

## CHAPTER 1

## FUNDAMENTALS OF GRENADES

There are several types of hand grenades. Each has different characteristics, and each provides the soldier with a variety of capabilities. Hand grenades give the soldier the ability to kill enemy soldiers, destroy enemy equipment, give signals, and control riots. Historically, the most important hand grenade is the fragmentation grenade. It is the soldier's personal indirect fire weapon system.

## 1-1. CHARACTERISTICS

Hand grenades share the following three common characteristics:

- o Their employment range is short.
- o Their effective casualty radius is small.
- o Their delay element permits safe throwing.

## 1-2. COMPONENTS

Hand grenades have the following main parts:

- o Body -- contains filler and, in certain grenades, also provides fragmentation.
- o Filler -- chemical or explosive substance in the grenade, which determines grenade use and characteristics.
- o Fuze assembly -- causes the grenade to function by igniting or detonating the filler.

## 1-3. MECHANICAL FUNCTION

The following is the proper procedure (and the results thereof) when preparing to throw a hand grenade.

- a. Insert the safety clip. All hand grenades do not have safety clips (NSN 1330-00-183-5996). However, a hand grenade safety clip is available through class V ammunition supply channels for some of these. It is adaptable to the M26- and M67-series, the MK2, and the M69 practice grenade. The safety clip prevents the safety lever from springing loose even if the safety pin assembly is accidentally removed. Adjustment instructions are illustrated

in Figure 1-1. Safety clip installation instructions are as follows:

(1) Hold fuzeed grenade in palm of hand with pull ring up (Figure 1-1).

(2) Insert small loop at open end of safety clip in slot of fuze body beneath the safety lever (Figure 1-1).

(3) Press clip across safety lever until closed end of clip touches safety lever and clip is snapped securely in place around the safety lever (Figure 1-1).

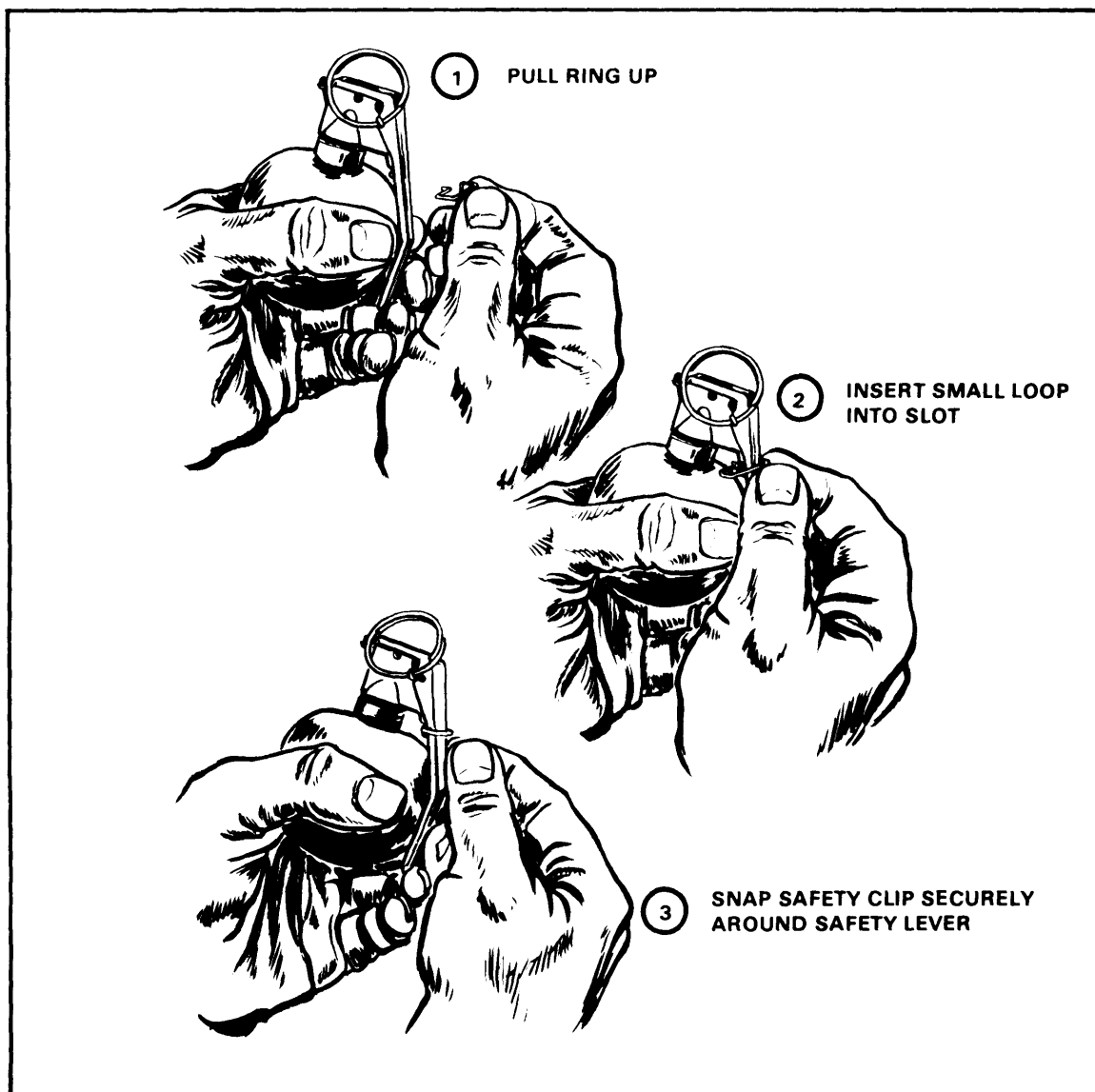


Figure 1-1. Safety clip insertion.

b. Remove the safety pin from the fuze by pulling the pull ring. Maintain pressure on the safety lever. Once the safety clip and safety pin assembly have been removed, the safety lever will spring free if pressure is not maintained.

c. Once pressure on safety lever is released, the striker will be forced to rotate on its axis by the striker spring, throwing the safety lever off.

d. The striker then detonates the primer.

e. The primer explodes, igniting the delay element.

f. The delay element burns for the prescribed amount of time (see Figure 1-2, and then it activates either the detonator or igniter.

g. The detonator or igniter acts to either explode or burn the filler substance (Figure 1-2).

