requirements.**
- (E) Quantities not to exceed 750,000 small arms primers stored in a building shall be arranged such that not more than 100,000 small arms primers are stored in any one pile and piles are at least 15 feet apart. (IFC 33063.5.2.3)

INTERNAL OCCUPANCY SEPARATION

- (A) The required separation for various occupancy groups within the same building shall comply with Table 508.3.3 of the International Building Code. Re-creation of that table follows:

Table 508.3.3
 Required Separation of Occupancies (Hours)

Occupancy	A ^e , E		I		R ^d		F-2, S-2 ^{c,d} , U ^d		B ^b , F-1, M ^b , S-1		H-1		H-2		H-3, H-4, H-5	
	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS
A ^e , E	N	N	1	2	1	2	N	1	1	2	NP	NP	3	4	2	3 ^a
I	----	----	N	N	1	NP	1	2	1	2	NP	NP	3	NP	2	NP
R ^d	----	----	----	----	N	N	1	2	1	2	NP	NP	3	NP	2	NP
F-2, S-2 ^{c,d} , U ^d	----	----	----	----	----	----	N	N	1	2	NP	NP	3	4	2	3 ^a
B ^b , F-1, M ^b , S-1	----	----	----	----	----	----	----	----	N	N	NP	NP	2	3	1	2 ^a
H-1	----	----	----	----	----	----	----	----	----	----	N	NP	NP	NP	NP	NP
H-2	----	----	----	----	----	----	----	----	----	----	----	----	N	NP	1	NP
H-3, H-4, H-5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	N	NP

See footnotes for this table in the IBC.

STORAGE

- (A) No quantity limitations shall be imposed on the storage of small arms ammunition in warehouses, retail stores, and other occupancies other than those imposed by the limitations of the storage facility and by public safety regulations. (NFPA 495 14.2.2)
- (B) Small arms ammunition shall be separated from materials classified by the DOT as flammable liquids, flammable solids, and oxidizing materials by a distance of 4.6m (15ft) or by a fire partition having a fire resistance of one hour. (NFPA 495 14.2.3)
- (C) Small arms ammunition shall not be stored together with Division 1.1, Division 1.2 or Division 1.3 explosives, except where the storage facility is suitable for the storage of explosive material. (NFPA 495 14.2.4)



Administrative Policy
SMOKELESS PROPELLANTS
Public Safety – A701

Approved by Council:

November 12, 2009

Revised Date:

December 22, 2009

- (D) Smokeless propellants shall be stored in shipping containers specified by the DOT “Hazardous Materials Regulations”. (NFPA 495 14.3.6)

DETACHED, OUTDOOR STORAGE AND BUILDING SEPARATION

- (A) Detached storage requirements per Table 415.3.2 of the International Building Code shall apply.
- (B) Distances for buildings containing explosives shall comply with Table 3304.5.2(2) and Table 3304.5.2(3) of the International Fire Code.
- (C) Outdoor storage requirements shall comply with Section 3304 of the International Fire Code.
- (D) Barricade may be required on outdoor storage structure based on the amount of explosive stored in the structure.

QUANTITIES

Smokeless Propellant:

- (A) Quantities exceeding 50 lb, but not exceeding 100lb shall be stored in portable wooden boxes having walls of at least 1 inch thickness. (NFPA 495 143.9)
- (B) Quantities exceeding 100 lbs, but not exceeding 800 lbs, shall be stored in non-portable storage cabinets having walls of at least 1 inch thickness. (NFPA 495 14.3.9)
- (C) Not more than 400 lbs shall be permitted to be stored in any one cabinet, and cabinets shall be separated by a distance of 25 feet or by a fire partition having a fire resistance of at least 1 hour. (NFPA 495 14.3.9)
- (D) Quantities exceeding 800 lbs, but not exceeding 5,000 lbs shall be permitted to be stored in a building, providing that the eight requirements of NFPA 495 14.3.9 are followed.
- (E) Smokeless propellants not stored in accordance with A-D above, shall be stored in a Type 4 magazine and located in accordance with NFPA Chapter 9 and the International Fire Code.