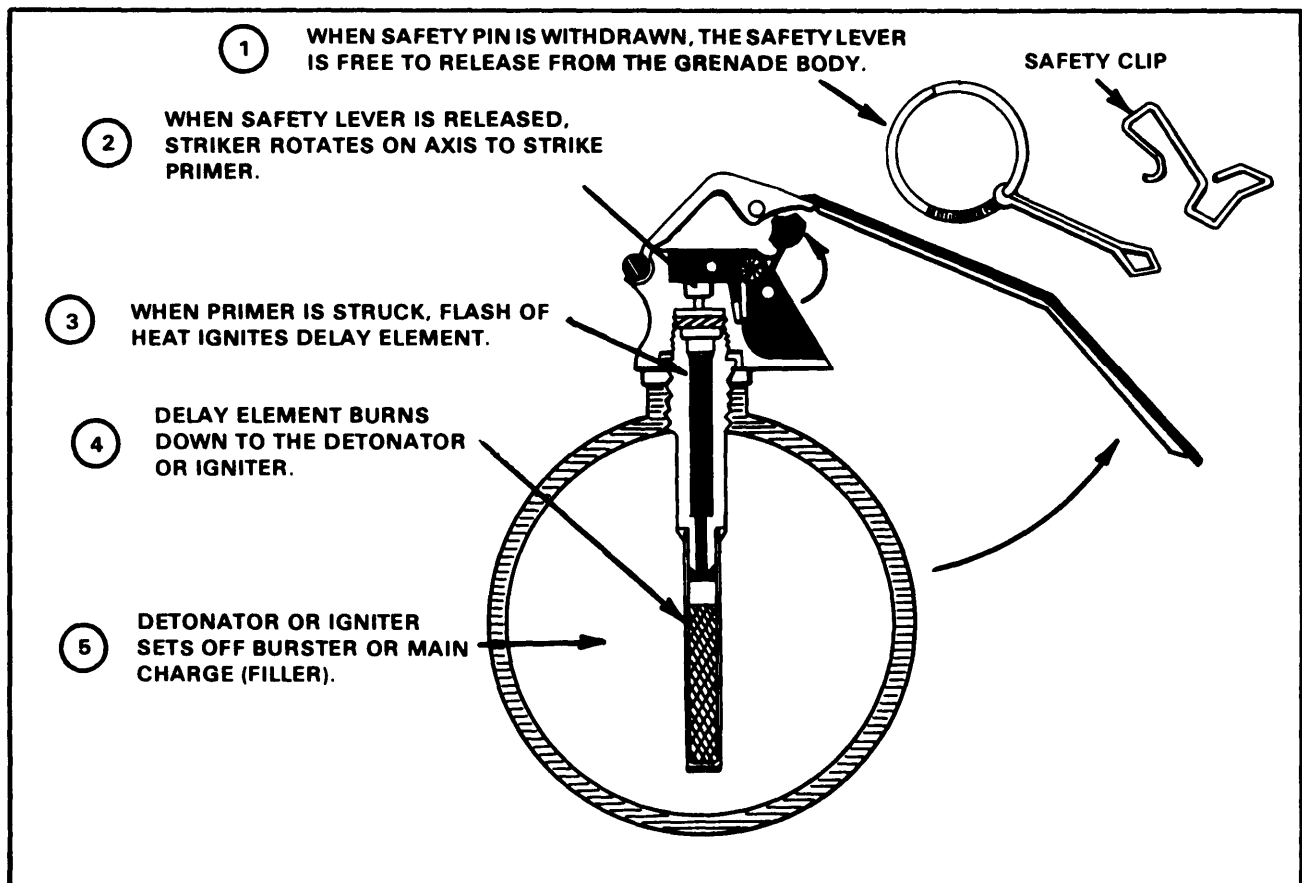


Figure 1-2. Fuze functioning.

**WARNING:** IF PRESSURE ON THE SAFETY LEVER IS RELAXED AFTER THE SAFETY CLIP AND SAFETY PIN HAVE BEEN REMOVED. IT IS POSSIBLE THAT THE STRIKER CAN ROTATE AND STRIKE THE PRIMER WHILE THE THROWER IS STILL HOLDING THE GRENADE. THIS IS CALLED "MILKING" THE GRENADE. THROWERS MUST BE INSTRUCTED TO MAINTAIN ENOUGH PRESSURE ON THE SAFETY LEVER SO THE STRIKER CANNOT ROTATE.

#### 1-4. FUZES

The two types of fuzes used in current US hand grenades are detonating and igniting. Both function in the same manner; the difference is how they activate the filler substance.

a. Detonating. Detonating fuzes explode within the grenade body to initiate the main explosion of the filler substance. Detonating fuzes include the M204A1, M204A2, M206A2, M213, and the C12 integral fuze.

(1) M204A1 and M204A2 fuzes (Figure 1-3). These fuzes are used with the M26 and M26A1 fragmentation grenades, which have been reclassified as the M61 under the product improvement program that added an attached safety clip feature. Each fuze functions as described in paragraph 1-3. The delay element is a powder train requiring 4 to 5 seconds to burn to the detonator. The detonator sets off the filler.

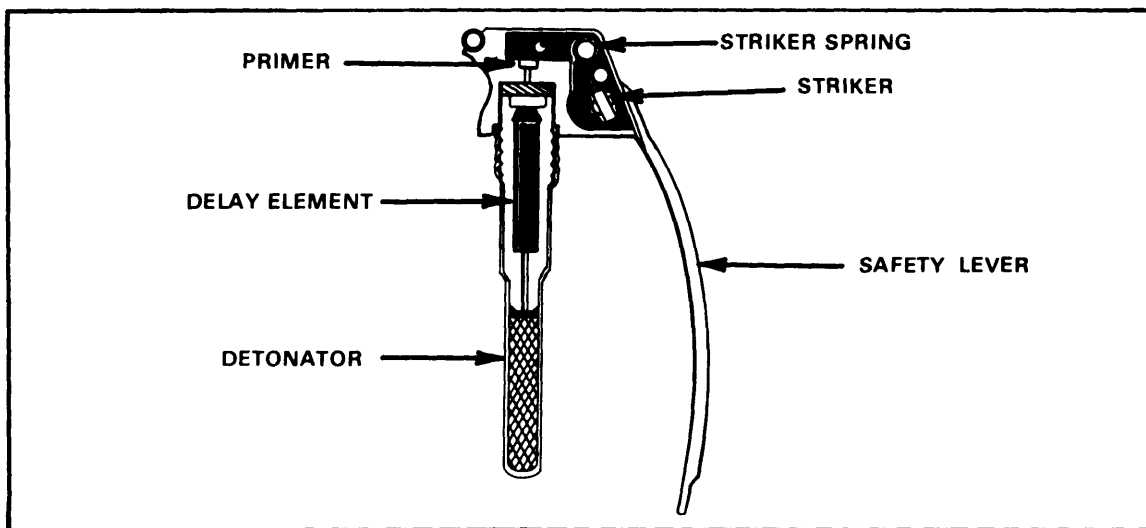


Figure 1-3. M204A2 fuze.

(2) M206A2 fuze (Figure 1-4). This fuze is used with the MK3A2 offensive hand grenade, commonly referred to as the concussion grenade. The M206-series of fuzes is similar to the M204-series, except for the safety lever. The M206 has a straight safety lever, while the M204 safety lever is curved. The delay element is a powder train requiring 4 to 5 seconds to burn to the detonator.

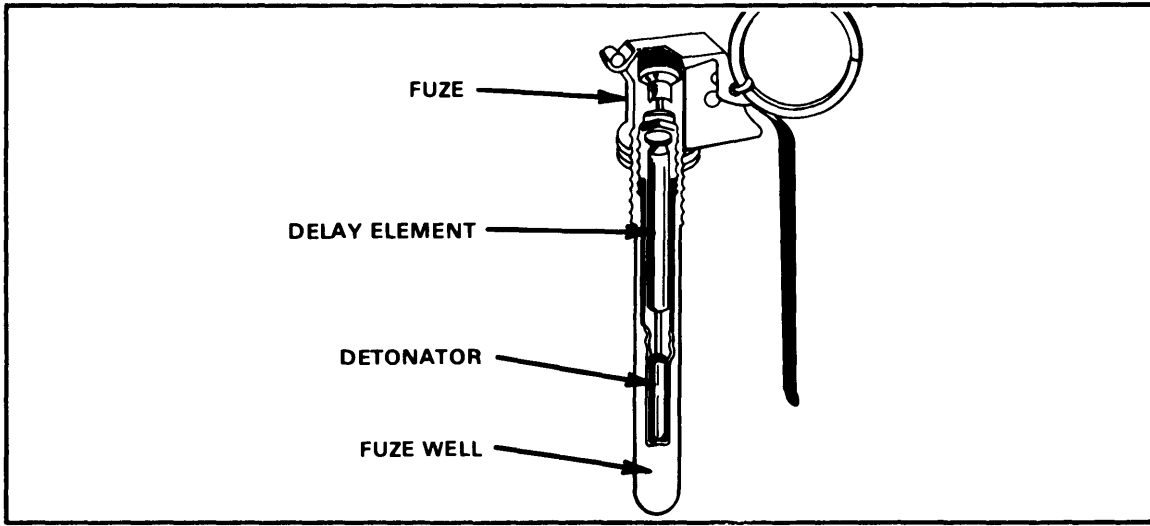


Figure 1-4. M206A2 fuze.

(3) M213 fuze (Figure 1-5). This fuze is used with the M67 fragmentation grenade. It has a safety clip. The delay element is a powder train requiring 4 to 5 seconds to burn to the detonator.

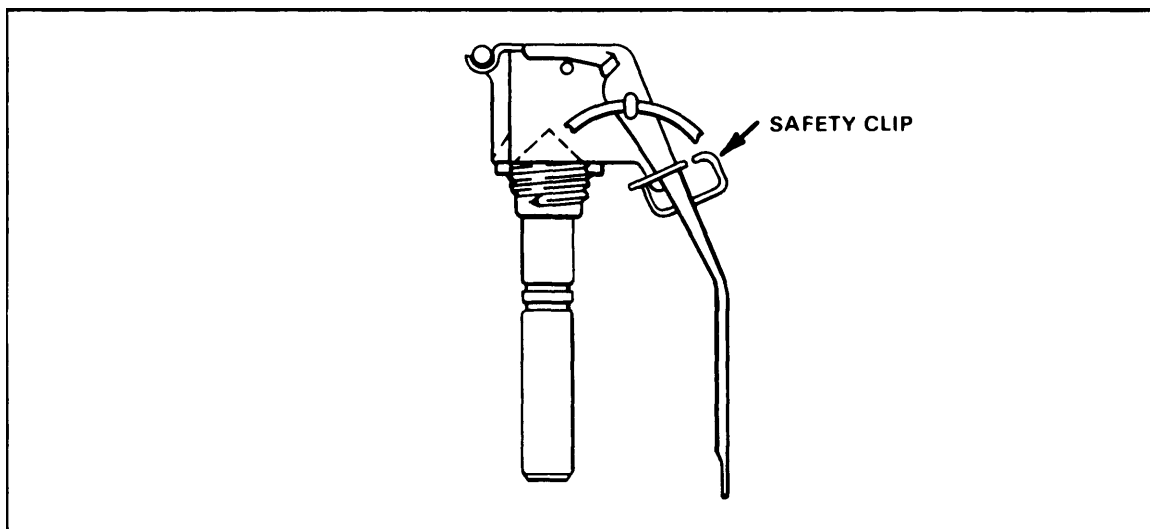


Figure 1-5. M213 fuze.

(4) C12 integral fuze (Figure 1-6). This fuze is an integral part of the M25-series riot control hand grenades. The fuze consists of a firing pin (screwed to the base of the grenade body), an arming sleeve, and a slider assembly. The slider assembly contains a delay element of 1.4 to 3 seconds and a small detonator. It functions as follows:

(a) When the safety pin is removed, the arming sleeve is held in place with the thumb.

(b) When the arming sleeve is released, the slider assembly is forced downward toward the firing pin under pressure of the firing spring.

(c) At the bottom of the fuze well, the slider strikes the firing pin and ignites the delay element which, in turn, sets off the detonator.

(d) The detonator bursts the grenade body and disperses the riot control agent over an area about 5 meters in diameter.

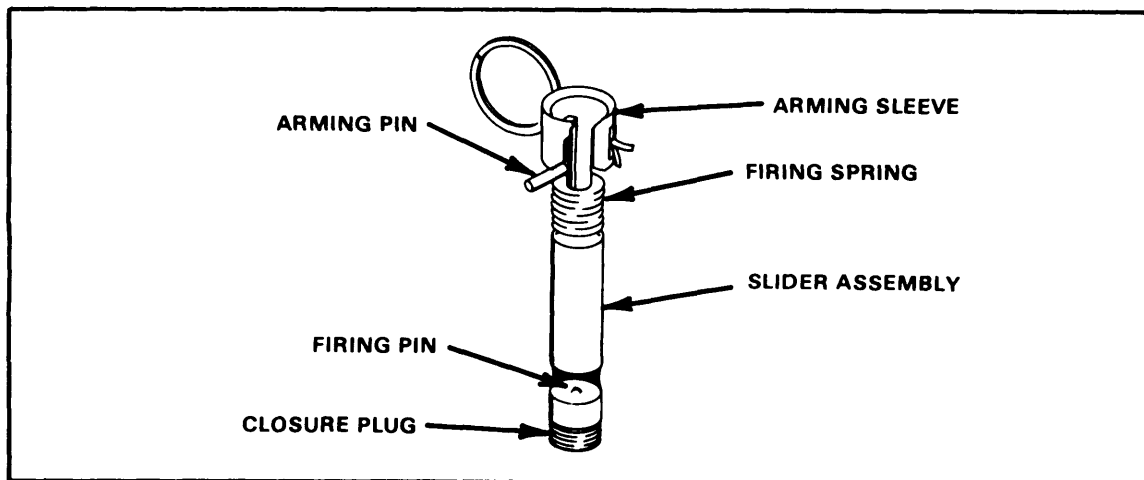


Figure 1-6. C12 integral fuze.

b. Igniting. Igniting fuzes are designed for use with chemical hand grenades. They burn at high temperatures and ignite the chemical filler.

(1) M201A1 fuze (Figure 1-7). This fuze is designed for use with the AN-M8HC white-smoke grenade, the AN-M14 TH3 incendiary grenade, and the M18 colored-smoke grenade. This fuze is interchangeable with any standard firing device. The fuze function is described in

paragraph 1-4. The time delay element is a powder train requiring 1.2 to 2 seconds to burn to the igniter. The igniter ignites the filler or a pyrotechnic starter with a violent burning action and forces the filler to be expelled from the grenade body.

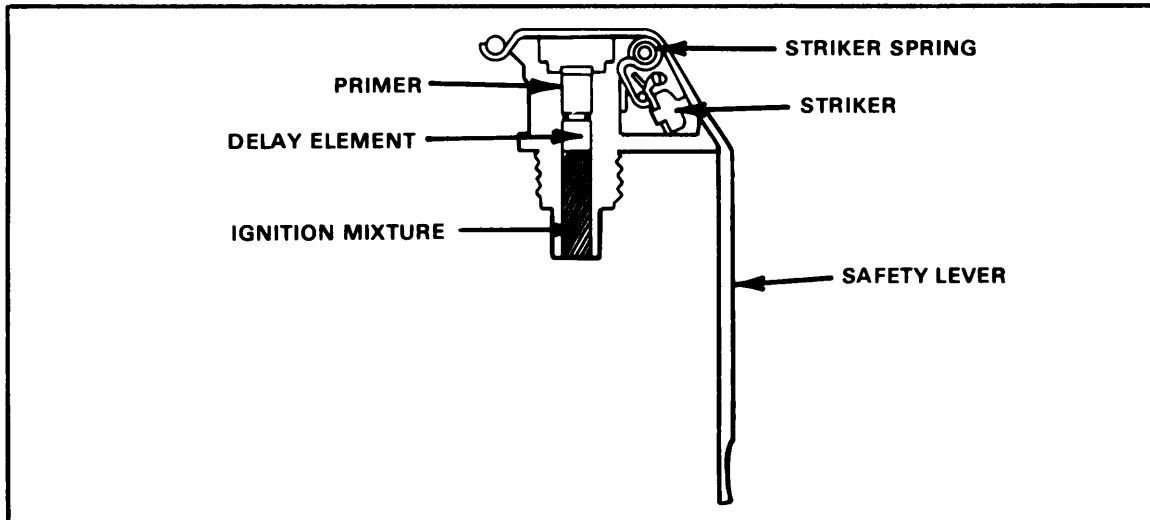


Figure 1-7. M201A1 fuze.

(2) M228 fuze (Figure 1-8). This fuze is used with the M62 and M69 practice hand grenades to replicate the fuze delay of the M67 fragmentation hand grenade. The time delay element is a powder train with a 4- to 5-second burn time. The igniter then induces the explosion of a black powder charge.