Administrative Policy
SMOKELESS PROPELLANTS
Public Safety – A701

Approved by Council:

November 12, 2009

Revised Date:

December 22, 2009

Primers – Commercial Stock:

- (F) Quantities not exceeding 750,000 shall be permitted to be stored in a building where not more than 100,000 are stored in any one pile and where piles are at least 15 feet apart. (NFPA 496 14.5.6(1))
- (G) Quantities exceeding 750,000 shall be permitted to be stored in a building, provided the following conditions are met: (NFPA 495 14.5.6(2))
 - a. Warehouse or storage room shall not be accessible to unauthorized personnel.
 - b. Primers shall be stored in cabinets.
 - c. No more than 200,000 primers shall be stored in any one cabinet.
 - d. Shelves in cabinets shall have a vertical separation of at least 2 feet.
 - e. Cabinets shall be located against walls of the room with at least 40 feet between cabinets.
 - f. Separation between cabinets shall be permitted to be reduced to 20 feet where barricades twice the height of the cabinets are attached to the wall, midway between each cabinet.
 - g. Barricades shall extend at least 10 feet outward, shall be firmly attached to the wall, and shall be constructed of ¼ inch boiler plate, 2 inch thick wood, brick or concrete block.
 - h. Primers shall be separated from materials classified by DOT as flammable liquids, flammable solids, and oxidizing materials by a distance of 25 feet or by a fire partition having a fire resistance rating of at least 1 hour.
 - i. Building shall be protected by an automatic sprinkler system.
- (H) Small arms primers not stored in accordance with F-G shall be stored in a magazine meeting the requirements of NFPA 495, chapter 9.



Administrative Policy
SMOKELESS PROPELLANTS
Public Safety – A701

Approved by Council:

November 12, 2009

Revised Date:

December 22, 2009

References

1. Bureau of Alcohol, Tobacco and Firearms (ATF) – Federal Explosives Law and Regulations booklet.

General Questions:

a. Question 16 (page 61):

Is small arms ammunition subject to regulations under Federal explosives law?

Answer:

No. The law specifically exempts small arms ammunition and components thereof. [18 USC 845(a) (4)]

b. Question 81 (page 69):

Is smokeless powder designed for use in small arms ammunition subject to the explosives storage requirements?

Answer:

Smokeless propellants designed for use in small arms ammunition are exempt from regulation under 18 USC Chapter 40 and regulations in 27 CFR Part 555. However, it should be noted that persons engaged in the business of importing or manufacturing smokeless propellants must have a Federal explosives license. Additionally, smokeless propellant designed for use other than small arms ammunition is not exempt. Therefore, explosive products such as squibs, fireworks, theatrical special effects, or other articles that may be utilizing smokeless propellants are regulated and must be stored accordingly.

2. International Building Code (IBC)
3. International Fire Code (IFC)
 - a. Chapter 27 – Hazardous Materials
 - b. Chapter 33 – Explosives and Fireworks
4. National Fire Prevention Association (NFPA) – NFPA 495
 - a. Manufacturing classification – authority for different classification NFPA 495 5.3.1.1.1



Administrative Policy
SMOKELESS PROPELLANTS
Public Safety – A701

Approved by Council:

November 12, 2009

Revised Date:

December 22, 2009

b. NFPA 495, Annex A – Relating to In-Process Hazard Classification (excerpts from)

The hazard classification, for example, Division 1.1, 1.3, and so forth, of explosive materials when packaged for transportation or storage could be different from the hazard classification for these same materials as the materials as moving within the processing area. The differences in classification can be due to quantity or mass material present, its physical form, the configuration (or arrangement) of the material, as well as other extrinsic or intrinsic factors. An in-process hazard classification is used to characterize the hazards of a given material as it exists outside of its packaging within the manufacturing process.

The hazard classification of packaged explosive materials might vary as the material is removed from the original shipping container for use in an assembly operation. Similarly, the hazard classification for materials that are in process of being formulated might vary and the hazard classification of the bulk form of the material can be quite different from that of the same material in its packaged state. The hazard classification of some materials can be said to be “package dependent” with the hazard classification subject to change depending on the type of construction of the package used as well as the quantity contained within the package.

An analogy can be made between packaged material and unpackaged materials that are being handled in processing operations through the use of mechanical equipment such as mixing, blending, or formulation processes. The quantity of material used and the shape of the containers (or configuration) that includes the physical dimensions can all have a bearing on the hazard classification of the material. The critical mass (critical height, and/or critical diameter) is frequently used as a measure of safety in establishing the parameters of the manufacturing process.

5. SAAMI – DVD “Smokeless Powder and the Fire Service
 - a. Shows the explosive properties of smokeless powder in DOT approved containers.
6. United States Code (USC) – 18 U.S.C 845(a) (4)