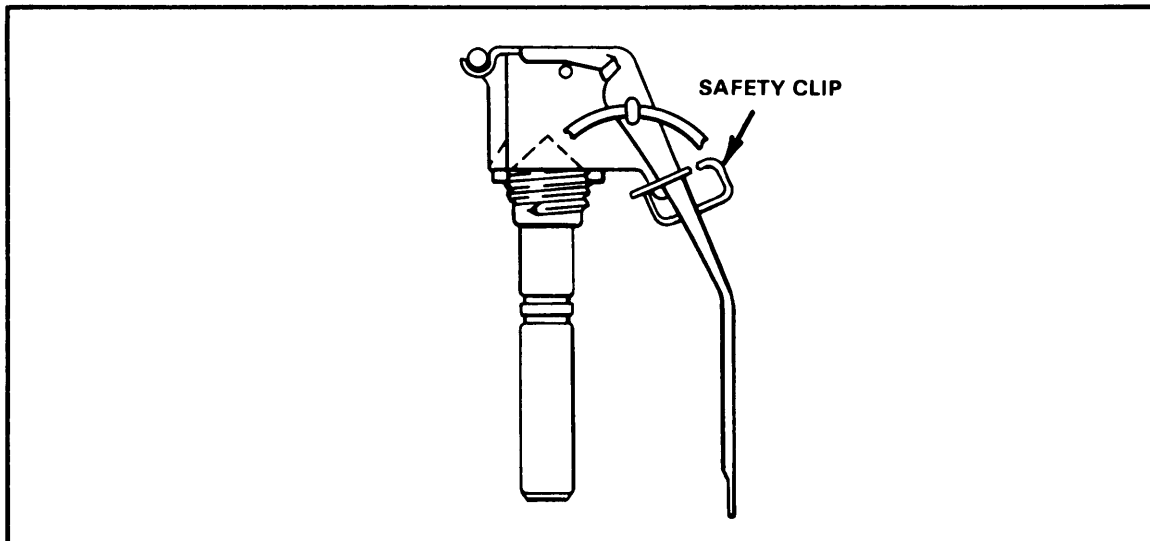


Figure 1-8. M228 fuze.

## 1.5 FRAGMENTATION HAND GRENADES

### a. M61 (Figure 1-9).

(1) Body -- thin sheet metal. Fragments are produced by a serrated wire coil fitted to the inside of the grenade body.

(2) Filler -- 5.5 ounces of Composition B.

(3) Fuze -- M204A1 or M204A2.

(4) Weight -- 16 ounces.

(5) Safety clip -- yes, see paragraph 1-3.

(6) Capabilities -- can be thrown 40 meters by average soldier. The effective killing radius is 5 meters and the effective casualty-producing radius is 15 meters.

(7) Color/markings -- olive drab body with a single yellow band at the top. Nomenclature and or lot number markings are in yellow.

**WARNING** ALTHOUGH THE KILLING RADIUS IS 5 METERS AND THE CASUALTY PRODUCING RADIUS OF THIS GRENADE IS 15 METERS, FRAGMENTS CAN DISPERSE AS FAR AWAY AS 230 METERS

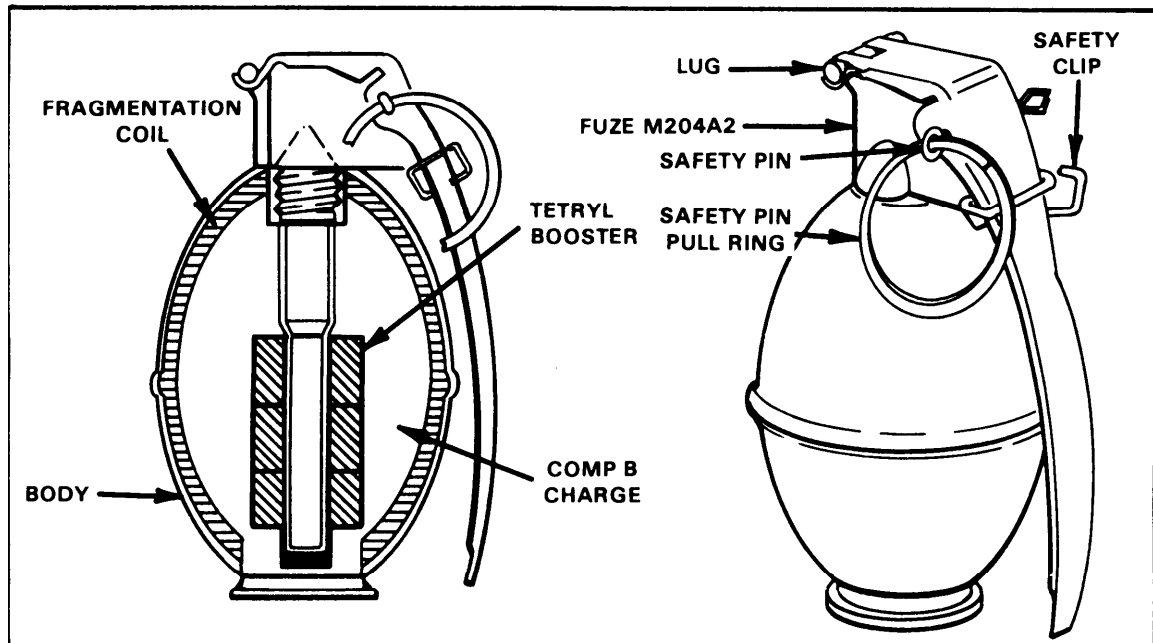


Figure 1-9. M61 fragmentation grenade.



b. M67 (Figure 1-10).

(1) Body -- steel sphere.

(2) Filler -- 6.5 ounces of Composition B.

(3) Fuze -- M213.

(4) Weight -- 14 ounces.

(5) Safety clip -- yes, see paragraph 1-3.

(6) Capabilities -- can be thrown 40 meters by average soldier. The effective casualty-producing radius is 15 meters.

(7) Color/markings -- olive drab body with a single yellow band at the top. Nomenclature and or lot number markings are in yellow.

**WARNING: ALTHOUGH THE KILLING RADIUS IS 5 METERS AND THE CASUALTY PRODUCING RADIUS OF THIS GRENADE IS 15 METERS, FRAGMENTS CAN DISPERSE AS FAR AWAY AS 230 METERS**

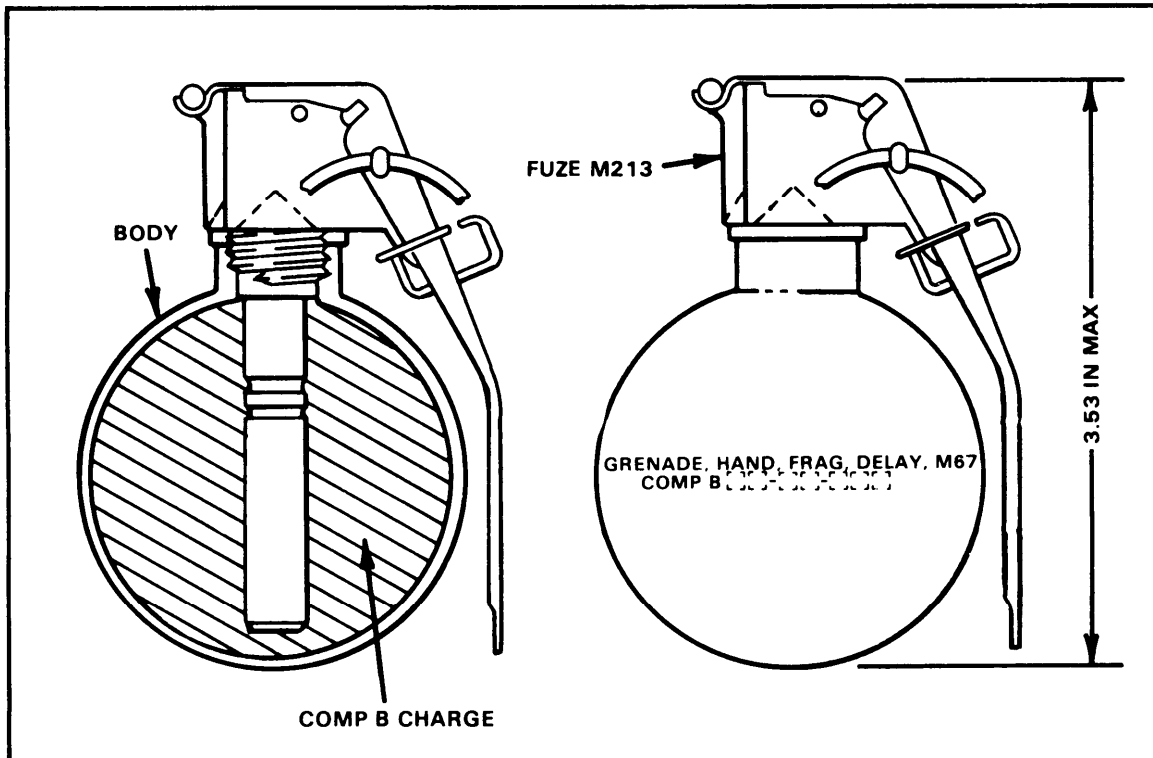


Figure 1-10. M67 fragmentation grenade.

## 1.6 CHEMICAL SMOKE HAND GRENADES

a. M15 White Phosphorous. The M15 grenade (Figure 1-11) is a bursting type grenade used for signaling, screening, and incendiary purposes.

(1) Body -- sheet metal.

(2) Filler -- 15 ounces of white phosphorus.

(3) Fuze -- M206A2.

(4) Weight -- 31 ounces.

(5) Capabilities -- the average soldier can throw the grenade 30 meters. The grenade has a bursting radius of 17 meters. All friendly personnel within this 17-meter area should be in a covered position to avoid being struck by burning particles. The WP filler burns for about 60 seconds at a temperature of 5,000 degrees Fahrenheit. This intense heat causes the smoke produced by the grenade to rise quite rapidly, especially in cool climates. This makes the M15 grenade less desirable for use as a screening agent.

(6) Color/markings -- grey with one yellow band and yellow markings.

(7) First aid -- treat burns caused by WP in the same way as ordinary burns (FM 21-11). If particles of WP are embedded in the flesh, immerse the wound in water or pack with wet cloths to halt combustion. Then pick out or squeeze out the WP. The particles will reignite spontaneously if allowed to dry. Apply copper sulphate solution to halt combustion of the WP particles. This permits them to be removed without igniting.

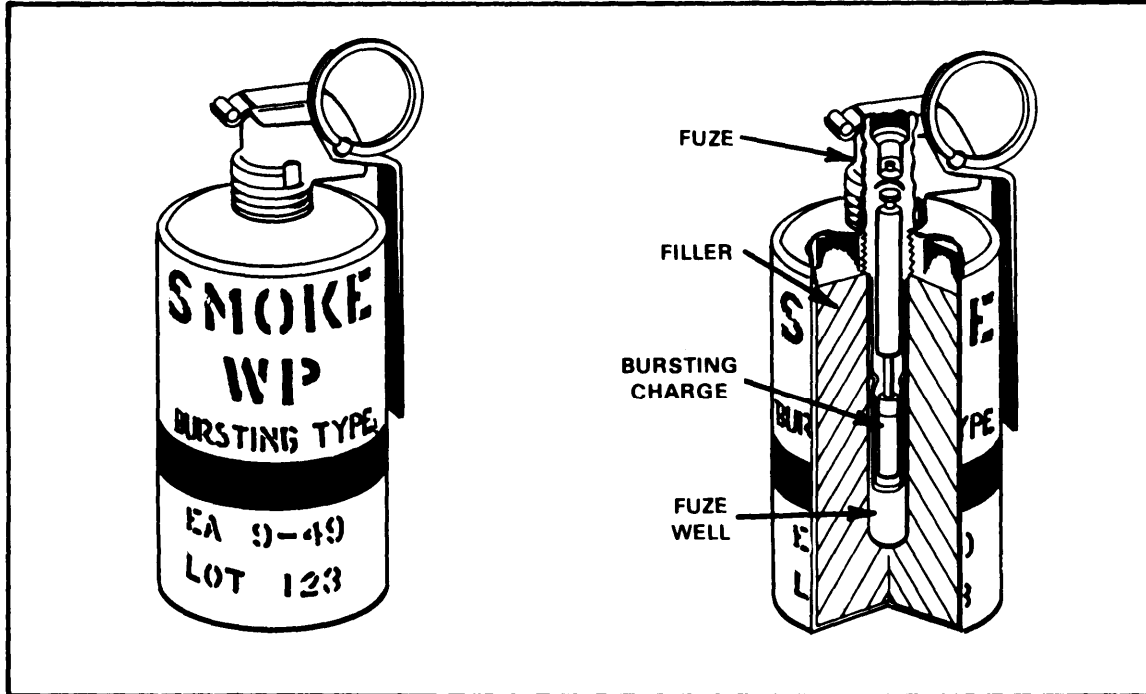


Figure 1-11. M15 WP smoke hand grenade.

b. AN-M8 HC White Smoke (Figure 1-12). This grenade is used to produce dense clouds of white smoke for signaling and screening.

- (1) Body -- sheet steel cylinder.
- (2) Filler -- 19 ounces of Type C, HC smoke mixture.
- (3) Fuze -- M201A1.
- (4) Weight -- 24 ounces.
- (5) Safety clip -- no.
- (6) Capabilities -- can be thrown 30 meters by average soldier. The grenade emits a dense cloud of white smoke for 105 to 150 seconds.
- (7) Color/markings -- light green body with black markings and a white top.

**WARNING: ANY DAMAGED AN M8 HC GRENADES THAT EXPOSE THE FILLER ARE HAZARDOUS EXPOSURE OF THE FILLER TO MOISTURE AND AIR COULD RESULT IN A CHEMICAL REACTION THAT WILL IGNITE THE GRENADE**

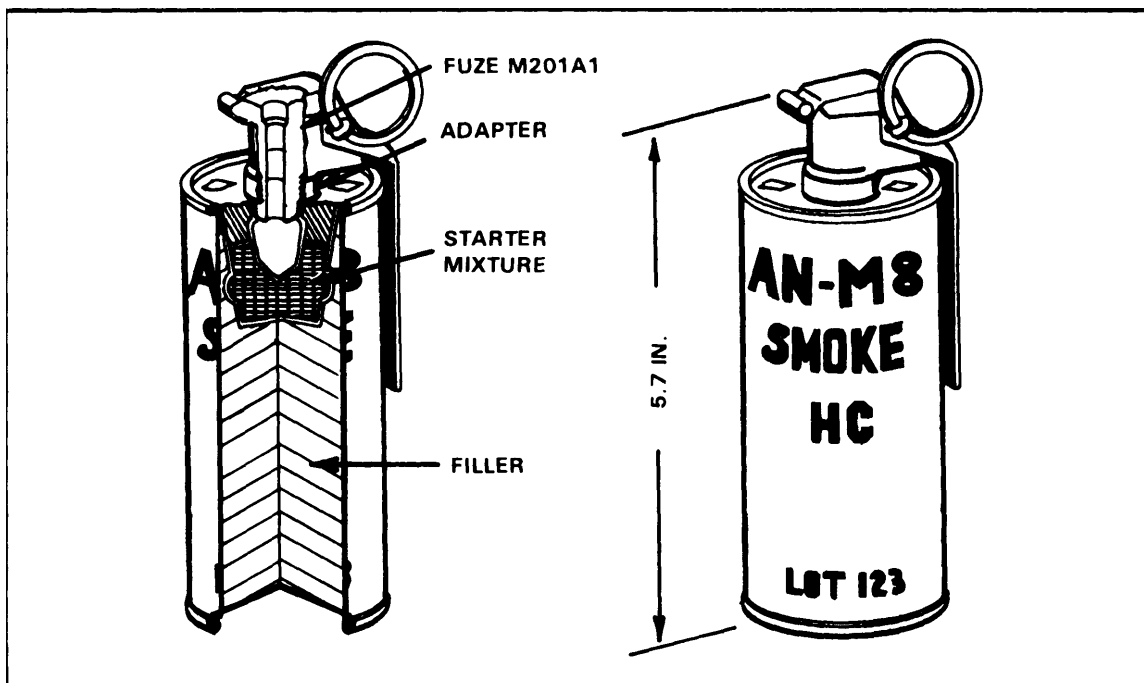


Figure 1-12. AN-M8 HC white smoke grenade.

**WARNING: THE AN M8 HAND GRENADE PRODUCES HARMFUL HYDROCHLORIC FUMES THAT IRRITATE THE EYES, THROAT, AND LUNGS IT SHOULD NOT BE USED IN CLOSED IN AREAS UNLESS SOLDIERS ARE WEARING PROTECTIVE MASKS**

c. M18 Colored Smoke (Figure 1-13). This grenade is used as a ground-to-ground or ground-to-air signaling device, a target or landing zone marking device, or a screening device for unit movements.

(1) Body -- sheet steel cylinder with four emission holes at the top and one at the bottom to allow smoke release when the grenade is ignited.

(2) Filler -- 11.5 ounces of colored smoke mixture (red, green, yellow, and violet).

(3) Fuze -- M201A1.

(4) Weight -- 19 ounces.

(5) Safety clip -- no.

(6) Capabilities -- can be thrown 35 meters by average soldier. The grenade produces a cloud of colored smoke for 50 to 90 seconds.

(7) Color/markings -- olive drab body with the top indicating the smoke color.

(8) Field expedient -- When employing the M18 or AN-M8 HC hand grenade, it may be desirable to use one of these grenades without the fuze. To do this, the following procedure should be used in combat only:

- o Remove the tape from grenade bottom to expose the filler.
- o Remove the fuze by unscrewing it from the grenade.
- o Ignite starter mixture with open flame.
- o Immediately throw the grenade to avoid burn injury.

**WARNING: WITH BOTH THE AN M8 AND AN-M18, THERE IS DANGER OF STARTING A FIRE IF USED IN A DRY AREA**

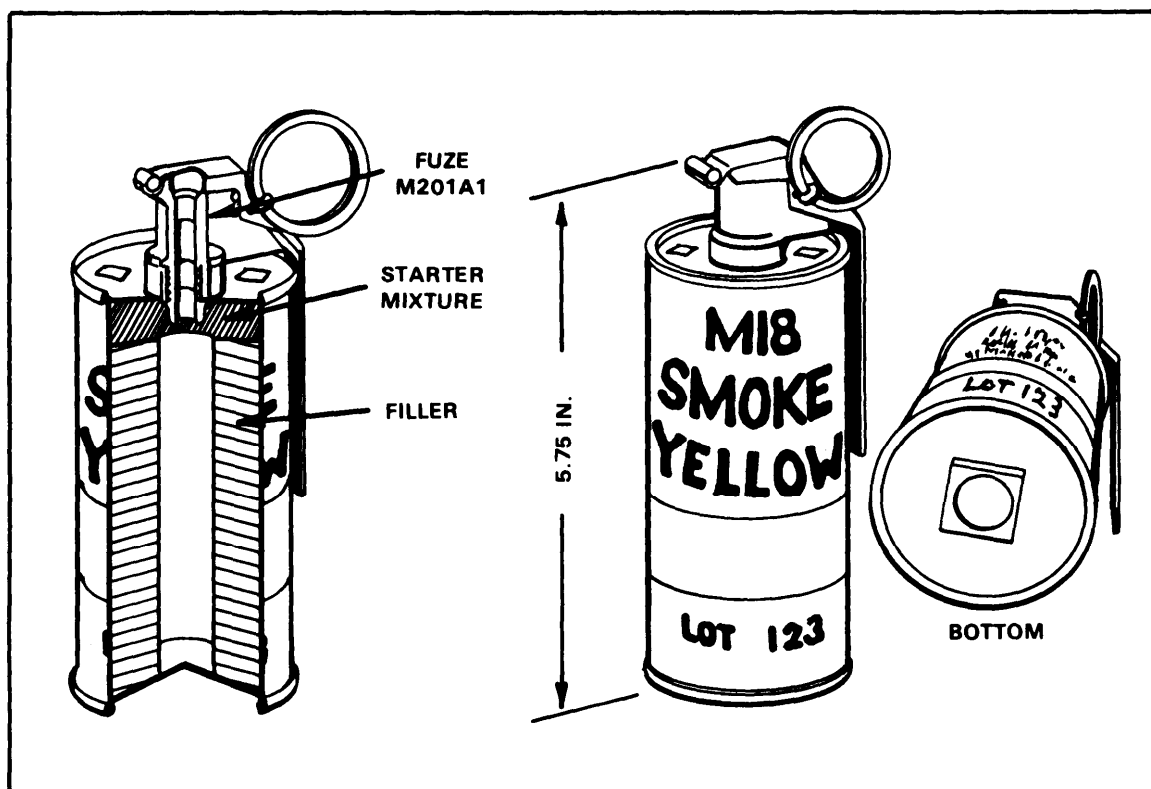


Figure 1-13. M18 colored smoke grenade.

## 1.7 RIOT CONTROL HAND GRENADES

a. ABC-M7A2 and ABC-M7A3 CS (Figure 1-14). The ABC-M7A2 and the ABC-M7A3 riot control hand grenades contain only CS as a filler. They differ only in the amount of filler and the form of the CS they contain.

(1) Body -- the bodies of both grenades are sheet metal with four emission holes at the top and one at the bottom.

(2) Filler -- 5.5 ounces of burning mixture and 3.5 ounces of CS in gelatin capsules in the ABC-M7A2 grenade, and 7.5 ounces of burning mixture and 4.5 ounces of pelletized CS agent in the ABC-M7A3 grenade.

(3) Fuze -- M201A1, see paragraph 1-4.

(4) Weight -- approximately 15.5 ounces.

(5) Safety clip -- no.

(6) Capabilities -- can be thrown 40 meters by average soldier. Both grenades produce a cloud of irritant agent for 15 to 35 seconds.

(7) Color/markings -- gray body with a red band and red markings.

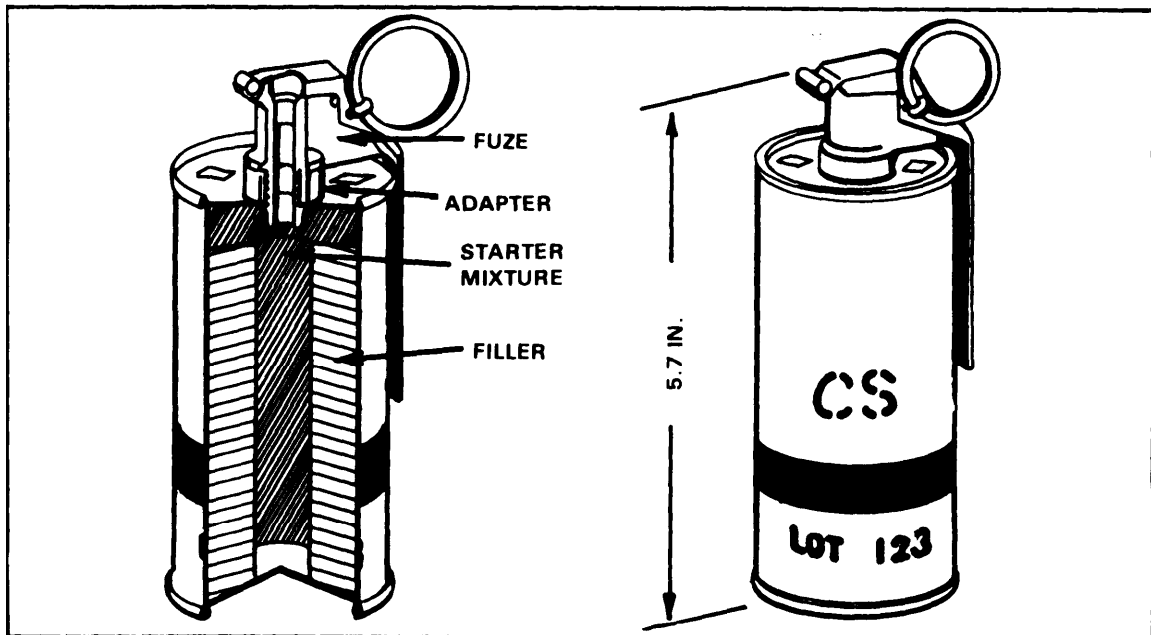


Figure 1-14. ABC-M7A2 and ABC-M7A3 riot control grenades.

**WARNING: FRIENDLY FORCES SHOULD PUT ON PROTECTIVE MASKS BEFORE THROWING THESE GRENADES**

b. ABC-M25A2 (Figure 1-15). The ABC-M25A2 riot control hand grenade is a bursting munition with an integral fuze. The M25A2 grenade is an improved version of the M25A1 grenade. The two grenades differ primarily in body construction.

- (1) Body -- compressed fiber or plastic.
- (2) Filler -- CS1 varies in weight and composition according to the type of agent contained in the grenade. All fillers are mixed with silica aerogel for increased dissemination efficiency.
- (3) Fuze -- integral, see paragraph 1-4.
- (4) Weight -- 8 ounces.
- (5) Safety clip -- no.
- (6) Capabilities -- can be thrown 50 meters by average soldier. The radius of burst (visible cloud agent) is about 5 meters, but grenade fragments may project as far as 25 meters.
- (7) Color/markings -- gray body with red band and red markings.

**WARNING: FRIENDLY FORCES SHOULD PUT ON PROTECTIVE MASKS BEFORE THROWING THESE GRENADES**

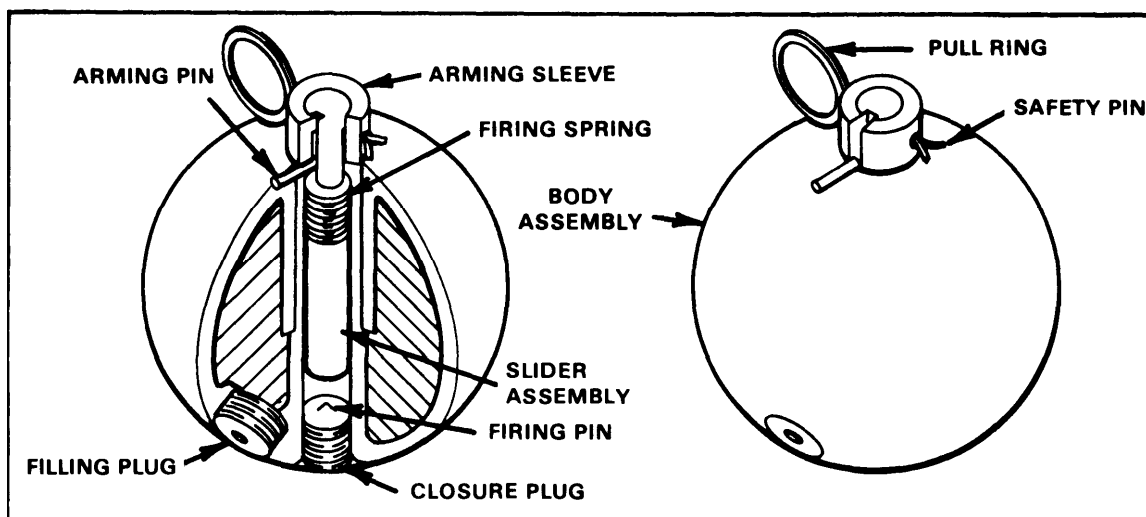


Figure 1-15. ABC-M25A2 riot control grenade.

1-8. SPECIAL-PURPOSE HAND GRENADES

a. Incendiary (Figure 1-16). The AN-M14 TH3 incendiary hand grenade is used to destroy equipment. It can damage, immobilize, or destroy vehicles, weapons systems, shelters, or munitions. The grenade may also be used to start fires in areas containing flammable materials.

(1) Body -- sheet metal.

(2) Filler -- 26.5 ounces of thermate (TH3) mixture.

(3) Fuze -- M201A1, see paragraph 1-4.

(4) Weight -- 32 ounces.

(5) Safety clip -- no.

(6) Capabilities -- can be thrown 25 meters by average soldier. A portion of the thermate mixture is converted to molten iron, which burns at 4,000 degrees Fahrenheit. It will fuze together the metallic parts of any object that it contacts. Thermate is an improved version of thermite, the incendiary agent used in hand grenades during World War II. The thermate filler of the AN-M14 grenade burns for 40 seconds and can burn through a 1/2-inch homogeneous steel plate. It produces its own oxygen and will burn under water.

(7) Color/markings -- gray with purple markings and a single purple band (current grenades). Under the standard color-coding system, incendiary grenades are light red with black markings.

**WARNING: AVOID LOOKING DIRECTLY AT THE INCENDIARY GRENADE AS IT BURNS.  
THE INTENSITY OF THE LIGHT IS POTENTIALLY HAZARDOUS TO THE  
RETINA**



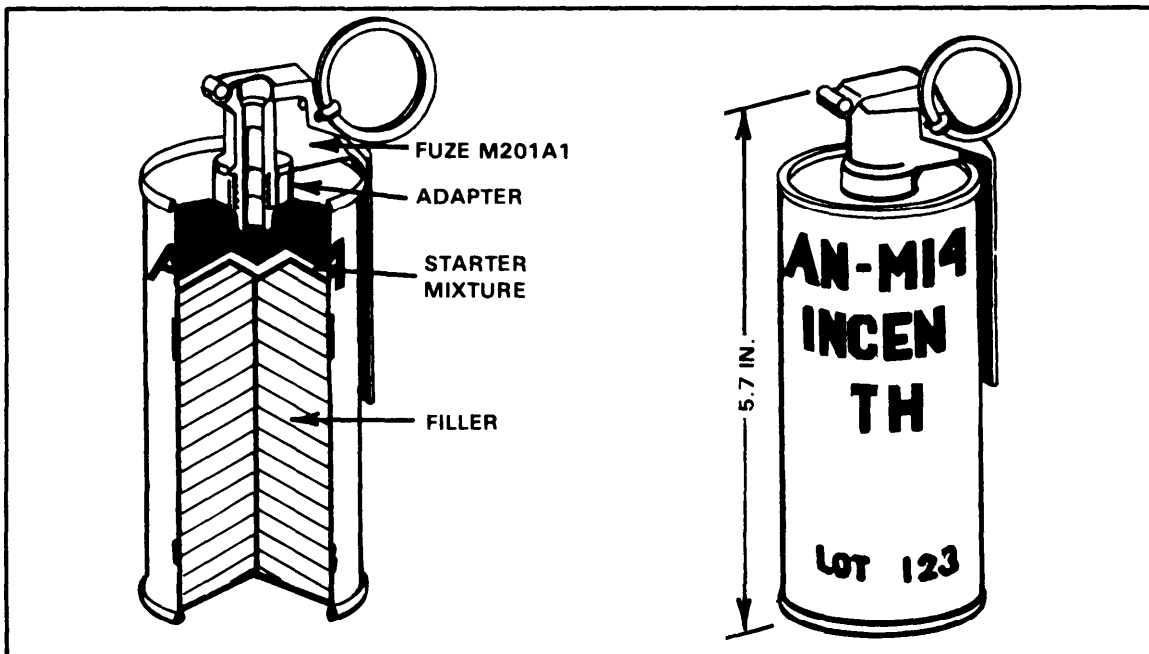


Figure 1-16. AN-M14 TH3 incendiary grenade.

b. Offensive (Figure 1-17). The MK3A2 offensive hand grenade, commonly referred to as the concussion grenade, is designed to produce casualties during close combat while minimizing danger to friendly personnel. The grenade is also used for concussion effects in enclosed areas, for blasting, or for demolition tasks. The shock waves (overpressure) produced by this grenade when used in enclosed areas are greater than those produced by the fragmentation grenade. It is, therefore, very effective against enemy soldiers located in bunkers, buildings, and fortified areas.

- (1) Body -- fiber (similar to the packing container for the fragmentation hand grenade).
- (2) Filler -- 8 ounces of TNT.
- (3) Fuze -- M206A1 or M206A2, see paragraph 1-4.
- (4) Weight -- 15.6 ounces.
- (5) Safety clip -- yes, see paragraph 1-3.
- (6) Capabilities -- can be thrown 40 meters by average soldier. The MK3A2 has an effective casualty radius in open areas of 2 meters. Secondary missiles and bits of fuze may be projected as far as 200 meters from the detonation point.

(7) Color/markings -- black with yellow markings around its middle.

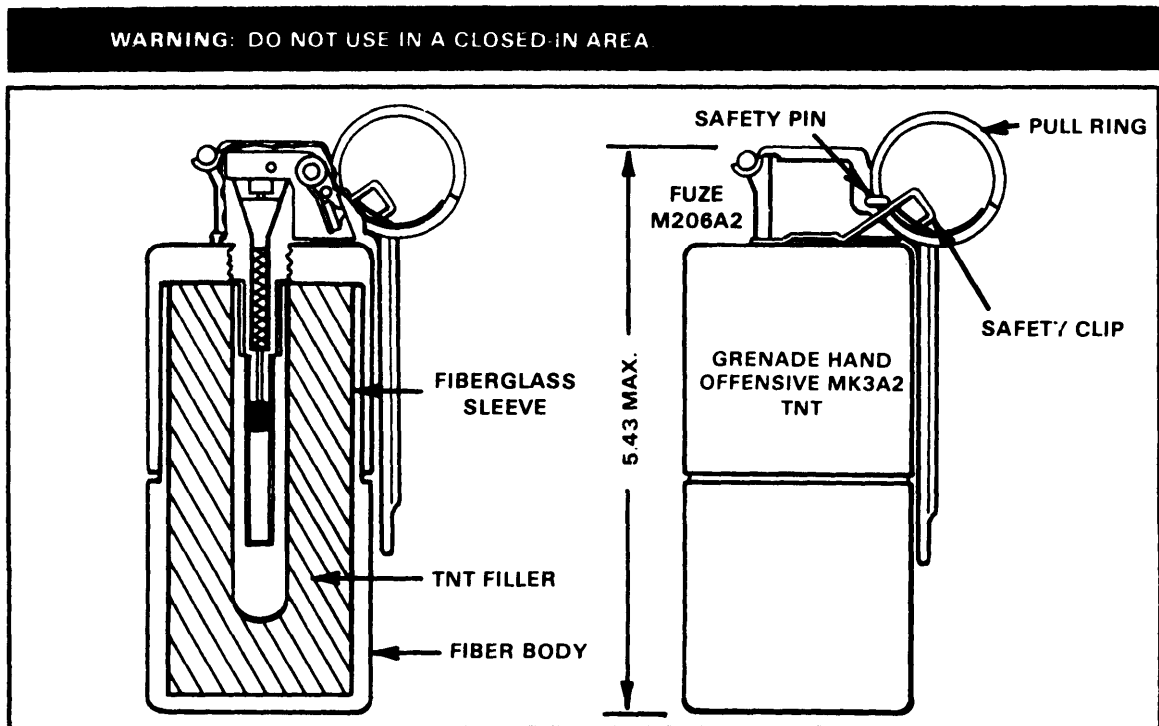


Figure 1-17. MK3A2 offensive grenade.

c. Practice (Figure 1-18). the M69 practice hand grenade simulates the M67-series of fragmentation hand grenades for training purposes. The grenade provides realistic training and familiarizes the soldier with the functioning and characteristics of the fragmentation hand grenade.

- (1) Body -- steel.
- (3) Fuze -- M228, inserted into grenade body.
- (4) Weight -- 14 ounces.
- (5) Safety clip -- yes.
- (6) Capabilities -- can be thrown 40 meters by average soldier. The M69 grenade emits a small puff of white smoke after a delay of 4 to 5 seconds and makes a loud popping noise. The grenade body can be used repeatedly by replacing the fuze assembly.
- (7) Color/markings -- light blue with white markings. The safety lever of the fuze is light blue with black markings and a brown tip.

**WARNING: FUZE FRAGMENTS MAY EXIT THE HOLE IN THE BASE OF THE GRENADE BODY CAUSING INJURIES**

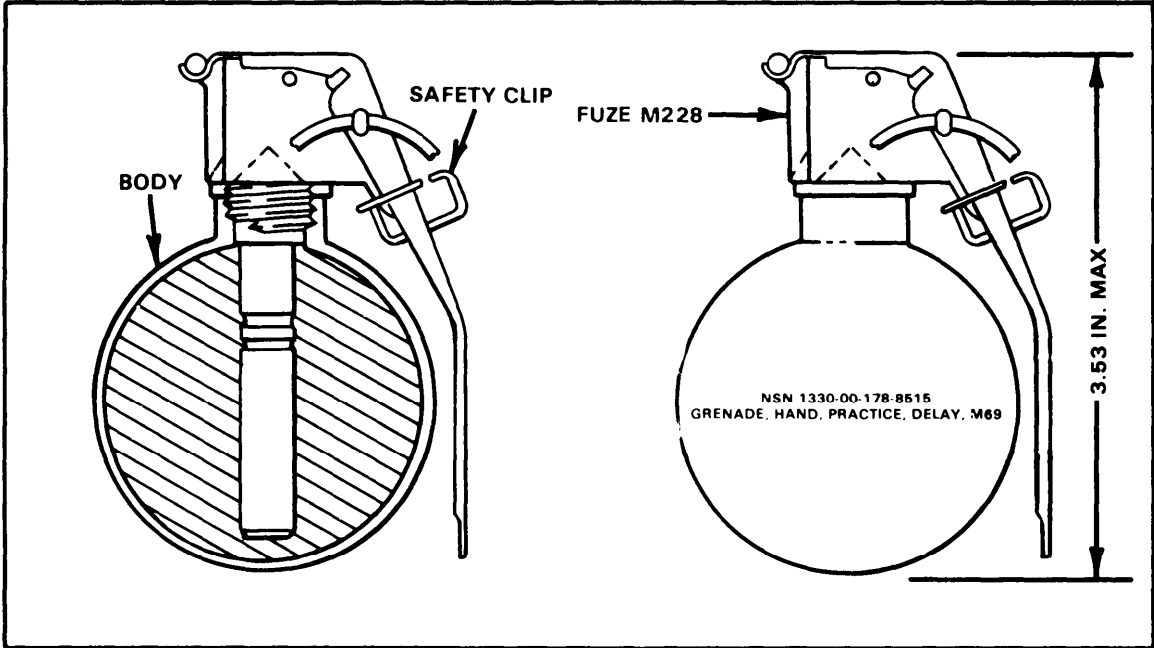


Figure 1-18. M69 practice grenade.